

STEEL

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Contents . . February 17, 1936

Volume 98 - No. 7

As the Editor Views the News	13
Del Monte Conference Backs Steel House	14
Continuous Mills Since 1926 Cost \$200,000,000	14
Steel Complying with Social Security Act	15
Financial News of the Steel Industry	18
Windows of Washington	19
Steelmaking Operations for the Week	21
Mirrors of Motordom	22
Men of Industry	24
Obituary	26
35,000,000 Tons Is Estimate of 1936 Iron Ore Shipments	27
Petroleum and the Metalworking Industries— <i>Editorial</i>	29
The Business Trend—Charts and Statistics	30
Metallurgy of Transmission Gears—I	32
Press Accidents Reduced by Safety in Die Design	38
Power Drives	40
Surface Treatment and Finishing	44
Methods and Materials	48
Light-Polarizing Glass, a New Development	48
Conference Discusses Superheated Cast Iron	51
Welding, etc.— <i>Robert E. Kinkead</i>	53
Forum on Modernization	54
Parade of Progress in Pictures	56
Progress in Steelmaking	59
New Equipment Descriptions	62
Review of Trade Publications	65
Market Reports and Prices	67-87
New Construction and Incorporations	89
Index to Advertisements	98

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As the Editor Views the News

TODAY the business world is watching the spectacle of a curious reversal in the recent trends of two major divisions of industry. The automobile industry, which dominated a large part of the nation's activity in 1935, is in a period of declining production, which may continue for several weeks. Meantime, the heavy goods industries, which were sluggish during most of last year, are coming back to life. In fact, developments of the past week indicate that reviving activity in capital goods (p. 67) may offset to a considerable extent the lack of the customary strong support from the motor car industry.

The result of this simultaneous rise and fall in two important sectors of activity is a fairly strong situation in business generally. Steel operations are at the highest point touched thus far in 1936. Freight traffic is moving in good volume and here and there are renewed signs of difficulty in obtaining cars of certain types. This situation gives point to the recent increase in the purchase of equipment by the railroads. Keeping in mind this picture of activity at home, it is interesting to note that in Great Britain (p. 85) steel ingot output in January was the second highest in the history of British steel.

A Chicago psychologist startled his listeners at the recent convention of the American Management association by declaring that 20 to 30 per cent of employes suffer from mild mental aberrations. The symptoms of this condition, he explained, are "seclusiveness or a tendency to day-dreaming, insubordination, chronic ill health without organic basis, over-suspiciousness of associates and superiors, over sensitivity to slights, and over-tendency to errors and accidents." Among executives, he said, the symp-

toms are "pedantry, cruelty to subordinates and extreme stinginess." We venture the opinion, that every personnel director and many other alert observers in industry will agree that the Chicago doctor is more right than wrong in his diagnosis. The condition he describes has played havoc with morale in many units of industry. Fortunate is the company whose officers know how to keep its employes happy and contented.

Industrial safety probably has been affected by what may be termed "depression nerves," but a Detroit safety expert cites another factor.

Building Safety Into Dies

He believes that the rush nature of work in sheet stamping plants (p. 38) tends to cause management to neglect to provide for safety when designing dies for stamping. He shows practical methods for incorporating safety provisions into dies when they are in the process of being designed A recently developed light-polarizing glass (p. 48) promises to extend the principle of strain-testing, which has been applied to engineering structures One of the recent interesting applications of hard facing (p. 50) involved the use of stellite on the teeth of cylindrical caissons on an important engineering project.

Being engaged in the business of disseminating information, we were particularly interested in the action of the Supreme Court last Monday in upholding the principle of free speech. "The newspapers, magazines and other journals of the country," said Mr. Justice Sutherland, "have shed and continue to shed more light on the public and business affairs of the nation than any other instrumentality of publicity A free press stands as one of the great interpreters between the government and the people. To allow it to be fettered is to fetter ourselves." That last sentence may become classic. All of us should try to remember it whenever we are provoked because we think an author or editor has abused the right of free expression.

E. L. Shaner

Del Monte Group Backs Steel House; Urges U. S. Economy

Del Monte, Calif.

A RECORD breaking attendance of almost 400 at the twelfth annual conference of the Iron, Steel and Allied Industries of California, held here Feb. 6-8, heard the steel frame house lauded as a potential outlet of great magnitude for steel, and adopted a resolution setting up a committee of nine to further it.

The conference, at which were represented steel mills, reinforcing and merchant steel bar jobbers, foundries, tubular goods distributors, traffic managers, purchasing agents, and other factors of the iron and steel industry, also heard Walter S. Tower, executive secretary of the American Iron and Steel institute, New York, estimate \$200,000,000 as the outlay of the industry for modernizing its equipment and adding new finishing capacity—although no more raw steel capacity—in 1936. (See STEEL, Feb. 10, p. 15)

Other speakers included James A. Emery, general counsel, National Association of Manufacturers, Washington; J. D. Fenstermacher, Columbia

Steel Co., San Francisco; H. J. Bennett, Columbia Steel Co., San Francisco; E. L. Soule, Soule Steel Co., San Francisco; E. F. Watkins, Southern California Edison Co., Los Angeles; and C. B. Tibbetts, Los Angeles Steel Castings Co., Los Angeles.

The presiding officers—chairman, W. W. Glosser, Hubbard & Co., Emeryville, Calif.; vice chairman E. H. McGinnis, Union Hardware & Metal Co., Los Angeles; and secretary, Charles H. Knight, California state chamber of commerce, San Francisco—were unanimously re-elected.

Stimulating great enthusiasm for steel home construction and urging that it be popularized, Mr. Watkins pointed out that steel and electricity together had made magnificent strides in improving the standard of construction in the great cities in the past generation, but that private housing lags behind the standards of colonial days.

The downtown office building, the church, the theatre, great bridges, power lines, pipe lines, subways—not one of these magnificent examples of construction would have been possible in the colonial days, Mr. Watkins pointed out. In this connection, he said further:

"Then take a look at the stand-

methods for single dwelling throughout the nation. And what do we find? Steel has hardly participated at all to date in this phase of the construction industry, and electricity has just made a beginning.

"We find that the average residence built in colonial days in America was better constructed than the average residence being built today. You are all familiar from your own experience with the fact that there are thousands of houses being built now which will become a source of annoyance and expense to the occupants throughout future years: roofs leak, casements leak, door frames sag, windows jam and rattle, bathrooms settle, tile cracks, floors and stairs squeak, plaster cracks, they are insufferably hot and stuffy in summer and a burden to keep warm in winter, termites get into the woodwork, and fire burns down from 50,000 to 100,000 each year.

United Front Needed

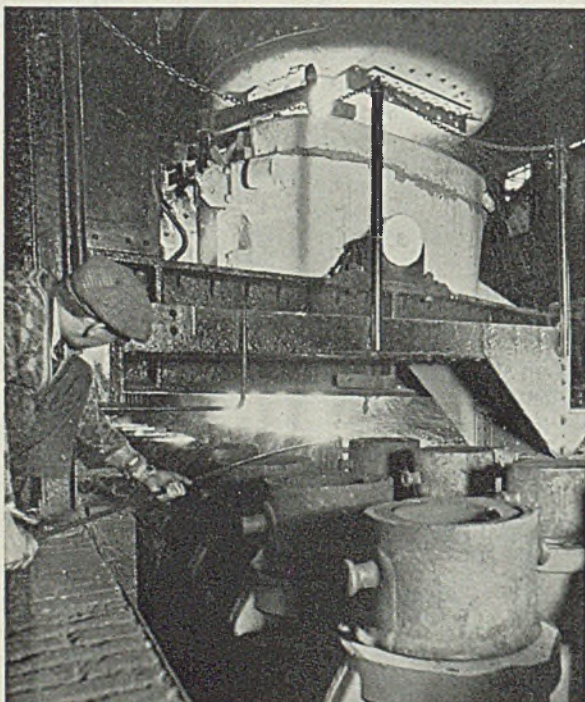
"That part of the construction industry engaged in residence building has no leadership. The units are obsessed with the price complex to such an extent that they have practically educated the prospective home builder into a point of view where price alone governs most of his decisions. It is a disgrace to this branch of the construction industry that they persist with the same inherent faults in materials used, methods and technique, repeating the same old faulty practices of the past. It is a pity that there does not exist in this branch of the construction industry some present impelling force that will drive on toward real outstanding betterments.

"I wish to lay down a challenge here to the steel industry to take hold of this branch of construction and offer the leadership which it has demonstrated that it possesses, to inject into residence construction the same great beneficial improvements that it has brought to commercial and industrial construction.

"With the exception of a few building materials and specialties which have been developed from time to time, the prevailing methods and technique of residence construction involve no substantial element of progress. After studying the record I am convinced that it is quite safe to assume that there will be no outstanding improvement in these standards until steel assumes the leadership, bringing with it into the picture the great technological co-operation which it has built up through science and engineering to produce a safer, a more comfortable, a more substantial, and in every respect better home.

"I am not in sympathy with the proponents of the idea that steel will make no progress in its entry into the home construction field until it can produce a house on a comparable price basis with those being built by other methods and with other materials. That question of comparable first costs will work itself out in the normal way as the automobile, the electric refrigerator, the radio and many other products have worked

Automobiles in Embryo



Here, in the open-hearth steel works at the Rouge plant of the Ford Motor Co., in Dearborn, Mich., molten metal is being poured from a giant ladle into ingot molds—one of the intermediate steps in the making of steel for the new 1935 Fords. Four molds are filled at one operation.

out, as public acceptance and demand have resulted in volume production.

"If my experience is worth anything in formulating an accurate opinion on the main problem confronting the industry today, it has brought me to this principal conclusion: That no major success will accrue to any one of the fifty or more individuals and concerns now engaged in selling their individual types or parts of steel houses until they themselves can forget or will forget their own individual pride of ownership in their particular patents or ideas, and pool their interests with the mills and the distributors throughout the country in one great forward industrial movement to introduce and popularize to the American people the many superior advantages inherent in a well designed modern steel frame dwelling."

Mr. Bennett, also driving home on the steel house matter, pointed out that the principal sales points in favor of the use of steel in home construction are that steel can bring to these smaller buildings the same advantages of rigidity, freedom from shrinkage with resulting plaster and other unsightly cracks, fire safety, lightning protection and immunity to attack by termites and vermin, that it does now to skyscrapers.

Continuing, he stated that the immunity to steel frame houses on the Pacific coast to termite attack was more important than all other factors due to the inroads made by these insects in the destruction of wood frame residences.

Advocates More Publicity

He recommended that the steel industry, as a whole, join in concerted action in publicizing its advantages and that newspaper and magazine publicity be used in covering each steel frame house under construction, particularly in the district in which the house is being constructed in order to give the interested public an opportunity to inspect the frame.

The steel house committee set up by the conference consists of three men to represent the mills in California, three to represent the California fabricators, and three the distributors, the committee being authorized to develop a plan of procedure which will obtain the active participation of the steel industry throughout the country in promoting better homes built around steel.

Other resolutions adopted by the conference put it on record as "favoring every possible economy in the spending of federal funds on public works projects by the elimination of present wasteful and inefficient methods and practices," and denouncing the labor handicaps imposed by unions on Pacific coast shipping.

Chairman Glosser, in opening the convention, urged the delegates to carefully consider the adoption of a policy which would determine between price stabilization at pre-deter-

mined fixed levels, which tends always to hold the market at relatively higher levels, or the policy based upon scientific and consistent price reduction. He favored the latter.

Reopens Brazilian Mines

United States Steel Corp. is resuming the production of manganese in Brazil, after four years' suspension.

Sees Record Scrap Year

Darwin S. Luntz, president, Institute of Scrap Iron and Steel Inc., at a recent meeting of the Cincinnati chapter predicted that the scrap iron industry is entering into a period of prosperity that will be equal to if not greater than that of 1929.

Industry Complies With Security Act

ALTHOUGH they are uncertain as to the constitutionality of the federal social security act, iron and steel manufacturers are beginning to set up separate records of employes and wages, so as to comply with its provisions.

As pointed out in STEEL (Jan. 13, page 10) the unemployment feature, requiring a 1 per cent tax on payrolls this year will mean a collection of no less than \$6,000,000 from the steel industry. The tax will be 2 per cent in 1937, and 3 per cent in 1938 and thereafter, unless the

Officers Chosen at Del Monte by Iron, Steel and Allied Industries of California

Executive Committee and Officers Elected For Coming Year

Chairman.....W. W. Glosser, Hubbard & Co., Emeryville, Calif.
Vice-Chairman.....E. H. McGinnis, Union Hardware & Metal Co., Los Angeles
Secretary..Chas. H. Knight, California State Chamber of Commerce, San Francisco

EXECUTIVE COMMITTEE

Northern California

Southern California

REINFORCING STEEL JOBBERS

R. G. Falk, W. C. Hauck & Co.,
San Francisco
C. M. Gunn, Gunn, Carle & Co.,
San Francisco

N. E. Dawson, Soule Steel Co., Los Angeles
Wm. A. Godshall, Blue Diamond Corp.,
Los Angeles

MERCHANT STEEL JOBBERS

G. W. Boole, A. M. Castle & Co.,
San Francisco
H. M. Tayler, Tayler, Spotswood Co.,
San Francisco

Harold E. Howard, Ducommun Metals &
Supply Co., Los Angeles
Donald Priest, Los Angeles Heavy Hard-
ware Co., Los Angeles

TUBULAR

F. F. Elliott, Crane Co., San Francisco

J. A. Crawford, Republic Supply Co.,
Los Angeles

STEEL MILLS

William A. Ross, Columbia Steel Co.,
San Francisco

P. W. Cotton, Bethlehem Steel Corp.,
San Francisco

FOUNDRIES

C. M. Henderson, H. M. Macaulay
Foundry, Berkeley, Calif.
Charles P. Hoehn, Enterprise Foundry
Co., San Francisco

C. B. Tibbetts, Los Angeles Steel Casting
Co., Los Angeles
C. A. Stilson, Metal Trades Manufactur-
ers' association, Los Angeles

PURCHASING AGENTS

F. P. Summers, Standard Oil Co.,
San Francisco
A. J. MacLean, Utah Copper Co.,
San Francisco

E. F. Watkins, Southern California
Edison Co., Los Angeles
W. H. Jackson, Axelson Manufacturing
Co., Los Angeles

TRAFFIC

T. E. Banning, Columbia Steel Co.,
San Francisco

T. A. L. Loretz, Consolidated Steel
Corp., Los Angeles

MANUFACTURERS

Salem Pohlman, California Wire Cloth
Co., Oakland, Calif.
J. M. Culverwell, Kortick Manufacturing
Co., San Francisco

A. E. Hitchner, Westinghouse Electric
& Mfg. Co., Los Angeles
H. Detrick, Josslyn Manufacturing Co.,
Los Angeles

STRUCTURAL SHOPS

P. F. Gillespie, Judson Pacific Co.,
San Francisco
Charles E. Spencer, Bethlehem Steel
Corp., San Francisco

A. Neuffer, Bethlehem Steel Corp.,
Los Angeles
A. G. Roche, Consolidated Steel Corp.,
Los Angeles

act later is held unconstitutional.

Contrary to some reports and opinions, according to tax experts in the industry who have been watching the situation closely, no effort has been made anywhere to obtain a court decision on the federal law.

The reason is that so far "no one has been hurt", and therefore cannot base a complaint. The tax will not be collected until the close of the year. When the returns are due, an employer could refuse to pay and thus have his reasons reviewed by a court.

The only alternative that some lawyers have been able to figure, to obtain a test as speedily as possible, would be for an employer to dismiss an employe on the ground that he could not pay the tax, and then to have the employe sue him. No employer apparently has wanted to take the initiative.

Despite the fact that the federal act provides that 90 per cent of the tax paid by an employer shall be placed to his credit, through state channels, when his state passes a "conformity" bill, many employers do not want their states to pass such bills.

See State Acts Upheld

The reason is that they do not want a state to pass such a law when the federal act might be held unconstitutional and the state act might be declared valid. Hearings before state legislative committees indicate that they do not want to be bound by a state law, based entirely on an unconstitutional federal law. In Wisconsin, the state conformity law has been declared constitutional. Its provisions, closely following the federal security pattern, will remain in effect, regardless of how the United States Supreme Court may rule on the federal act.

The Social Security board, Washington, created under the act, has issued a pamphlet in which it stresses the advantages to be gained by the states in passing conformity bills. It says:

"The federal tax will bring money into the general treasury, for the general purposes of the government.

"This means that a state which passes an unemployment compensation law will be able to keep nine-tenths of this payroll tax at home . . . Nor will the state which acts promptly be at any competitive disadvantage with other states, for employers in states which do not act will have their payrolls levied upon in any event.

"The difference between the states which pass unemployment compensation laws and those which do not, then, is simply that the state which acts will get the benefit of the payroll levy, while the state which does not act will not get this benefit.

"Nine states and the District of

Columbia, where employers provide more than a third of the entire payroll of the country, now have unemployment compensation laws. In many other states bills proposing such laws are being introduced in legislatures now convening. The success of the federal social security act as a means of reducing the economic and social disturbances of unemployment will be dependent on the states. *There is no unemployment compensation for the commercial or industrial worker until his state has an approved law.*"

In any event, benefits will not begin before 1938, and they are limited to \$240 to one person in one year.

Continuous Mills Cost \$200,000,000

APPROXIMATELY \$200,000,000 will have been expended for continuous wide sheet and strip mills since 1926 when mills now authorized or in process of construction are completed, according to the American Iron and Steel institute. This expenditure represents overall costs of constructing 21 continuous 4-high mills with an aggregate capacity of 9,000,000 gross tons of hot-rolled sheets and strip annually.

Six are in Ohio, four each in Pennsylvania and Indiana, three in Michigan, two in Illinois, and one each in New York, and West Virginia. From 1926, when the first continuous 4-high mill went into operation, until the end of 1929 a total of eight continuous mills was built with a capacity of 3,000,000 tons. Since 1929 thirteen additional mills have been constructed or projected with a capacity of 6,000,000 tons.

Demand for continuous mill products has been relatively much stronger than for other steels the past six years. In the 6-year period 1924-29 total production of sheets and strip and black plate for tinning was 47,015,642 tons or approximately 22.5 per cent of all finished sheet produced in those years. During the 6-year period 1930-35 output amounted to nearly 35 per cent.

In 1935 output of sheets, strip and black plate is estimated at 10,700,000 tons, highest total yet produced. This tonnage is estimated to be over 52 per cent of the total finished steel output in that year.

J. & L. Stockholders OK Bonds for New Wide Mill

Stockholders of the Jones & Laughlin Steel Corp., at a special meeting in Pittsburgh Friday, approved the creation of a first mort-

gage of \$100,000,000 on the properties of the company, under which \$40,000,000 in bonds will be issued at this time to meet the expense of a continuous wide strip-sheet mill estimated to cost \$25,000,000, and \$15,000,000 for other capital expenditures at Aliquippa and the South Side plant, and to retire a present funded debt of \$5,248,000 outstanding from a \$25,000,000 issue in 1909. Considerable more than the required 50 per cent of the common and 75 per cent of the preferred stock approved the expansion plan.

The new mill will be let immediately, inasmuch as plans have been drawn. In anticipation of approval of its expansion program, the management of Jones & Laughlin has enlarged its personnel, as noted in STEEL for Feb. 10, page 25.

The new continuous strip-sheet mill will enable Jones & Laughlin to compete more vigorously in the market for consumers' goods, which has recovered more quickly than the market for durable or capital goods.

Bethlehem Vindicated in War Shipbuilding Profits

A master who has been weighing the disagreement between the federal government and the shipbuilding subsidiaries of the Bethlehem Steel Corp. announced a finding in Philadelphia last week that the government owes Bethlehem \$5,661,154, and that the government's claim of \$19,654,856 against Bethlehem should be dismissed.

Involved in the proceedings were profits made by Bethlehem and a policy prescribed by Charles M. Schwab, chairman of Bethlehem, and during the war general manager of the Emergency Fleet Corp. of the shipping board.

The litigation started in March, 1925, with Bethlehem asking for \$8,800,000 and the government counter-suiting for \$19,654,856. The finding is considered a vindication of Bethlehem and Mr. Schwab.

Plate Fabricators Re-elect

Steel Plate Fabricators association re-elected its officers and directors at the annual meeting held in Chicago, Feb. 11. Officers are: President, Merle J. Trees, Chicago Bridge & Iron Works, Chicago; vice president, W. H. Jackson, Pittsburgh-Des Moines Steel Co., Pittsburgh; treasurer, A. O. Miller, Petroleum Iron Works Co., Sharon, Pa. Tom R. Wyles is executive director.

The association has carried on as an industry since the termination of the NRA code and includes in its membership the major plate fabricating capacity of the country.

Housing

ARCY CORP., Empire building, Pittsburgh, which first broke into print about six weeks ago on reports that it would soon enter the steel housing field, is about to build five steel houses at Cleveland. Construction will start with the beginning of open weather. It is also planned to exhibit one of the company's patented steel houses at the Great Lakes exposition to be held at Cleveland this summer.

The Arcy Corp. was incorporated with \$5,000,000 stated capital as a holding company for a number of subsidiaries. The principal subsidiaries are Tuscar Metals Inc., Canal Dover, O., and New Philadelphia, O.; Alloy Welding Co., New Philadelphia, and Porcelain Enameled Co. Inc. The Tuscar Metals division is occupying plants formerly operated by American Sheet & Tin Plate Co. and may possibly acquire either lease or ownership to the Morgantown, W. Va., plant of American Sheet & Tin Plate Co., which is not now being operated.

R. C. Cochran, formerly assistant auditor of American Sheet & Tin Plate Co., is president of Arcy Corp. A number of prominent architect's, designers, etc., are identified with it, one being Bernard McGarry, a well-known practicing architect in both Cleveland and New York.

At present, Arcy Corp., in the Tuscar Metals and other operating divisions, is conducting mill tests, loading tests, etc., on a number of different types of steel construction. One type of steel housing design, the patent rights for which have been purchased, is that of Prof. Walter H. Stulen, of Carnegie Institute of Technology, whose design was de-

tailed at some length in STEEL for July 15, 1935. Mr. Stulen has been working on a hollow sheet-metal column employing Cor-Ten steel, to be used for building purposes.

Safety

ANEW all-time safety record was established by the Homestead steelworks of Carnegie-Illinois Steel Corp. in January. Only three employes were injured severely enough to cause a loss of time from their regular jobs, this with a force of 7519 men working a total of 1,093,982 hours. The best previous record for one month was four accidents in June, 1935, with a similar force working only 847,623 hours.

Interlocking Directorate Suit Is Withdrawn

Department of justice Feb. 11 withdrew the suit filed in 1935 against alleged interlocking directorates of the Youngstown Sheet & Tube Co., Inland Steel Co., Delaware River Steel Co., Republic Steel Corp., Corrigan, McKinney Steel Co. (now a part of Republic), McKinney Steel Holding Co., Cleveland-Cliffs Iron Co., Cliffs Corp., Otis Steel Co. and Wheeling Steel Corp.

Following the filing of the suit, several of the alleged interlocking directors resigned, and the government feels that whatever condition it objected to has been adjusted.

At the same time the interlocking directorate suit was filed, the department of justice attempted to block the merger of the Republic Steel Corp. and the Corrigan, McKinney Steel Co., and lost this action.

Meetings

OIL BURNER INSTITUTE INC., reorganized in 1935 from the American Oil Burner association, will hold its twelfth national convention and show in Detroit, April 14-18. Convention headquarters will be at the Statler hotel; the exposition will be in Convention hall. More than 50 manufacturers of oil burning equipment and appliances already have taken space in the show.

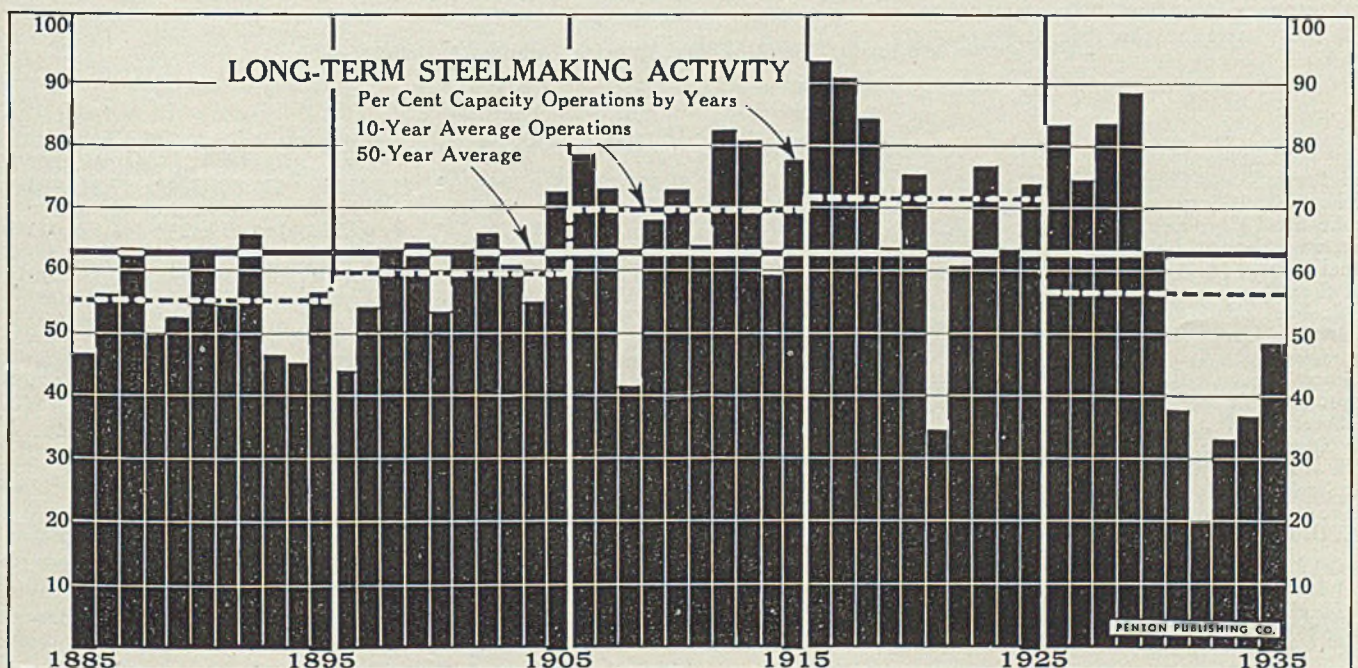
W. J. Smith, general manager, Cleveland Steel Products Corp., Cleveland, is president of the institute; G. Harvey Porter is managing director, and C. F. Curtin is show manager. Headquarters of the institute are at 30 Rockefeller Plaza, New York.

TO EXHIBIT AT SPRINGFIELD

Purchasing Agents Association of Western Massachusetts Inc., of which J. E. Connor, president, National Equipment Co., Springfield, Mass., is president, will hold an industrial exhibition in the Springfield municipal auditorium March 5-7. Manufacturers of products of interest to the trade in western Massachusetts will exhibit.

Reconstruct Lake Freighter

Oglebay, Norton & Co., Cleveland, through its shipping subsidiary, the Columbia Transportation Co., is reconstructing its steamer G. G. Posr into a self-loader and self-unloader for use in the scrap and pig iron trade on the Great Lakes. The steamer has a capacity of 5800 tons and will be operated by W. E. Richey, president, Lake Ports Shipping Co., 310 South Michigan avenue, Chicago.



Financial

Profits of Consumers of Iron and Steel Are Increasing

All Figures Are Profits Except Where Asterisk Denotes a Loss

PROFITS in 1935 of important metalworking interests, including leading consumers of iron and steel and some suppliers, were more than double those of 1934, on the average.

Forty-seven companies, including 22 listed in the accompanying table and 25 previously reported, show an aggregate net profit of \$58,925,398 for 1935, against \$26,827,981 for the identical companies in 1934.

In the table at the bottom of this page are comparisons of leading steelmaking interests which have reported thus far for the fourth quarter and all 1935.

SPLITS SHARES 25 FOR 1

Cleveland Hobbing Machine Co., Cleveland, has increased its capital stock from 4000 no-par shares to 100,000 shares of \$4 par, and has declared a dividend of 20 cents on the new shares, payable April 1 to record of March 16.

MCKEESPORT NET RISES

McKeesport Tin Plate Co., McKeesport, Pa., earned \$2,135,097, or \$7.11 per share in 1935, against \$1,859,339, or \$6.19 a share in 1934.

VALUE COLORADO FUEL & IRON

An economic value of \$33,526,152 has been placed upon the Colorado Fuel & Iron Co., Denver and Pueblo, Colo., by Herbert Sands, consulting engineer, Denver, at the direction of Federal Judge Symes. The company's balance sheet Dec. 31, 1935, listed the book value at \$38,463,058. A third valuation known as sales value, based on the appraisers' idea what the properties

	1935	1934
Caterpillar Tractor Co., Peoria, Ill.....	\$5,949,307	\$3,651,190
Kelsey-Hayes Wheel Co., Detroit.....	1,242,772	326,392
Page Hershey Tubes Ltd., Welland, Ont.....	642,331	620,018
General Steel Wares Ltd., Toronto, Ont.....	177,939	158,316
American Brake Shoe & Foundry Co., New York.....	1,699,400	1,169,341
Williamsport Wire Rope Co., Williamsport, Pa.....	317,425	300,933
Monarch Machine Tool Co., Sidney, O.....	90,317	24,159
Veeder-Root, Inc., Hartford, Conn.....	499,552	278,318
Continental Can Co., New York.....	11,223,578	10,707,122
New Jersey Zinc Co., New York.....	4,666,000	3,788,380
Chapman Valve Mfg. Co., Indian Orchard, Mass.....	112,965	100,716
Acklin Stamping Co., Toledo, O.....	34,232	.....
Chicago Railway Equipment Co., Chicago.....	9,011	61,290
Union Twist Drill Co., Athol, Mass.....	329,104	161,973
Arthur G. McKee & Co., Cleveland.....	129,652	*86,931
Shepard-Niles Crane & Hoist Corp., Montour Falls, N. Y....	36,676	*83,416
Square D Co., Detroit.....	726,484	428,769
Motor Wheel Corp., Lansing, Mich.....	1,087,979	409,673
City Auto Stamping Co., Toledo, O.....	476,138	66,892
Houdaille-Hershey Corp.....	2,456,196	931,401
Minneapolis-Moline Power Implement Co., Minneapolis....	170,678	*2,172,999
Blaw-Knox Co., Blawnox, Pa.....	550,000	35,505
Total, above 22 companies.....	\$32,627,736	\$20,877,042
Grand total 47 companies, including 25 previously reported.....	\$58,925,398	\$26,827,891

would sell for at forced sale, was \$12,000,000.

Judge Symes has ordered February interest on Colorado's \$4,500,000 5 per cent bonds paid Feb. 1.

DIVIDENDS DECLARED:

Harbison-Walker Refractories Co., Pittsburgh, extra of 12 1/2-cents on the common, plus regular 25 cents, March 2 to record of Feb. 14. Also regular quarterly preferred of \$1.50, April 20 to record April 6.

Timken Roller Bearing Co., Canton, O., extra of 25 cents and regular of 50 cents, March 5 to record of Feb. 18.

Brown Fence & Wire Co., Cleve-

land, semiannual of \$1 on Class A stock and quarterly of 30 cents on Class B, both Feb. 29 to record of Feb. 15.

Union Twist Drill Co., Athol, Mass., 25 cents, March 31 to record of March 20.

Vanadium-Alloys Steel Co., Latrobe, Pa., 50 cents, March 2 to record of Feb. 20.

Black & Decker Mfg. Co., Baltimore, \$7 on its preferred, eliminating all arrearage, and 50 cents on the common, March 31 to record of March 16.

Motor Wheel Corp., Lansing, Mich., 20 cents, March 10 to record of Feb. 20.

Financial Timetable for Blast Furnace, Steel Mill and Rolling Mill Interests

All Figures Are Profit Except Where Asterisk Denotes A Deficit

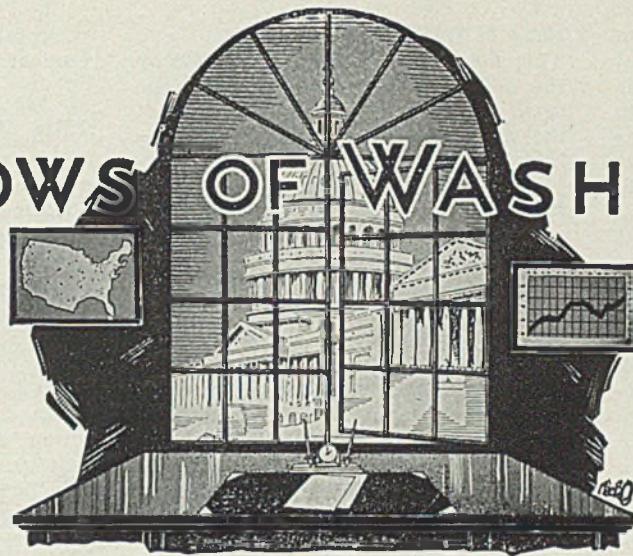
	Fourth Quarter 1935	Third Quarter 1935	Fourth Quarter 1934	Year 1935	Year 1934	Ingot Capacity Gross Tons
United States Steel Corp.....	\$5,326,417	\$1,305,205*	\$10,234,413*	\$1,084,917	\$21,667,780*	27,341,900
Bethlehem Steel Corp.....	2,396,026	701,616	411,099	4,291,253	550,571	8,980,000
Republic Steel Corp.....	1,191,439	507,731	1,226,271*	4,455,734(a)	3,459,428*	6,129,000
Youngstown Sheet & Tube Co.....	1,493,734	574,799	920,152*	1,597,521	2,578,785*	3,120,000
National Steel Corp.....	2,522,693	2,287,763	1,467,825	11,136,451	6,050,722	2,232,000
Inland Steel Co.....	2,749,309†	1,810,203	550,073	9,417,818‡	3,729,889	2,000,000
Colorado Fuel & Iron Co.....	166,272	10,234	437,164*	275,524	241,540*	888,000
Crucible Steel Co. of America.....	.....	.....	.....	1,268,176	75,157	875,000
Sharon Steel Hoop Co.....	.....	.....	.....	1,050,000	10,667*	450,000
Gulf States Steel Co.....	119,350	58,443	44,468*	141,269	58,039*	400,550
Wickwire Spencer Steel Co.....	107,123	4,655	118,940*	53,146*	426,799*	150,000
Acme Steel Co.....	438,155	384,479	168,431	1,757,972	1,035,963	.....
Scullin Steel Co.....	.....	.....	.....	48,378*	304,926*	.....
Virginia Iron, Coal & Coke Co.....	28,207*	.....	21,603	85,096*	24,682*	.....
Apollo Steel Co.....	.....	.....	.....	134,875	79,344*	.....
Interlake Iron Corp.....	200,000	259,493*	48,503*	470,000*	683,764*	1,215,000(b)
E. & G. Brooke Iron Co.....	.....	.....	.....	37,747	.....	132,000(b)

(a) Includes Corrigan-McKinney after Sept. 25. (b) Iron capacity.

† Includes fourth quarter profits of Joseph T. Ryerson & Son Inc.

‡ Includes fourth quarter profits of Joseph T. Ryerson & Son, but does not include profits for the first nine months of 1935 amounting to \$691,692.

WINDOWS OF WASHINGTON



WASHINGTON WHETHER or not the United States Supreme Court shall be plowed under is being very actively discussed by members of both chambers of congress. Probably when the TVA decision comes down, and if it knocks out the pet "Yardstick" project, the hue and cry for the court's goat will be even louder than it has been up to now.

A large assortment of bills and resolutions is pending before committees of both houses, proposing amendments to the constitution curtailing in one way or another the powers of the highest court of the land.

Most of these amendments would take from the court the power to pass on the constitutionality of laws enacted by congress. There is a feeling in many quarters that placing such restraints on the court would not only destroy it but would also wreck the constitution itself.

Action Is Remote

There are probably just enough members of both houses of congress who feel the same way to prevent anything of the kind really being enacted. But even after congress did get through with such legislation, it would still be up to the states to ratify any such change.

Aside from the court the spotlight is being held in Washington by the increasing uneasiness of the administration over the fiscal outlook. To this end the President is having continuous conferences with government officials and unofficial advisers.

The revenue question is the one which probably will hold congress here longer than it hopes. There was talk at the capitol last week among some of the leaders again mentioning May 1 as a probable date for adjournment, but this depends largely on the tax situation and how it is finally solved.

Further inflation talk developed

last week, but this is not being taken seriously. Of course, taxation presents its own peculiar problem, especially in an election year. Members of both houses of congress, and more especially the lower house, where all members come up for reelection in November, are groaning over the possibilities of either new forms of taxes or of rate increases.

Lending activities of the government are being carefully gone into by the President. In his first official move recently he cancelled unexpended authorizations totalling more than a billion dollars. However, there was a great deal of baloney about all of this.

The stories that went out to the country rather indicated that this was money which the President had saved. That is not the case. The money had been authorized but there has really been no idea of spending it at all. However, some Washington observers think that they see in this move that the pump priming policy of the administration is coming to an end. These savings in this particular case were only in bookkeeping.

EXTENDING NEUTRALITY ACT

The senate foreign affairs committee has reported out a simple resolution which would continue the present neutrality law until May 1, 1937, with a few amendments. One of these would ban loans to belligerents. Prediction of this action was made in this column last week.

In fact, there have been so many people pulling so many ways on Capitol Hill in connection with a neutrality law that the leaders of both houses think that they had better go easy until they see just what all of this is about.

Experts of the interstate commerce commission have appeared before the Nye munitions investigating committee, recommending that the navy create its own facilities for doing all of its own construction

work. The steel industry should be especially interested in this in view of the recommendations made for additional shipways, modernization of machine tools, and the like.

Right in this connection it may be recalled that less than a year ago a committee of navy experts, including some outside machinery representatives, made a survey of all of the navy yards as to their equipment.

While nothing has ever been made public as the result of that survey, it is known that the committee reported to the secretary of the navy that machine tools and similar equipment in all of the navy yards are hopelessly out of date and that it would cost a good many millions of dollars to replace the outmoded machinery properly.

It was understood that the secretary of the navy would try to get some PWA or WPA money for this replacement, but if it was ever asked for Mr. Ickes never allocated any of his money for this purpose.

GOVERNMENT IN ARMAMENT BUSINESS COST \$47,000,000

In connection with the surveys which have been made, the interstate commerce commission experts put into the record figures showing that the plant costs to the government of reproducing the facilities for the manufacture of machine guns and small arms, taking the Colt Patent Fire Arms Mfg. Co. plant as typical, would be some \$8,800,000 less depreciation of \$5,600,000.

The same experts suggested expenditures of \$2,365,000 for additional government ship ways; repairs to existing ways, \$995,000; additional facilities exclusive of ways, \$8,744,000; modernization of machine tools, \$5,000,000; and other additions to navy yards \$6,000,000. The total would be just under \$24,000,000.

C. H. Spencer chief valuation engineer of the ICC, who appeared be-

fore the Nye committee in connection with this matter, also testified that the machine tools in the navy yards of the country "are far from up to date." He emphasized the importance of this and pointed out that expenditures for machine tools would be necessary soon in any case.

In connection with government ownership of the armament industry, it was set forth that the government would have to lay out some \$47,000,000 before it could begin the manufacture of armaments, but that after it had that there is a prospective saving of more than \$1,000,000 on one heavy cruiser alone.

It is probably in connection with this report that the Nye committee a short time ago interrogated steel representatives on their cost of production and depreciation costs.

There is a story going around also that one of the supplemental reasons for calling representatives of the Bethlehem, Midvale and Carnegie-Illinois companies was to get into the record the statement of J. Carson Adkerson, representing the domestic manganese producers. The latter has been trying to get before some congressional committee for months to repeat his oft-told tale.

In the final analysis, Mr. Adkerson made two recommendations to the committee (1) Accumulation of a stock pile of domestic manganese ore in such amount and of such grade as may be required by the war department and (2) a tariff on metallic manganese contained in imported ores and alloys sufficient to properly equalize costs of production at home and abroad and to insure domestic producers fair competition in the domestic market.

FTC G-MEN ON TRAIL OF "COLLUSIVE" STEEL BIDDING

Judge Ewin Davis, former chairman of the federal trade commission and now "just a member", stated last week that the investigation the commission is making into the alleged collusive bidding of several steel companies on federal projects is "coming along nicely."

It will be recalled that the commission began this investigation some weeks ago at the request of the President, who sent memoranda to the commission furnished him by Secretary Ickes, who had been baiting the steel industry for some weeks before he finally conceived the idea of the trade commission investigation.

The collusive bidding was supposed to have taken place in connection with bids at the Triboro bridge in New York, and on federal projects at Miami, Fla., and Morehead City, N. C.

The best information available at the commission last week was that it is hoped that the commission may be able to make a report to the President by the middle of February, but this is based largely on hope. Several men were put on this as a special job, and

some of them have been in the field. This field work was not completed by the end of last week but it will be soon. No indication was obtainable at the commission what—if anything—has been learned.

BERRY COUNCIL NEEDS OXYGEN

Committees of the Berry industrial progress council met here for two days last week to formulate reports to be made to the council, which is expected to meet here sometime next week. Some of the committee, it is stated, did not complete their work and may have another meeting before the council gets into action.

There is a lot of backstair talk to the effect that when the council meets next week it may suggest that it be made a permanent body. There are others, however, who are expressing the opinion that when the reports have been filed or made to somebody or other—the President or congress or anyone who will receive them—the body will dissolve. Unless some action is taken in the meantime, the council must cease to function as of April 1 because the personnel goes off the NRA payroll for good at that time, under the law.

TALK MORE TAXES ON STEEL

Running around in circles, trying to find some way to pay new processing taxes, it is reported that the suggestion has been made that producers of steel products, automobile manufacturers, and other producers be made to bear the brunt of the taxes.

This is based on the theory that when the farmer gets any money he immediately turns it over to someone for something he buys. No one takes this seriously, but such talk is being heard in the corridors of congress these days.

REFUSE SALARY INCREASES

Just to keep the record straight, it should be recorded here that John L. Lewis, president of the United Mine Workers, and his officers have refused the salary increases recently voted them at the mine workers convention in Washington. Mr. Lewis was to be raised from \$12,000 to \$25,000 a year and several officers from \$9000 to \$18,000.

Labor

IN VIEW of severe weather which has handicapped scrap operations in New York for several weeks, all scrap iron yards are permitted to operate on Saturdays, beginning Feb. 15, for a temporary period. This decision was made at a meeting of the administrative committee of the voluntary labor code of the New York chapter of the Institute of Scrap Iron and Steel. Scrap yards in New York have been closed on Saturday since last June, under the

voluntary labor code signed by members of the New York chapter.

HEAR MESTA CHARGE THIS WEEK

Mesta Machine Co., West Homestead, Pa., has been charged with coercion in violation of the Wagner labor law in a filing by Clinton S. Golden, regional director for the national labor relations board at Pittsburgh. The company is accused of firing F. L. Taylor, a roll turner, because of his activity in the United Roll Turner's Association of America and refusing to deal with that union exclusively in collective bargaining. Hearing of the Mesta case will be held Feb. 17 in the Federal building at Pittsburgh.

MACWHYTE PAYS BONUS EQUAL TO COMMON DIVIDEND

The Macwhyte Co., Kenosha, Wis., manufacturing wire rope and cable, aircraft fittings, etc., on Feb. 1 paid its employees, numbering about 250, a bonus practically equal to the dividend paid to common stockholders in 1935. This is the first time since 1929 that anything has been paid on the common stock, according to H. E. Sawyer, treasurer, and the company is sharing its earnings with its workers. The minimum bonus was \$5 and the maximum several hundred dollars, depending on length of service and wages received last year.

POSTPONE WHEELING HEARING

Hearing before the national labor relations board to determine the necessity of an election at Wheeling Steel Corp., Portsmouth, O., for choosing bargaining representatives has been postponed indefinitely. It is believed that the postponement was prompted by the desire of both parties to determine the outcome of a similar case scheduled for March 9 at Portsmouth, O.

A similar case involving Jones & Laughlin Steel Corp. has now been set for hearing at Pittsburgh, March 2.

FINDS NRA WAGES SUSTAINED

Analysis by the National Industrial Conference board, New York, of payroll records of 2000 manufacturing plants in 25 industries employing over 1,000,000 workers shows that hourly earnings in employment last October were above those of April, the last month of NRA, and that the work week was less than two hours longer.

LABOR'S PAY ENVELOPE FATTER

Average weekly earnings in 25 typical manufacturing industries were \$23.46 in December, against \$23.31 in November, according to the National Industrial Conference board, New York. In December, employment rose 0.9 per cent, and payrolls 1.6 per cent.

Production

STEELMAKING continued its upward trend last week, rising 1½ points to a peak of 54½ per cent for the year to date. This compares favorably with a rate of 53 and 43 per cent respectively in the corresponding weeks of 1935 and 1934. Youngstown, Chicago, eastern Pennsylvania, Cleveland, Wheeling, Buffalo, and Detroit were among those districts to show a slight lift in their operating schedules, while the remaining districts held unchanged. Further details follow:

Youngstown—Advanced 1 point last week to 62 per cent, due to slightly increased schedules of the local mills of Carnegie-Illinois Steel Corp., and the adding of an open hearth at Farrell, Pa., to the active list. Fifty-two out of 83 units are melting.

Chicago—Rose 1½ points to 59½ per cent, the best rate in two months. Several mills continue practically at capacity and anticipate steady schedules for at least 30 days. Blast furnace operations are unchanged, 19 of 41 stacks continuing active.

Pittsburgh—Steady at 40 per cent last week, the leading interest contributing largely to the support of this figure with a 38-40 per cent rate, whereas the leading independent declined slightly to 45 per cent.

Twenty-seven steelworks blast furnaces of 60 continue in blast. Carnegie-Illinois has 11 of 32 on; National Tube, 2 of 4 at McKeesport, Pa.; American Steel & Wire, 1 of 2 at Donora, Pa.; Jones & Laughlin, 7 of 11; Pittsburgh Steel and Pittsburgh Crucible Steel, each 1 of 2; and Bethlehem, 4 of 7 at Johnstown, Pa. Jones & Laughlin has swung over from ferromanganese to basic iron in one of its Aliquippa stacks after a brief run on the former.

Wheeling—Up 3 points to 84 per cent last week, recording a fourth consecutive weekly gain. Thirty-one out of 37 open-hearth furnaces were operating among four district plants.

Detroit—Up 6 points to 94 per cent, as 16 out of 17 open-hearth furnaces in the two local mills were on, as against 15 of 17 two weeks ago.

Central eastern seaboard—Up slightly to 37 per cent, but so far this year has not succeeded in breaking through this level. There appears little doubt, however, but what this will be accomplished before the close of this quarter, and very likely within the next fortnight. The trade generally anticipates an improvement in steel demand once the weather conditions moderate, which have not only curbed demand, but have retarded shipments on such tonnage as is under order, due to handling difficulties at the producing plants.

New England—Unchanged at 83

Steelmaking Operations

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended		Same week	
	Feb. 15	Change	1935	1934
Pittsburgh	40	None	39	26
Chicago	59½	+ 1½	63	38
Eastern Pa.....	37	+ ½	31	27½
Youngstown...	62	+ 1	60	45
Wheeling	84	+ 3	87	69
Cleveland	66½	+ 5	77	79
Buffalo	34	+ 2	45	42½
Birmingham...	63	None	55½	52
New England...	83	None	63	82
Detroit	94	+ 6	100	79
Cincinnati	80	None	†	†
Average.....	54½	+ 1½	53	43

per cent, with a drop to 75 per cent scheduled for this week.

Birmingham—Held at 63 per cent last week. Fourteen open hearths are active, and two or three others are in shape for resumption on short notice.

Buffalo—Increased to 34 per cent last week, a gain of 2 points, following the lighting of an additional open hearth by Republic Steel Corp. Thirteen open hearths are now in production, and further gains are expected toward the end of the quarter.

Cleveland—Up 5 points to 66½ per cent last week. Republic Steel Corp. is operating 11 of its 14 open hearths. Otis Steel Co. continues with four. National Tube Co. has shut down one, making its total 11 out of 12 units active.

Cincinnati—Steady at 80 per cent, with 19 of 24 open hearths in operation. No change is expected this week, although mill backlogs show shrinkage.

CORPORATION SHIPMENTS RISE

Shipments of finished steel by the United States Steel Corp. in January were 721,414 tons, a gain of 59,899 tons over the 661,515 tons shipped in December. In January, 1935, shipments were 534,055 tons. The January figure is the largest since June,

U. S. STEEL CORP. SHIPMENTS				
(Inter-company shipments not included)				
	(Tons)			
	1936	1935	1934	1933
Jan.	721,414	534,055	331,777	285,138
Feb.	533,137	385,500	275,929
March	668,056	588,209	256,793
April	591,728	643,009	335,321
May	598,915	745,063	455,302
June	578,108	985,337	603,937
July	547,794	369,938	701,322
Aug.	624,497	378,023	668,155
Sept.	614,933	370,306	575,161
Oct.	686,741	343,962	572,897
Nov.	681,820	366,119	430,358
Dec.	661,515	418,630	600,639
Yearly adj.	19,907	44,283
Total	7,371,299	5,905,966	5,805,235

1934, when shipments totaled 985,337 tons.

Urges Minimum Wage as Currency

A UNIVERSAL, permanent minimum wage, with a new kind of currency, were advocated as one means of preventing depressions by A. J. Patch, chief engineer, Barlow & Seelig Mfg. Co., Ripon, Wis., and American Iron Machine Co., Algonquin, Ill., in a recent address to the Men's club of Ripon.

"Prosperity does not depend upon the distribution or redistribution of wealth, but upon the distribution of income," he said.

"If the purchasing power of the farmer can be restored the re-employment of the unemployed and general business prosperity will be the natural result, but this condition cannot be made permanent unless a uniform wage scale can be maintained, and this is impossible so long as the income of our farmer group is subject to the law of supply and demand."

Instead of such schemes as control of farm production, however, he suggested another system:

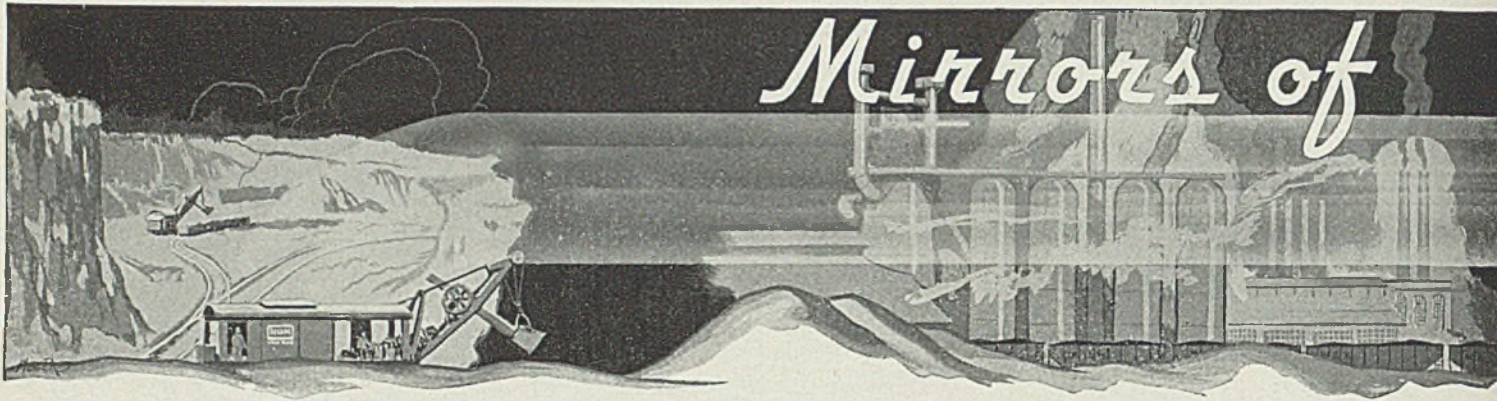
Would Facilitate Planning

"If wages are determined in advance, cost can be determined in advance, and cost will determine the exchange value. Without this knowledge no one can plan the production of anything; with it the farmer can do his own planning. Therefore, the only sensible thing to do is to establish a uniform minimum wage for all industries, thereby eliminating the influence of supply and demand from our price structure and substituting cost as a basis for all values."

He would make the minimum wage as permanent a value as the pound, gallon, inch or any other standard, and take it "out of politics."

"By far the best and simplest way to do this would be to issue a new kind of currency payable in a specified number of hours of unskilled labor or its equivalent, and exchange it for the present currency on the basis of the established wage rate, and retire our present currency.

"If, for instance, we should first establish a universal minimum wage of 50 cents per hour we could then exchange for one of present dollars a piece of currency payable in two hours of labor. We would merely substitute a labor dollar for a gold dollar and we would have a currency which could not be inflated or manipulated."



DETROIT

LAST week Doris Duke, the world's richest girl, took a special plane from New York to Detroit for the sole purpose of ordering on the spot a custom-built \$15,000 automobile. It was to have bumpers "in natural gold color" and a lot of other embellishments.

While this was going on, Mr. John Public, to the aggregate of several million, was sitting at home, more than likely shivering, reading of Miss Duke's purchase in the newspapers and coming to the ultimate comment that, "I think I'll wait until spring before I turn in the old hack."

So where millions, in terms of dollars, had no fear to tread, millions in terms of individuals had. The answer: Automobile production still is on the toboggan.

It is pretty hard for Detroit to take this sort of a doldrums. February here has always meant more than Valentine's day or Washington's birthday. In every former year January has been the get-ready month on new models, February the first taste of blood in rising assemblies.

Waiting for a Break

This year the difficulty is that the brisk November and December assembly rates were soon forgotten. What is now happening was to be expected—and the weather has made it worse—but Detroit was hoping that the rising tide of recovery would close the gap.

But another 30 to 45 days certainly has a break for the better in store. Consequently, a few of the harbingers are cropping to the surface. Several parts' companies are putting on a shade better activity against late March deliveries. A big die program is ready to break in about two weeks. But steel in volume for automobile assembly work, up to last week, had not budged from the outward calm that seems to have settled over the town.

Some steel sellers say their tele-

phone does not ring all day and when it does, some buyer wants only a small fill-in lot for next-to-impossible shipment. So, the balancing and filling goes on.

Preparations Aplenty

But as for dies, new machine tools and the one thousand and one preparations and plans behind scenes on new 1937 models, there is plenty of news. Detroit's die shops seem to be licking their chops over what is coming out about March 1.

Last week Auburn broke the ice by giving two Detroit diemakers some initial 1937 business. It was mostly small. Buick has placed fender dies for its 1937 car with a Toledo shop, and is taking the design of its new hood off the boards for forthcoming inquiry.

The new Buick hood, motivated to get away from a similarity to Olds, Pontiac, and even Chevrolet, seems to be a chief departure. Piecemeal, other Buick work is coming up.

Fisher Body's big program, out-distancing the field, is extremely promising, and the procedure will be to fill up its own shops first, followed by a division among outside suppliers. Detroit understands that Chevrolet's program will follow Fisher's immediately.

Speaking of Chevrolet, the talk is that "the purse-strings are off" for probably the biggest retooling and die expenditure at Flint in several years. Chevrolet has had inquiries out recently on individual parts for its completely-changed 1937 motor (still a six and not to be an eight), and the other Flint divisions indicate a bill for purchases is in the making that will run into many millions.

Fisher's new Grand Rapids plant is a bonanza to the various forms of automotive equipment builders. While it is true that a lot of this machinery was bought for Grand Rapids as long ago as the last week of October, there still is much to be contracted. Incidentally, they are go-

ing down more than 50 feet on the foundations for the four new giant "turret-top" presses to be put in at Grand Rapids, which almost approaches Ford's record at Rouge.

The Grand Rapids division already has witnessed ground-breaking, and within a few weeks Jones & Laughlin begins shipping against its order for 4250 tons of structurals and 2000 tons of reinforcing steel for the building. An attractive crane order for big electrics is pending for this new General Motors division.

Pontiac, too, is quietly gathering up the loose ends on the 1937 program, and the same goes for Olds. While the Chevrolet program is the most ambitious, no one can accuse the General Motors treasury, or high command, of stinting on preparations for the future.

On the other hand, out at Ford there has been a directly opposite policy—especially as it concerns machine tools—and this item is, after all, a major one in new car preparation.

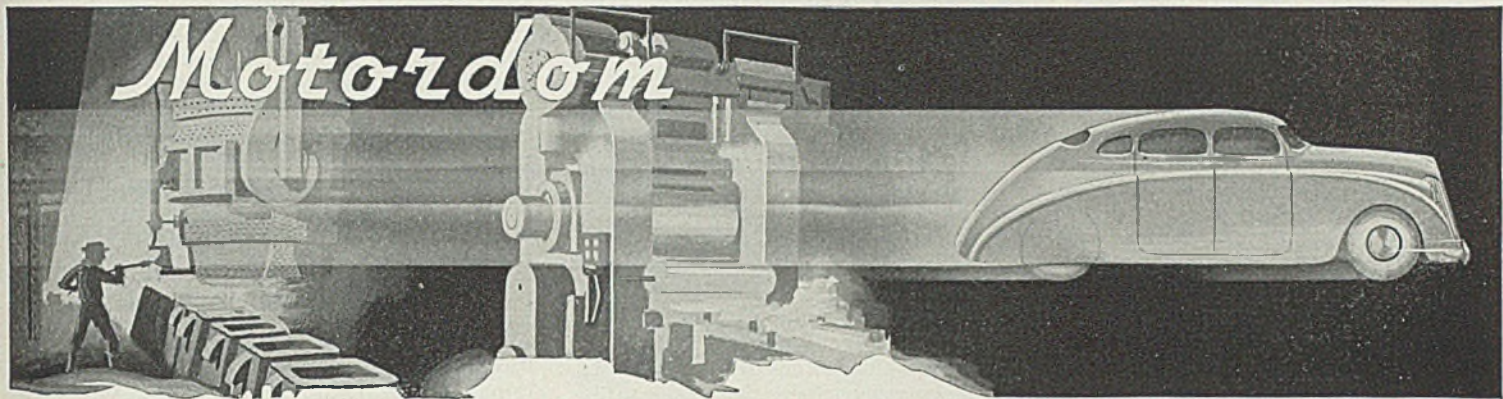
As is well known by now, the machine tool people put their prices up, effective Feb. 15, though they still have a heavy volume of orders to fill—orders taken at old prices.

General Motors failed to balk at the increase and is going right ahead with the changes it has for Flint, Saginaw, Lansing, Pontiac, and the various Detroit divisions.

Ford Stops Purchases

But Ford machine tool buying has been shut off 100 per cent. This, of course, applies to standard items, such as screw machines, millers, etc., and does not involve special-purpose machinery where prices are open to individual dickering and there are published no list prices.

At any rate, Ford purchasing officials decided they would take this occasion of a price increase to do some research and study. An extensive tabulation of all makers' prices on standard machine tools is being compiled, both as before and



after the markup last Saturday, for what purpose is anyone's guess.

Ford, of course, has progressed on 1937 changes; no car manufacturer has not at this writing. And there's something brewing at the Rouge on the steel top and other model innovations. But, for the time being, the purse strings have been pulled tight.

Personnel at the steel purchasing division at Ford, last week working up a sheet and strip buy of moderate size, has been pretty badly crippled. A month ago Ernest Snyder died, Claude Nellis is in Florida indefinitely with a heart ailment and Charles Carroll was ill last week. A. E. Conn, who formerly bought forgings, has been switched over to steel buying at Rouge.

But to return to retooling. Another program that keeps leaking out despite the secrecy officials seem determined on maintaining, is Packard's. Today at Packard it is truly an impossibility to get into the plant, whereas formerly parts suppliers, etc., had free run in development departments.

New Model Out by Summer

What made the curtain ring down tight was Packard's recent decision to make the small six. The management for a long time had dallied with five different plans, and finally got around to the go-ahead on the small six, that presumably will be dropped beneath the price of the 120.

Die work, to a large extent, and machine tools, to a minor extent, have now been placed for the forthcoming Packard, but it will be summer at the earliest before the new model is out. Contrast this with original thought last September to have the new car on the streets in April.

The six motor has been tested on Packard's proving grounds for at least the last six months but, as previously related, a six won't exactly be an innovation, for Packard a number of years ago was in the busi-

ness of making both a straight six and a twin-six.

Incidentally, there have been more delays at Packard on the plans that were hot a few months ago to augment the 120 line with a convertible, a town sedan, and three other models. Several details have been held up indefinitely. While there is no reason to believe these new 120 models have been definitely discarded, they are not a nearby announcement.

Flirt with New Frame

Packard has been working on the idea of making the instrument board of its cheaper cars an integral part of the frame itself. This plan, usually used in making racing cars, was tried once by Ford on passenger cars about three years ago.

What it does is give a faster assembly speed, for the body can be dropped directly onto the chassis but where Ford ran into trouble in 1932 with the scheme was in always get-

ting the body to fit snugly to the component dials, etc., of the dash. Very often all the time saving was lost, and then some.

At Chrysler there is an apparently well-founded report that the management has thought twice since General Motors came out with the Grand Rapids expansion of a die and small stamping shop. Chrysler seems to be looking about enviously for such a similar expansion.

While it is true that Chrysler might be able to pick up a division from a concern like Hupp, there is a policy at Chrysler Corp. to enlarge the Marysville, Mich., division. This plant, where the Chrysler apprentices are trained, is being groomed for a spare parts' division, and there has been some transporting of Highland Park machinery there.

Then too, Chrysler has a big die and stamping shop at the Dodge division that might be enlarged on to make die and stamping work for all other Chrysler divisions inclusively, that has been going to outside shops.

Chrysler might think the problem over twice, though, because there have been times when Dodge's die shop has bid competitively on Chrysler and DeSoto work and lost the business to outside suppliers.

Dodge Engineers Rushed

Right now Dodge's engineering division veritably is working night and day. Though Dodge engineers are burning midnight oil, projected plans are still on the boards. No better indication that they have not been taken off yet is that the Dodge die shop is employing only 50 to 60 men, against a full-time capacity of 700. And at that, the present force is like many assembly lines, on part time.

Chrysler Corp. has its 1937 changes lined up, of course, but is lagging behind General Motors division by comparison in putting them into effect.

One effect of Electric Auto-Lite
(Please turn to Page 87)

Automobile Production

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

	1933	1934	1935
Jan.	128,825	155,666	292,785
Feb.	105,447	230,256	335,667
Mar.	115,272	338,434	429,793
Apr.	176,432	352,975	477,691
May	214,411	330,455	364,662
June	249,727	306,477	361,248
July	229,357	264,933	336,985
Aug.	232,855	234,811	239,994
Sept.	191,800	170,007	89,804
Oct.	134,683	131,991	275,024
Nov.	60,683	83,482	398,039
Dec.	80,565	153,624	407,804
Year	1,920,057	2,753,111	4,009,496

Estimated by *Cram's Reports*

Week ended:	
Feb. 1	85,790
Feb. 8	69,876
Feb. 15	75,170

Men of Industry

WILLIAM LARIMER JONES JR. and Milton C. Angloch have been appointed vice presidents of the Jones & Laughlin Steel Corp., Pittsburgh.

Mr. Jones has been a director and a member of the executive committee for a number of years. Mr. Angloch has also been elected a director and a member of the executive committee, and at the same time appointed to fill many of the subsid-



William Larimer Jones

ary executive vacancies created by the recent death of A. B. Shepherd, including the presidencies of the Interstate Iron Co., Interstate Steamship Co., and Jones & Laughlin Ore Co. He retains the presidency of the Vesta and Shannopin Coal Cos. and the Blair Limestone Co., which positions he has held since 1927.

Mr. Jones was graduated from Princeton university in 1915 and started working in the company's plant at Aliquippa, Pa. During the war, he enlisted and served in the United States navy on transport duty between the United States and Europe. He is a director of the First National Bank of Pittsburgh.

Mr. Angloch began his career with Jones & Laughlin Ltd. in 1900 as a clerk at the South Side works. He was appointed purchasing agent in 1907, and has successively been assistant to the vice president and general manager, vice president and director of the Vesta and Shannopin companies and later president of these subsidiaries, as well as of the Blair company. He is a director of the Pittsburgh chamber of com-

merce, and president of the Pittsburgh Coal exchange.

Other vice presidents of Jones & Laughlin are W. C. Moreland, B. F. Jones III, W. J. Creighton, F. E. Fieger and W. B. Todd.

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F. K. Taylor, vice president in charge of industrial sales, Taylor Instrument Cos., Rochester, N. Y., is on a several weeks' visit to the southwest and Pacific coast offices. Mr. Taylor expects to be back in Rochester by March 1.

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H. Seymour Walcott, formerly vice president and sales manager of the Harter Corp., New York, has been appointed New York manager of the All-Steel-Equip Co., Aurora, Ill., with headquarters at 56 West Twenty-second street.

◆ ◆ ◆

R. G. McElwee, who recently became connected with the Vanadium Corp. of America, with headquarters in the Book building, Detroit, will specialize on consulting work on the use of alloys manufactured by the Vanadium corporation in gray iron and malleable iron foundry work. He also will be engaged in the correlating of research work to practical applications.

Mr. McElwee was born in Williamsport, Pa., and in 1915 entered



Lester C. Klein

Who has been appointed assistant to the president, United States Steel Corp., New York, succeeding John Hughes, who retired Feb. 1 under the Corporation pension plan, as reported in STEEL for Feb. 10

the employ of the Muncie Foundry & Machine Co., Muncie, Ind., as chief inspector. A year later he became connected with the General Motors Truck Co., Pontiac, Mich., as buyer, and in 1927 was made engineer of the American Car & Foundry Co., Detroit. From 1928 to 1932 he was employed as foundry engineer with Whitehead & Kales Co., River Rouge, Mich., and in the latter year was made general manager of the Ecorse Foundry Co., Ecorse, Mich.

◆ ◆ ◆

J. E. Middleton, of Philadelphia, was appointed secretary of the National Association of Used Machinery



Milton C. Angloch

and Equipment Dealers, Pittsburgh, at the annual meeting of the association held in the William Penn hotel, Pittsburgh. Other officers and directors were re-elected, including Marion D. Galbreath as president, Samuel A. Dewitt as vice president, and C. L. McDonald as treasurer.

Amendments were adopted providing for individual instead of group membership, and the changing of the time of the annual meeting to September, 1936, and yearly thereafter.

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At the annual dinner of the American Institute of Mining and Metallurgical Engineers, New York, Feb. 20, presentation of awards to four mining and metallurgical engineers for distinguished contributions to the technical and economic advancement of the mineral industries will be made. Those receiving honors are:

Clinton Crane, president, St. Joseph Lead Co., New York, who will be presented with the William Lawrence Saunders gold medal; C. C. Henning, assistant general metallur-

gist, Jones & Laughlin Steel Corp., Pittsburgh, who will receive the Robert W. Hunt award for 1936; Francis Hearne Crockard, metallurgist for Republic Steel Corp. at Thomas, Ala., recipient of the J. E. Johnson Jr. award; and Prof. Robert Peele, a member of the Institute since 1883, and professor emeritus of mining in the school of mines at Columbia university, who will be made an honorary member.

Lloyd Jones, vice president of Continental Roll & Steel Foundry Co., East Chicago, Ind., who has been in ill health for the past few months, has resigned. He will remain with the Continental company in a consulting engineering capacity. Mr. Jones was formerly with United Engineering & Foundry Co., and before going with the Continental company, he was connected with E. W. Bliss Co., Salem, O.

Kenneth S. Valentine has been appointed district manager in New York for the Patterson Foundry & Machine Co., East Liverpool, O.

Prior to becoming associated with the Patterson company, Mr. Valentine was sales manager of the Turbo Mixer Corp., New York, for eight years, and previous to that was chemical engineer of the Heller & Merz Co., now Calco Chemical Corp., Newark, N. J., and works manager of the Southern Dyestuffs Co., now Monsanto Chemical Co., Nitro, W. Va.

Mr. Valentine is well-known in the chemical and process industries, and is co-author of the section, "Mixing of Material" in "Chemical Engineering Handbook," as well as various



S. S. Marshall

Named assistant general manager of the Pittsburgh works of the Jones & Laughlin Steel Corp., as announced in STEEL for Feb. 10



Kenneth S. Valentine

books and articles on mechanical problems of the process industries. He was graduated from Columbia university in 1916, and is a member of the American Institute of Chemical Engineers.

Mr. Valentine will have charge of sales in metropolitan New York and in New England, and will, in addition, act in an advisory capacity on mixing problems in general.

Paul M. Jacobson has been appointed engineer in charge of the



Roy H. Noderer

Who has been made manager of the metallurgical department, Lorain division, Carnegie-Illinois Steel Corp., Johnstown, Pa., as announced in STEEL for Jan. 27. He joined Lorain Steel Co., Johnstown, as chief chemist in 1910, and in 1926 was promoted to metallurgist. He is a member of the American Society for Testing Materials, American Welding society, American Society for Metals and American Foundrymen's association

structural steel department of the Pacific Car & Foundry Co., Seattle. A graduate of the University of Washington, he formerly was with the Anaconda Copper Co., and the Star Iron & Steel Works, Tacoma, Wash. For the past nine years he has been in the structural steel department of Wallace Bridge & Structural Steel Co., Seattle.

L. D. Holland, formerly sales manager of the western division of E. F. Houghton & Co., manufacturer of oils and leathers, Philadelphia, has been made manager of research development, with headquarters in the general offices, Philadelphia.

A. A. Miller, formerly head of the Cincinnati office, has been promoted to the position of western sales manager, with headquarters in San Francisco.

E. Q. Parker, head of the purchasing department of Yuba Mfg. Co., San Francisco, and C. M. Romanowitz, sales manager of the same company, are in New York on a business trip, bringing a large contract to the East Coast. Due to the creation of a great demand for the gold dredging and other equipment made by the Yuba concern, caused by the higher value of gold, the Yuba company has enjoyed a large business over the past two years.

Col. Merrill G. Baker has been re-appointed executive vice president of the Steel Founders' Society of America, New York, and R. L. Collier has been re-elected secretary-treasurer.

The following directors were elected: Lee C. Wilson, Reading steel



H. D. Stark

Appointed general superintendent of the Pittsburgh works of Jones & Laughlin Steel Corp., as noted in STEEL for Feb. 10

casting division, Reading, Pratt & Cady Co., Reading, Pa.; George H. Chisholm, Atlas Steel Casting Co., Buffalo; Frank M. Robbins, Ross-Meehan Foundries, Chattanooga, Tenn.; D. C. Bakewell, Duquesne steel foundry division, Continental Roll & Steel Foundry Co., Pittsburgh; A. H. Anthony, Massillon Steel Castings Co., Massillon, O.; F. A. Lorenz Jr., American Steel Foundries, Chicago; Paul H. Leussler, Omaha Steel Works, Omaha, Nebr., and J. P. Arnoldy, Warman Steel Casting Co., Huntington Park, Calif.

Louis J. Desparois has been appointed district sales manager at St.



Louis J. Desparois

Louis for Pickands, Mather & Co., Cleveland, seller of pig iron and coke, with headquarters at 1255 Telephone building. For the past two years, he had been identified with Hickman-Williams & Co. at St. Louis. Previously, for eight years, he had been associated with the St. Louis Coke & Gas Co. Mr. Desparois gained considerable practical experience in foundries through 12 years' connection with the American Radiator Co., during which time he was superintendent of various foundries of this company.

R. S. Hammond, vice president, Whiting Corp., Harvey, Ill., was elected president of the Foundry Equipment Manufacturers' association at a meeting held in Cleveland, Feb. 8. B. C. Trueblood, Arcade Mfg. Co., Freeport, Ill., was named vice president.

The following were elected directors for a 3-year term: E. O. Beardsley, Beardsley & Piper Co., Chicago; R. W. Hisey, Osborn Mfg. Co., Cleveland; and T. Kaveny Jr., Herman

Pneumatic Machine Co., Pittsburgh. Arthur J. Tuscany was renamed executive secretary.

Attendance at the meeting was highly satisfactory. A feature of the program was the discussion of the plans for the coming exhibition of foundry equipment and supplies at Detroit.

R. J. Schuler, manager of sales, LaSalle Steel Co., Chicago, is confined to the Cottage Grove hospital, Detroit, where he recently underwent an operation.

Willis L. King, director of Jones & Laughlin Steel Corp., Pittsburgh, and widely known throughout the steel industry through his long identification with the company, celebrated his eighty-fifth birthday, Feb. 14.

Joseph G. Schaefer, formerly superintendent of the Chicago district works of the Wyckoff Drawn Steel Co., has been appointed manager of the Ambridge, Pa., division, succeeding the late John M. Adams. He will, however, retain managership of the Chicago division.

Edwin T. Warren, assistant superintendent of the Carrie furnaces in the Pittsburgh district for Carnegie-Illinois Steel Corp., has been appointed superintendent of blast furnaces at the Edgar Thomson works, Braddock, Pa. He succeeds F. H. N. Gerwig, now on leave of absence.

Mr. Warren began his business career with the Baltimore warehouse of Carnegie Steel Co. in 1915, and a few months later was transferred to the Homestead steelworks engineering department. After service overseas during the World war, Mr. Warren returned to the metallurgical department of the Homestead works



Edwin T. Warren

in 1919, was made assistant superintendent of open hearth No. 3 in 1925, and in 1928 was named assistant superintendent of the Carrie furnaces. He is a graduate of Worcester Polytechnic institute, and a member of the Eastern States Blast Furnace and Coke Oven association.

Died:

DONALD W. LLOYD, strip mill engineer in the Cleveland district for Carnegie-Illinois Steel Corp. in Cleveland, Feb. 7. Mr. Lloyd began his career in Cleveland as assistant chief engineer for the William Tod Machine Co., 36 years ago. In 1921 he became special engineer for the Trumbull Steel Co. In charge of strip mill work, and two years later became engineer for the Carnegie Steel Co. in Cleveland. Until recently, Mr. Lloyd had been engaged in doing specialized work for the new 43-inch strip mill now erected at McDonald, O., by Carnegie-Illinois.

Clive Beldon Vincent, 72, chairman of the board, Torrington Co., Torrington, Conn., in that city Feb. 4.

Herman G. Kiefer, 47, metallurgist for the Timken Detroit Axle Co., Detroit, and at the time of his death president of the Goodenow Incinerator Co., Detroit, at Detroit recently.

Oscar W. Mueller, 73, former president of the Mueller Machine Tool Co., Cincinnati, in Cincinnati, Feb. 5. He had been engaged in the manufacture of machine tools for 47 years, retiring recently.

George B. Hetherington, 65, traffic manager of the A. O. Smith Corp., Milwaukee, in Milwaukee, Feb. 7. He joined the Smith organization in March, 1923, having previously been connected with the Sante Fe and Rock Island railroads and the Armour Grain Co. He served in the food administration at Baltimore during the World war.

Harry B. Parker, 65, president and general manager, Albion Malleable Iron Co., Albion, Mich., Feb. 10. Mr. Parker went to Albion from Chicago in 1889 when his stepfather, W. S. Kessler, founded the iron company. He was made vice president of the organization in 1892, assistant general manager in 1899, and general manager in 1910. He became president in 1933 upon the death of Mr. Kessler.

James W. McClure, 47, assistant to the auditor of Carnegie-Illinois Steel Corp., Pittsburgh, at Beaver, Pa., Feb. 6. He had been with the former Carnegie Steel Co. since 1907 in various capacities, was special engineer in the Pittsburgh office in

1932, and in the same year, chief of the cost department, holding that position until December, 1935, when he became assistant auditor.

♦ ♦ ♦
Walter Hay, 60, vice president of the Union Chain & Mfg. Co., Sandusky, O., in Sandusky, Feb. 8.

♦ ♦ ♦
J. W. Emery, 86, president and secretary, Channon Emery Stove Co., Quincy, Ill., Feb. 6. He founded the company 55 years ago.

♦ ♦ ♦
Walter F. Mandel, secretary-treasurer, Kensington Steel Co., Chicago, in that city, recently. Mr. Mandel had been associated with the Kensington company 12 years.

♦ ♦ ♦
William C. Hill, 62, founder of Hill Automotive Service Inc., and Hill Piston Co., in Jackson, Mich., Feb. 10. He was a former president of the Automobile Engine Builders Association of America.

♦ ♦ ♦
Charles J. H. LaGanke, 66, founder of the LaGanke & Sons Stamping Co., Cleveland, in Cleveland, Feb. 8. Before retirement three years ago, Mr. LaGanke had been engaged in the stamping industry 43 years.

♦ ♦ ♦
George W. Peffer, 59, an official of the McDonald, O., plant of the Carnegie-Illinois Steel Corp., in Youngstown, O., Feb. 9. Born in Pittsburgh and graduated from Penn State college, he went to Youngstown in 1909 from Duquesne, Pa., to supervise the construction of the Republic Steel open-hearth plant. He later joined the Sharon Steel Hoop Co., and was superintendent of that firm for several years.

♦ ♦ ♦
James Close, 60, iron pipe manufacturer, in Tucson, Ariz., recently. Born in Waterbury, Conn., he began his business career there with the firm of Holmes, Booth & Hayden, makers of iron pipe. He moved to Newark, N. J., in 1897, and founded and became first president of the New Jersey Tube Co. For the past ten years Mr. Close had been associated with the Pipe & Tube Bending Co. of America, Newark, N. J.

♦ ♦ ♦
Joseph J. Petch, 39, stainless steel expert in the midwestern section for Allegheny Steel Co., Brackenridge, Pa., in Chicago, Feb. 8. Mr. Petch, long associated with the stainless steel industry, for eight years before joining the Allegheny company was located at Massillon, O., with the United Alloys Steel Co., now a part of Republic Steel Corp. He went to Chicago 12 years ago. During the war Mr. Petch left Ohio State university to serve as a naval ensign in foreign waters.

35,000,000 Tons, 1936 Ore Estimate; Deals in Vessels

PRELIMINARY estimates of Lake Superior iron ore shipments this season center on 35,000,000 tons, about 25 per cent more than in 1935 and largest since 1930, when 47,000,000 tons were shipped.

Stocks at lower lake ports and furnaces have been reduced to normal proportions. In January consumption amounted to 2,933,000 tons, 5 per cent less than in December. Available stocks Feb. 1 were 28,408,000 tons, 3,600,000 tons less than on Feb. 1 last year.

Consumption this month probably will fall below that of January; both March and April are expected to show fairly good gains. As the iron ore men see it, approximately 8,500,000 tons of ore will have been consumed by May 1, leaving a stock balance of 19,908,000 tons. On May 1 last year the stocks amounted to 24,816,000 tons.

Depends on Iron, Steel Demand

This situation, with prospects for increased iron and steel production, is considered one of the best indicators of a substantial rise in the ore movement.

No important change is anticipated this season in the ratio of ore consumption to pig iron production, and as the quality of the lake ore has been standardized to within fractional limits, ore shipments are likely to increase in almost the same proportion as pig iron production.

Last year pig iron output was 31.7 per cent over 1934, while ore shipments were 29 per cent above 1934. To say, then, that the iron ore shippers expect a gain of 25 per cent this year in their tonnage is equivalent to indicating what they anticipate the year will bring forth in pig iron output. To a considerable extent their estimate is based on conferences with their associated iron and steel companies and others to whom they supply ore.

Despite the larger use of scrap in 1935, more iron ore was used for the pig iron produced than in any year since 1930. The ratio was 1.717 tons of lake ore to one ton of pig iron made with lake ore. The ratio was 1.726 in 1930; 1.766 in 1929, and 1.8 in 1923, highest on record.

To keep down their costs in 1932, when demand and prices were low, pig iron manufacturers used all the flue dust and yard stocks they could collect. Only 1.414 tons of ore was used in that year for each ton of

pig iron manufactured, as an average.

As demand for pig iron increased, so did the proportionate use of ore. High scrap prices are expected to be a contributing factor in raising ore shipments this year.

Final figures on Lake Superior shipments in 1935, as compiled by the Lake Superior iron ore association, Cleveland, show a total of 28,503,501 tons, compared with 22,063,824 tons in 1934.

The 1935 total includes 144,692 tons shipped all-rail. This all-rail movement contrasts with 60,444 tons in 1934. The sharp increase was due mainly to the relighting of the Zenith furnace at Duluth late in the year.

The Oliver Iron Mining Co., United States Steel Corp. subsidiary, shipped 10,372,143 tons in 1935, or 36.3 per cent of the total, whereas in 1934 its proportion was 40 per cent.

The Blueberry mine, formerly the Ford Motor Co.'s model iron ore property on the Marquette range, now operated under a new management increased its shipments to 353,719 tons, from 253,267.

Shipments of beneficiated iron ore totaled 10,140,782 tons, 32 per cent, about the same proportion as for several years. In this were included 5,011,605 tons of concentrates, while the remaining tonnage was merely crushed or screened.

Looking for Vessels

An indication of increased activity in iron ore is the purchase by the M. A. Hanna Co., Cleveland, which hauls ore for the National Steel Corp., of the bulk freighter WORRELL CLARKSON from the Kinsman Transil Co., Cleveland. The Clarkson is a 600-foot, 12,000-ton boat.

The Inland Steel Co. and the International Harvester Co., operating the Wisconsin Steel Works, both of Chicago, have been inspecting some freighters with a view to enlarging their fleets.

There is the possibility that Inland may order a large freighter for 1937 delivery, which would be the first since 1929. There is no shortage of carrying capacity, but much of it is in small vessels, which are not economical to operate.

The American fleet of Great Lakes bulk cargo carriers comprises 324 vessels, but the maximum number in commission last year was 186. This was 57.4 per cent of the number, but represented 62 per cent of carrying capacity.

The fleet could haul 80,000,000

tons of ore in a season, vessel men say, but the railroads are not equipped to handle that amount, even if blast furnaces wanted it. When shipments soared to 65,000,000 tons in 1929 some delay was encountered due to the lack of railroad dock facilities.

This is not viewed as a problem, because shippers do not envision such a tonnage again for many years. In

the pre-depression period normal annual shipments were considered 55,000,000 to 60,000,000 tons. Mine capacity as well as vessel capacity was developed to this point, and even beyond.

The assumption, however, that because the number of vessels has outrun demand there is no need among individual companies for more boats is incorrect. Some iron and steel in-

terests have more than enough; others apparently do not have sufficient, and with shipments again on the upgrade this is leading to readjustments.

The doubt which assails the industry as to whether ore shipments will return to their former "normal" for many years has led some of the smaller independent vessel interests to consider their position.

Lake Superior Iron Ore Shipments in 1935 and 1934

Mesabi Range

1935		1934		1935		1934		1935		1934	
Adams-Spruce Group	1,719,511	1,326,272	Harold	42,998	7,171	Malta	30,442	39,727	Snyder	130,333	
Agnew	98,151	30,646	Harrison	23,159	106,857	Margaret		161,405	South Uno		
Albany	252,588		Hartley-Burt	2,107,643	2,000,942	Minorca	61,640	39,918	G. N.	6,228	22,741
Alexandria	446,255	209,802	Hawkins	203,272	114,716	Morrison	180,237	171,273	South Uno		
Biwabik	472,892	327,330	Hill Annex	1,720,962	496,804	Morrison	725,763	575,861	N. P.	18,016	35,312
Bruce	169,406	104,409	Hoadley	54,346	23,991	Mesabi Chief	837,402	779,441	Stevenson	188,822	71,373
Bruce Annex	23,664		Hull Rust	213,790	175,154	Minnewas		555,693	Susque-		
Burt-Pool-Day	307,209	215,938	Julia	13,644		Mississippi No. 2	73,275	48,078	hanna	403,369	302,491
Canisteo	605,095	430,142	Kinney	241,243	145,206	North Har-			Union		110,528
Commodore	66,024	56,688	Langdon	230,412	72,802	rison	46,195	61,511	Utica Exten-		28,271
Dale	72,400	46,148	LaRue	238,063	110,490	Patrick-Ann	135,578	220,310	Wacootah	259,721	75,956
Danube		194	Leonidas	820,019	285,006	Quinn	24,689		Webb	288,381	165,572
Drew		103,531	Lincoln	105,112	60,928	St. Paul	263,375	181,621	Wheeling	138,224	74,204
Dunwoody	22,615	551,522	Mace No. 2	106,359		Sargent	130,720	125,684	York	68,333	75,985
Genoa-Sparta	65,522		Magnetic Con-	11,143	4,652	Scranton	242,151	282,416	Total	18,877,537	14,650,099
Godfrey	438,674	351,112	Mahoning	778,560	857,570	Sellers	2,309,152	1,170,416			
Halobe	403,151	173,018	Mahoning Rust	51,280	75,926	Shenango	190,324	358,789			
						Sheriden		1,756			

Menominee Range

1935		1934		1935		1934		1935		1934	
Balkan-Judson	63,682	19,177	Davidson Group	96,336	50,588	Homer	13,638		Tobin	86,297	12,903
Bates	193,351	148,078	Fogarty	25,232	7,874	James	175,014	42,061	Virgil	64,792	
Bengal	16,923	7,668	Forbes	122,884	19,796	Loretto	40,893	50,087	Warner		115,154
Bristol		162,594	Genesee	27,286	114,485	Monongahela		71,885	West Chapin	29,183	17,243
Buck	21,538	10,629	Hiawatha No. 1	284,228	152,598	Odgers	65,332	52,285	Zimmerman	52,073	6,245
Caspian	20,695	23,404	Hiawatha No. 2	424		Penn Mines	125,538	59,280	Total	1,634,022	1,335,027
Chapin		190,993				Quinnesec	7,179				
Cornell	20,616					Riverton	60,113				
						Rogers	20,775				

Marquette Range

1935		1934		1935		1934		1935		1934	
Archibald	26,828	3,750	Gardner-Mackinaw	144,467	110,264	Lloyd	180,208	99,023	Rolling Mill	25,338	
Athens	261,840	139,021	Greenwood	68,308	52,394	Maas	333,998	331,413	Stephenson	14,458	
Blueberry	353,719	253,267	Isabella		112,254	Morris	275,786	248,824	Tilden	190,511	167,688
Cambria	147,117	205,301	Lake Superior-Holmes	193,490	112,254	Negaunee	362,525	149,801	Volunteer	121,498	172,884
Cliffs Shaft	398,502	237,439				Princeton	101	134	Total	3,265,537	2,473,847
Francis	44,917	13,883				Richmond	121,926	86,067			

Gogebic Range

1935		1934		1935		1934		1935		1934	
Anvil	8,081	18,487	Keweenaw	82,874	5,270	Palms	14,477	33,660	Wakefield	231,933	204,129
Cary	55,860	14,094	Montreal	672,980	582,140	Puritan	204,341	281,973	Total	3,070,825	2,287,131
Eureka-Asteroid	323,291	234,945	Newport	519,160	185,775	Sunday Lake	120,176	140,128			
Ironton	344,577	312,710	Norrie-Aurora	357,817	155,255	Tilden	79,562	46,941			
						Townsite	55,696	71,624			

Cuyuna Range

1935		1934		1935		1934		1935		1934	
Alstead-Hillcrest Grp.	77,931	59,793	Mahnomen	151,286		Wearne Pit	4,086		Pioneer	465,731	430,116
Croft		85,640	Maroco Stock-pile		18,455	Wearne Stock-pile	79,958	70,581	Sibley	109,054	140,393
Evergreen	129,220	92,332	Portsmouth	71,005	81,244	Total	798,481	532,571	Soudan	108,319	113,685
Louise	55,655	17,760	Sagamore	229,340	106,766	Total	798,481	532,571	Zenith	173,995	100,955

Vermillion Range

Total 857,099 785,149
GRAND TOTAL 28,503,501 22,063,824

What Petroleum Means to Metalworking Industries

ONE of our worthy contemporaries in the business paper field, *National Petroleum News*, has just issued a 516-page special number in which its editors have done a remarkably good job of explaining what America's oil industry means to the public, to government and to all industry. Inasmuch as so many readers of *STEEL* enjoy vendor or customer relationships with oil companies, we believe a brief summary of the facts presented by *National Petroleum News* will be instructive and enlightening.

The oil industry has properties in every state, representing a total investment of \$13,276,000,000. Included in these properties are 333,070 producing wells, 115,000 miles of petroleum pipe lines, 638 refineries, 766 natural gasoline plants, 170,400 gasoline filling stations, 26,200 bulk stations, 750 tankers, 144,000 railroad tank cars, 5000 miles of gasoline pipe lines and 150,000 motor truck and trailers. The 999,800 employes who man these properties are paid \$1,217,000,000 in wages annually. The industry's bill for supplies for operations, maintenance and expansion amounts to \$876,000,000 per year.

Half of Oil Industry's Annual Supply Bill Goes for Well-Drilling Equipment

Of this last-named figure, \$440,000,000, or more than 50 per cent, goes for drilling equipment. This expenditure is important to the iron, steel and metalworking industries—more important today than at any time in the development of the oil industry. Those whose memories go back to the boom period of the Pennsylvania fields know that the drilling equipment of Derrick City, Custer City, Reno, Oil City, Titusville, etc. involved more wood than steel. Derricks, bullwheels, walking beams and even the smaller tanks were of wood. Today the drilling equipment of the Oklahoma City, East Texas, Kettleman Hills and other more recently developed fields embraces steel almost to the exclusion of wood. Therefore, a large portion of the annual expenditure of \$440,000,000 for drilling equipment goes to metalworking companies.

The remainder of oil's annual bill of \$876,000,000 includes \$72,000,000 for production equipment, \$30,000,000 for the upkeep of refineries, \$40,000,000 for new refineries, \$30,000,

000 for trucks, \$59,000,000 for service stations, \$80,000,000 for containers and packaging, and \$125,000,000 for miscellaneous. Obviously the metal industries receive a big slice of the expenditures for each of these items.

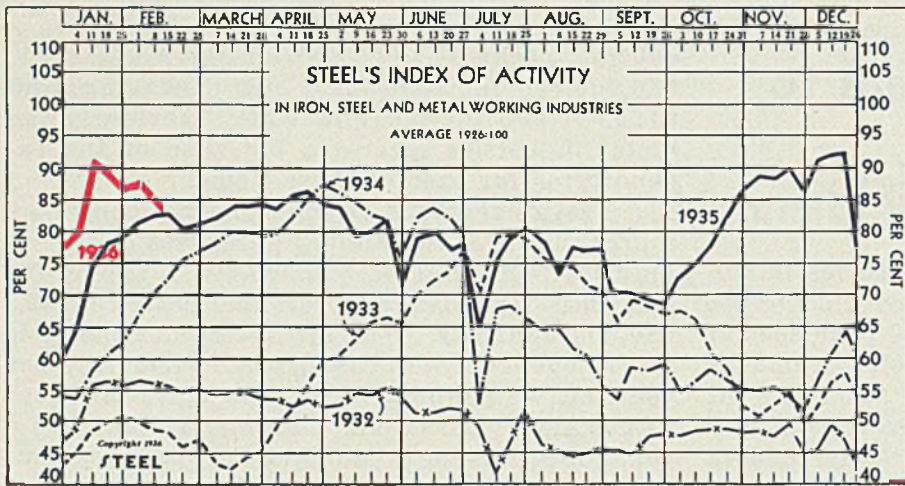
Actual dimensions of this slice are shown by a breakdown of the annual purchases of the oil industry. A total of \$25,000,000 is spent for tin cans. Railroad tank cars and parts cost \$5,480,000 annually. The bill for return bends is \$1,070,000. Oil well casing costs \$6,580,000 per year, oil well tubing \$2,045,100 and still tubes \$4,256,400. The industry spends \$55,300,000 a year for drums for oil and grease. It buys about \$2,993,200 worth of plates. Pipe, other than mentioned previously, costs \$3,812,800. Pails for grease account for an annual outlay of \$2,760,000. The surprising sum of \$1,613,000 is spent for grease guns. Pipe fittings account for \$2,352,300 and \$4,128,900 goes for valves and valve parts. Engines and parts cost \$2,275,500. Compressors represent an annual bill of \$3,000,000. Motor trucks and truck parts account for the considerable outlay of \$30,528,800 yearly.

Metalworking Industries in Dual Relationship Of Vendor and Customer with Oil Industry

Tanks cost \$4,062,300. Steel castings are bought at the rate of \$1,338,100 per year. Pumps, representing an outstanding requisite of the oil industry, cost \$16,400,900 annually. In addition to these items there are steel sheets, structural shapes, sucker rods, rivets, bolts, boilers, blowers, jacks, etc. which account for an expenditure of many millions of dollars.

These items add up to the credit side of the metalworking industries' ledger. There is a substantial offset in the large amount which these industries pay to the petroleum interests for fuel oil, gasoline, gas and other products. This reciprocal relationship suggests that oil, on one hand, and steel and its affiliated metalworking interests on the other, should be sympathetic to each other's major problems. The latter group is concerned with the petroleum industry's acute tax problem, with its task of promoting conservation, and with the vexing intricacies of its distribution problem. The better the oil companies can combat these obstacles, the greater will be the opportunity for the steel and metalworking concerns to serve their important customer more effectively. Conversely, the better the petroleum industry understands the major problems of steel and its allied industries, the more advantageous will be the dual relationship of vendor and purchaser.

THE BUSINESS TREND



STEEL'S index of activity in the iron, steel and metalworking industries declined 2.6 points to 83.9 in the week ending Feb. 8:

Week ending	1935	1934	1933	1932
Dec. 21	91.9	64.4	58.0	46.9
Dec. 28	77.3	60.8	53.7	42.9
Jan. 4	78.2	65.4	53.6	45.3
Jan. 11	90.2	73.8	58.1	48.6
Jan. 18	89.3	78.1	60.9	49.8
Jan. 25	86.0	79.5	62.3	50.8
Feb. 1	86.5†	81.8	66.9	49.9
Feb. 8	83.9*	82.7	70.7	48.7

†Revised *Preliminary.

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

Is Industry Beginning To Find Its Stride for 1936?

NOW that the trend line for business in 1936 has been traced through a period of six weeks, it is apparent that abnormal factors are affecting it appreciably. The most important disturbing influence is the shifting of the automobile season. That factor alone has played havoc with the familiar first-quarter trend that has run true to form in recent years.

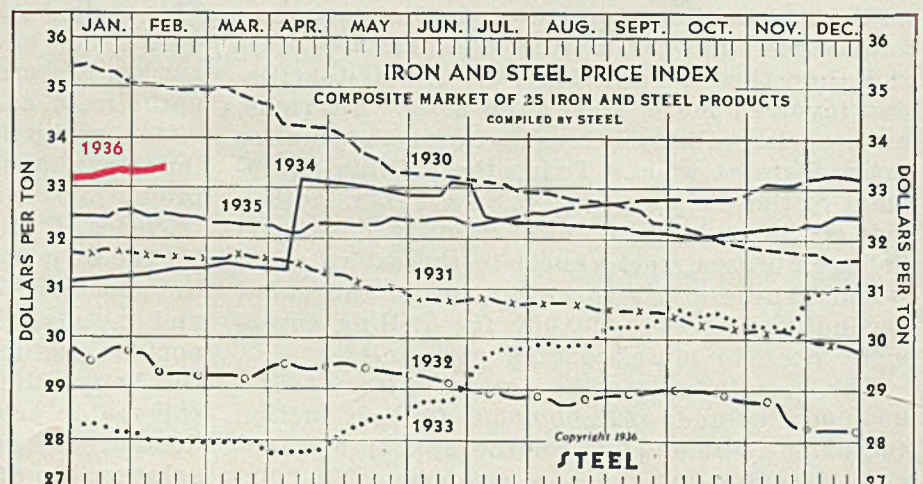
This is shown clearly by STEEL'S index of industrial activity. The index has been bobbing up and down uncertainly, whereas the customary pattern calls for a steady rise during the early part of the first quarter. Steelworks operations,

electric power output, revenue freight car loadings and numerous other barometers all are showing a tendency to follow the normal pattern. Against this trend we find that automobile production, due to the man-made attempt to shift the seasons, is swinging steadily downward. The low point may be reached late this month, or it may be pushed over into March.

However, there are signs that strong support is coming from the heavy goods industries and from other sources, which is offsetting to some extent the temporary weakness of the automobile situation. Again, the present prolonged spell of severe weather has affected activity appreciably, thus introducing a short-term variable which is difficult to appraise.

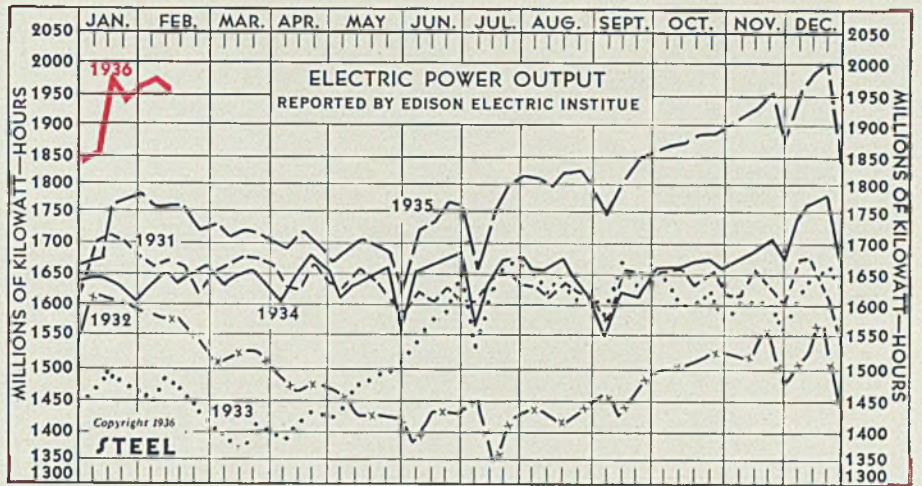
It is possible that under the cover of these abnormal influences, industry is settling down to a measured stride of about 85 on STEEL'S index.

	1936	1935	1934
Feb. 8	\$33.44	\$32.56	\$31.30
Feb. 1	33.40	32.56	31.21
Jan. 25	33.38	32.60	31.20
Jan. 18	33.34	32.62	31.17
Jan. 11	33.33	32.57	31.13
Jan. 4	33.31	32.51	31.10
Dec. 28	33.31	32.46	31.07
Dec. 21	33.31	32.46	31.07
Dec. 14	33.32	32.44	31.01
Dec. 7	33.30	32.25	30.96



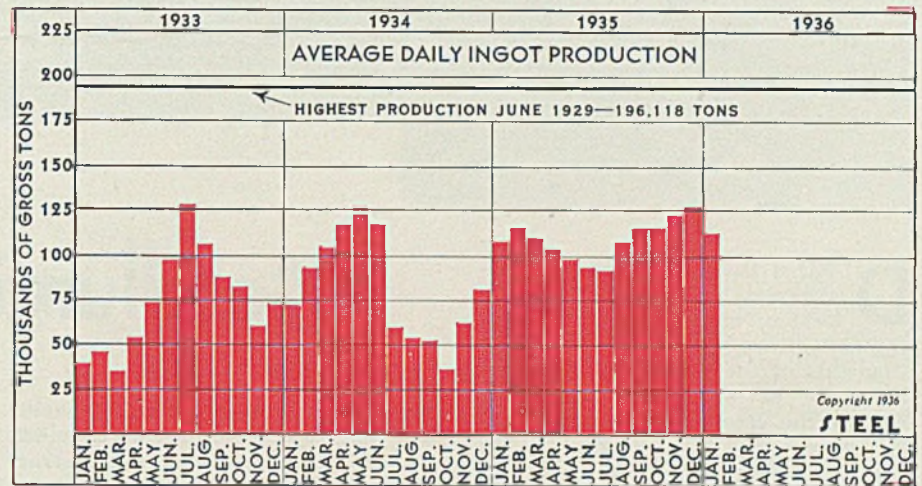
Electric Power Production Registers Slight Drop

	Millions Kw.-Hrs.			
	1936	1935	1934	1933
Feb. 8	1952	1763	1652	1482
Feb. 1	1962	1762	1636	1454
Jan. 25	1955	1781	1611	1469
Jan. 18	1949	1778	1625	1484
Jan. 11	1970	1772	1646	1495
Jan. 4	1854	1668	1564	1461
	1935	1934	1933	1932
Dec. 28	1847	1650	1539	1415
Dec. 21	2002	1788	1657	1554
Dec. 14	1983	1767	1644	1563
Dec. 7	1970	1743	1619	1519
Nov. 30	1877	1684	1554	1510
Nov. 23	1953	1705	1608	1475



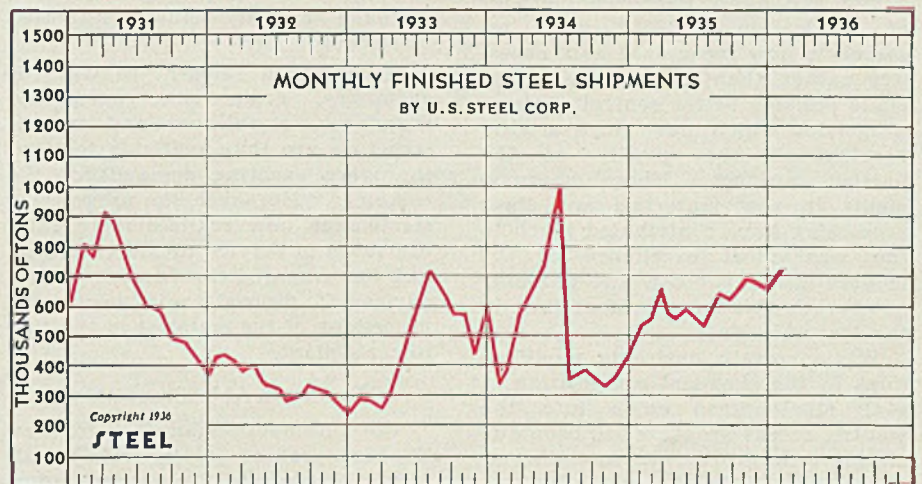
January Ingot Production Shows Moderate Decline

	Gross Tons		
	1936	1935	1934
Jan.	112,942	106,353	73,968
Feb.	115,740	92,164	92,164
March	110,313	103,646	103,646
April	101,558	117,443	117,443
May	97,624	125,907	125,907
June	89,236	117,672	117,672
July	87,316	59,578	59,578
Aug.	108,123	51,161	51,161
Sept.	113,193	50,759	50,759
Oct.	116,545	54,885	54,885
Nov.	121,279	61,947	61,947
Dec.	123,272	78,570	78,570



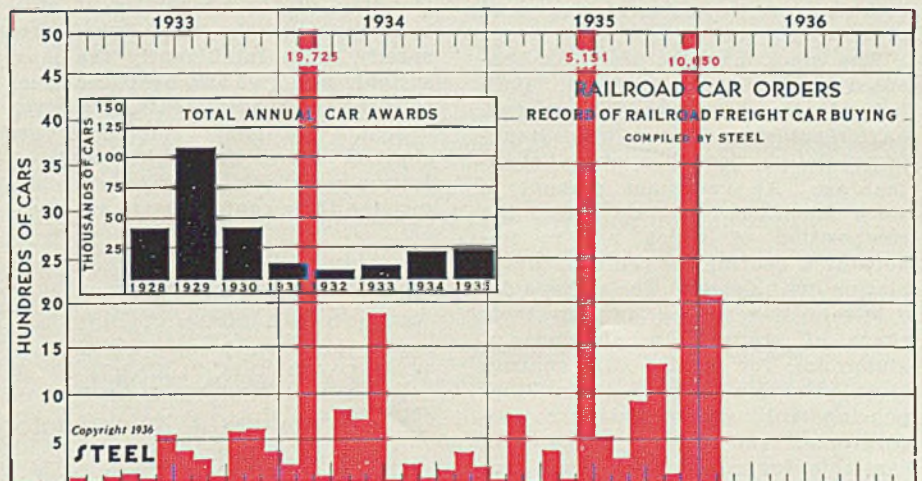
Finished Steel Shipments Up Sharply in January

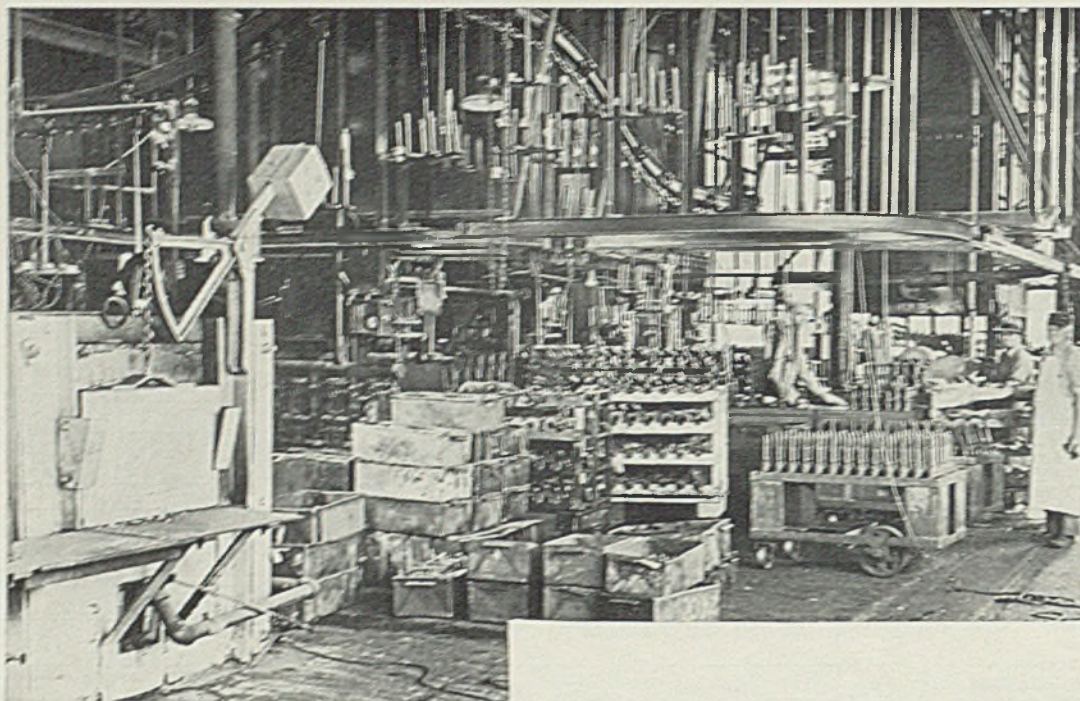
	Gross Tons		
	1936	1935	1934
Jan.	721,414	534,055	331,777
Feb.	583,137	385,500	385,500
March	668,056	588,209	588,209
April	591,728	643,009	643,009
May	598,915	745,063	745,063
June	578,108	985,337	985,337
July	547,794	369,938	369,938
Aug.	624,497	378,023	378,023
Sept.	614,933	370,306	370,306
Oct.	686,741	343,962	343,962
Nov.	681,820	366,119	366,119
Dec.	661,515	418,630	418,630



Freight Car Buying Declines Sharply in January

	1936	1935	1934	1933
	Jan.	2,050	24	152	3
Feb.	806	19,725	0	0
March	0	30	5	5
April	350	800	50	50
May	2	717	8	8
June	5,151	1,835	500	500
July	500	19	306	306
Aug.	200	105	202	202
Sept.	875	7	23	23
Oct.	1,250	75	514	514
Nov.	100	254	533	533
Dec.	10,050	110	316	316





GENERAL view in the transmission gear department at Buick, showing annealing furnace at left, and cyanide hardening equipment in the background

DURING the past decade notable progress has been made in the field of metallurgy, this being especially true with respect to steel. Demands of the motor car manufacturer for better quality have been met by the steel industry with gratifying results. The car builder, in turn, has been ever on the alert to devise and apply improved methods of fabrication. Metallurgical research is now recognized as a necessity rather than a luxury and has made possible better control of those properties which have such a vital bearing on the quality of the finished product. These improvements in raw materials and their processing have contributed much to the mechanical excellence of the modern passenger car, and probably nowhere is this more evident than in the transmission.

While certain desirable modifications in the chemical composition of gear steels have come into the picture, recent progress has been due mainly to improvements in the steels already available through advanced technique in their manufacture and processing.

The steel manufacturer has benefited much through research. Both individual and co-operative research have resulted in a better understanding of the physical chemistry of steel-making. An enormous amount of work has been done on slags, the composition of which has so important a bearing on the final deoxidation of the steel. The various deoxidizers have come in for their share of study; also the use of aluminum for grain size control. More attention is paid to melting, pouring, rolling and finishing temperatures, and better means are available for controlling these tem-

Metallurgical Aspects

peratures. Better design of molds and hot tops has contributed much to the improvement of ingot structure and soundness. The effects of occluded gases are being investigated more thoroughly.

Steels with closer control of chemistry, grain size, normality, soundness, cleanliness and macrostructure are thus available to meet the more exacting demands of the customer. Moreover, the progressive steelmaker now realizes more fully the value of service to the customer, and is prepared to furnish expert advice, if desired, relative to the processing of the material in the customer's plant.

Research Aids Customers

The automobile manufacturer has, likewise, profited greatly from metallurgical research. A better understanding of the properties of steel has enabled the metallurgist to specify more intelligently the most suitable material and heat treatment to meet the requirements of a given design. Incoming shipments are checked more thoroughly and effectively by the laboratory to determine their conformity to specifica-

tion. Better forging and heat treating equipment, together with better practice, insures higher and more uniform physical properties in the finished product.

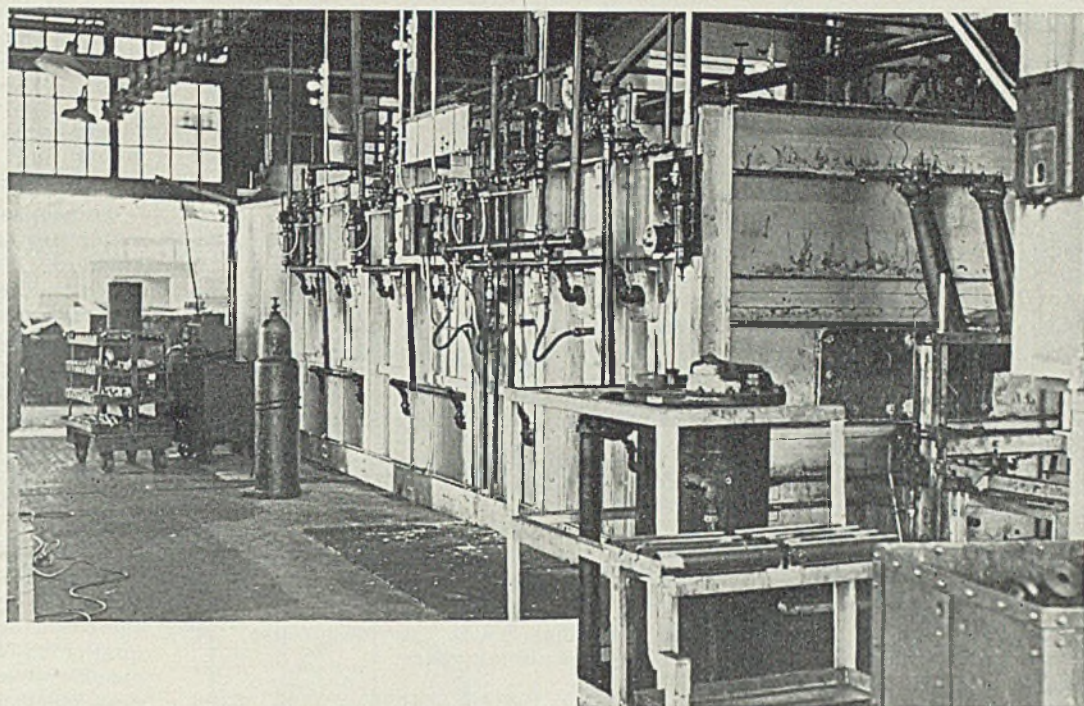
In order to give satisfactory service to the customer, a transmission must fulfill certain definite mechanical requirements. It must be silent in operation, shift smoothly and easily, stay in gear and stand up for the life of the car. In addition, it must conform to certain restrictions as to size and weight. It should be designed and built, not for average service, but for the most severe service it will encounter in the hands of the public.

In adequately meeting these requirements, the main considerations are design, materials and manufacturing. The three are so closely related and each one is so dependent upon the other two, that only by the closest co-operation between engineering and metallurgical departments and the shop, can satisfactory results be obtained.

The engineer must design the job with full knowledge of the limitations of materials and shop practice. The metallurgist must choose a material and heat treatment best suited to that particular design and method of manufacture. He also must maintain the proper standard of quality through enforcement of rigid specifications and by accurate control of metallurgical processing in the plant. The shop must manufacture to the required standards of accuracy and finish and make the necessary com-

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Chief Metallurgist, Buick Motor
Co., Flint, Mich.

CLOSEUP of controlled atmosphere hardening furnace and draw furnace (in foreground) at the Buick plant, for the continuous hardening of transmission gears



of Transmission Gears

pensations for errors introduced by distortion in hardening.

Gear noise usually is the most difficult problem to solve in the production of passenger car transmissions. Its primary cause is improper tooth contact. This may result from faulty design, inaccurate machining, or distortion in hardening. With a design that is fundamentally correct from a purely mechanical standpoint, the engineer still can be of much help in the control of distortion. Often such factors as thin sections, abrupt changes of section and other shapes which tend to distort badly can, with a little thought, be modified so as to lessen distortion troubles greatly.

Distortion and Noise

Machining and hardening, providing the engineer has done his part, must assume the responsibility for gear noise. While a minimum degree of distortion is desirable, it is not essential, since suitable compensation can readily be made in the machine shop for dimensional changes providing they are sufficiently uniform; it is variable distortion which causes so much trouble. Distortion troubles may not be directly due to improper hardening. Although occurring in the hardening operation, variable dimensional changes are often the result of nonuniformities in the steel which may be traced to previous processing and even back to the melting operation itself.

There are two general types of failure to which transmission gears

are subject, namely, wear and breakage.

Wear occurs in several different forms. Pitting is the most common

variety and is caused by fatigue of the tooth face due to compressive stress. Small particles of the surface actually lift out, leaving numerous cavities. This produces roughness, resulting in higher unit pressures with a cumulative effect in developing further pitting. Another form of wear is known as scoring, in which

Recent developments in the field of metallurgy have contributed much to the mechanical excellence of the modern passenger car. This is especially true with respect to the transmission where high-grade alloy steels are so essential. Research by both the steelmaker and the car builder has been largely responsible for the progress that has been made.

It is only by the proper co-ordination of design, material and manufacturing that the high standards of quality required today can be maintained. This is emphasized in the accompanying discussion by Mr. Schenck who has been chief metallurgist at Buick for 15 years, prior to which he was associated with the Duquesne works of Carnegie Steel Co. This article, which will appear in two installments, comprises a paper presented by Mr. Schenck before a production session at the annual meeting of the Society of Automotive Engineers in Detroit, January 13-17.

The first installment reviews current metallurgical practice employed throughout the industry and covers the various gear steels in use, together with their forging, annealing, hardening, drawing and physical properties. The second section, to appear in an early issue of *STEEL*, is devoted to Buick practice, with a detailed discussion of the material and its processing, and a brief description of an improved method of hardening now in a state of development.

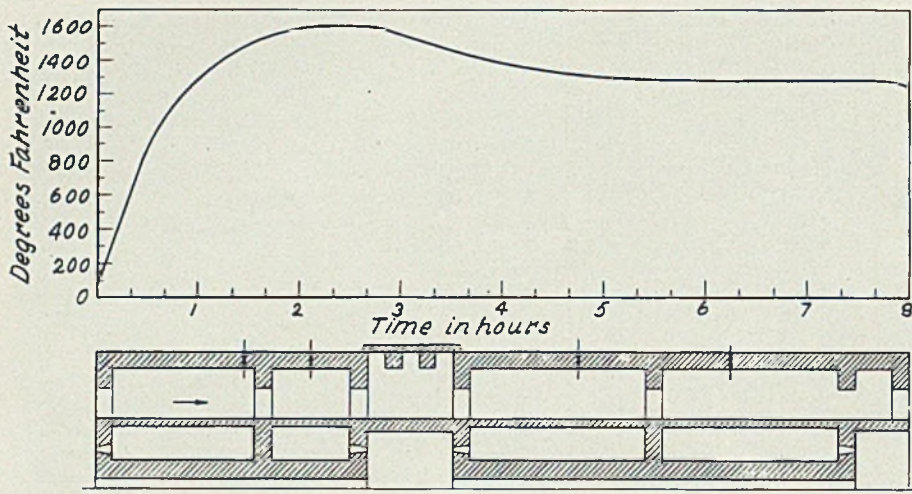


Fig. 1—Sketch of continuous annealing furnace, with time-temperature curves above

the surface metal appears to be flowed and torn, producing a roughened condition. It is believed that welding of minute areas from the heat of friction is responsible for scoring. Both pitting and scoring produce gear noise and may be caused by improper design, poor contact, low surface hardness, or excessive overloading.

Tooth breakage is of two distinct types—one due to brittleness or low impact value and the other to fatigue. They can be readily distinguished by the appearance of the fracture. The best safeguard against brittleness is to make frequent checks of impact value and be sure that all gears are drawn properly. Fatigue failure may be caused by incorrect design, poor contact, low tooth strength, excessive overloading, or notch effects due to undercuts, roughness or scratches at the base of the tooth.

Sources of Failures

The factors enumerated in the preceding paragraphs which tend to cause gear failure, either increase stress or lower the ability of the material to withstand stress. Pitting and fatigue breakage are true fatigue failures. They are progressive and are due to the effect of repeated stress. Failure may result from either a few cycles of high stress or many cycles of a lower stress. If the stress is below a certain critical value for a given material and treatment, an infinite number of cycles can be applied without failure. This critical value of stress corresponds to the fatigue limit. Failures due to brittleness are not progressive and may result from a single application of stress above the elastic limit, which could readily be absorbed by a tough material without appreciable damage.

A recent survey of the industry covering 20 companies manufacturing passenger cars, shows the fol-

lowing S.A.E. steels in use for transmission gears:

2515	3145	4615	5135	6150
		4620	5140	
		4640	5145	
			5150	

These steels consist of two distinct groups with respect to carbon content, heat treatment, and physical properties. For convenience we will refer to them as "low carbon" and "high carbon," the former comprising 2515, 4615 and 4620, and the latter including the balance of the steels in the list. The high-carbon steels represent about 90 per cent of the total production.

A further grouping with respect to melting process classifies the three 4600 steels, with several minor exceptions, as electric and all the other steels as open hearth. The relative merits of the two processes are a matter of some disagreement at the present time; preferences seem, in most cases, to be based more on theoretical considerations than on actual data from comparative tests.

Grain size is now an important part of all specifications for gear steels. The low-carbon steels, with few exceptions, are ordered to a range of 6-8 on the A. S. T. M. chart. Practice varies with the high-carbon steels, ranges of 4-6, 5-7, and 6-8 being in general use.

In addition to chemistry and grain

size, special requirements covering other characteristics affecting quality, such as normality, banding, inclusions, macrostructure, and hardenability, frequently are added. Carbon ranges are usually limited to five points and other chemical restrictions are sometimes found desirable.

Transmission gears are forged either in an upsetter or under a hammer. Small gears, such as the reverse idler, are sometimes machined from bar stock. There is some difference of opinion regarding this practice although it has been employed successfully for a number of years.

Die design is of the utmost importance, especially with reference to producing a smooth flow of metal and a symmetrical arrangement of the flow lines about the axis of the gear. It is also essential that the dies be kept in good condition. Increased die life at the expense of quality in the forging is often an expensive economy. Proper metal flow must be maintained uniformly for maximum physical properties and minimum distortion in hardening. Fortunately, we have a useful tool in the macroetch, which furnishes an excellent picture of how the metal behaves in the die.

Improved Furnaces Needed

Forging temperature is another important factor in producing good gears. For each steel there is a certain temperature range which gives the best results. The old style manually operated forge furnace, in which the control of time and temperature depends entirely upon the skill of the heater, is still in general use. It is to be hoped that recent developments in continuous heat treating furnaces with automatic temperature regulation and controlled atmosphere soon will be successfully applied to forging.

Much depends upon the operation of annealing, the purpose of which is to develop the most suitable structures for machining and hardening. Fortunately, the best structure for machining is usually the best for hardening.

Annealing temperatures and time cycles vary with the different steels, depending upon their individual characteristics and variations in

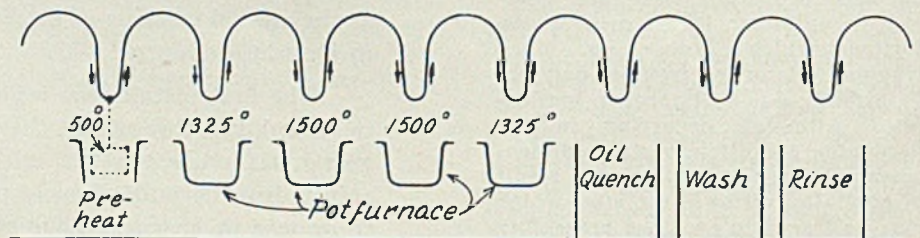


Fig. 2—Diagrammatic representation of continuous cyanide hardening equipment, in which the charge is carried through preheat, four cyanide pots, quenching, washing and rinsing

plant practice. The double treatment, consisting of a normalize and an anneal in two separate operations, extensively used at one time, is now practically obsolete, and has been replaced by the single high temperature treatment.

Continuous annealing furnaces with automatic temperature regulation, as shown diagrammatically in Fig. 1, are now in general use and permit much better control of the annealing cycle than was possible with the old style batch furnace.

The low-carbon steels are either furnace cooled or air cooled through the lower critical point from temperatures in the neighborhood of 1750 degrees Fahr. or higher. S.A.E. 2515 steel, with its high alloy content, has a tendency to air harden and requires slow cooling. Practice varies with S.A.E. 4615 and 4620, some plants using an air cool and others a slow cool. In air cooling, the gears should be spread out so as to obtain as nearly uniform a cooling rate as possible. Sometimes the charge is allowed to drop 100 degrees or more in the furnace before discharging for air cooling.

Cooling High-Carbon Steels

The high-carbon steels all require slow cooling through the lower critical. Annealing temperatures vary, but usually range from 1550 to 1750 degrees Fahr. These steels are extremely sensitive to the rate of cooling through the A_1 temperature and the greatest possible uniformity is necessary in order to maintain a desired structure. They are also sensitive to variations in annealing temperature, an increase in temperature requiring a slower rate of cooling.

A cooling rate which produces lamellar pearlite or its equivalent seems to give the best all around results. The S.A.E. 4600 steels do not readily form lamellar pearlite, but develop a corresponding optimum structure of their own which is peculiar to steels containing molybdenum. Structures containing more than small amounts of either sorbite or spheroidal cementite are liable to cause trouble in machining. Excessive spheroidization in the high-carbon steels may cause serious difficulties in hardening where short time cycles are employed.

Differences in grain size have an effect on pearlite formation and tend to produce irregularities in structure. A fine grain must be cooled through the A_1 point more rapidly than a coarse grain to develop the same amount of pearlite. The so-called duplex or mixed structures are, for this reason, more difficult to anneal properly than either a uniformly coarse or fine grain.

Since, in duplexed steel, the various sized grains start rapid growth at different temperatures, the best results should be obtained by

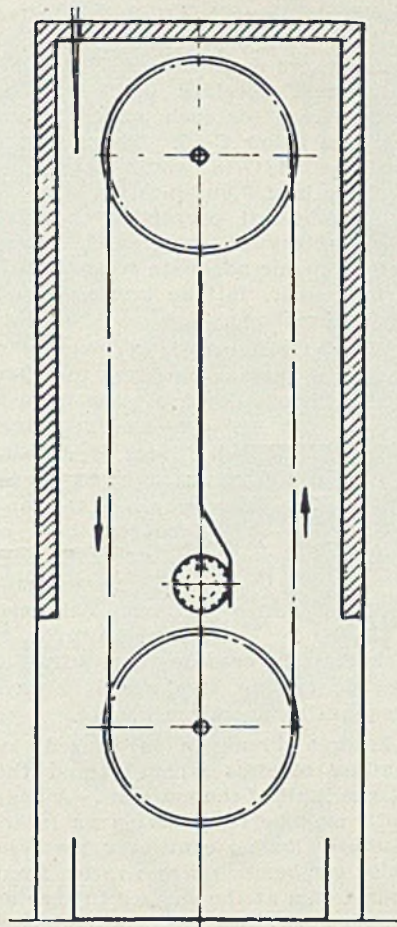


Fig. 3—Sketch of vertical gas-fired continuous draw furnace

using either a high or a comparatively low temperature for annealing. A sufficiently high temperature tends to produce a uniformly coarse grain, while a temperature below the coarsening point of all the grains will develop a uniformly fine grain. Since coarse grained steel generally machines more freely, the high temperature anneal should be preferable. High temperatures are also more effective in correcting banded structures which sometimes occur in an aggravated form, and tend to cause poor machining and excessive distortion in hardening. However, temperatures in excess of 1750 degrees Fahr., which is probably below the minimum for uniform coarsening, produce excessive scaling and high maintenance cost of equipment and are not used extensively.

In modern practice, all transmission gears are case hardened. Low-carbon gears are pack carburized and high-carbon gears are hardened from cyanide or some similarly activated bath. To the best of the writer's knowledge, the only exception to this practice for high-carbon gears is a new development in controlled atmosphere hardening which will be described later in this article. While cyanide hardening of gears has been employed for many years, it is only recently that it has come into such general use. Formerly, large quan-

ties of high-carbon steel gears were hardened from lead pots and atmospheric furnaces, but recent demands for a more wear-resisting surface have made these older methods obsolete.

The usual practice with low-carbon gears is to harden directly from the carburizing box. With the fine grained steels now available, this treatment develops high physical properties and greatly simplifies the hardening procedure. The carburizing temperature is usually 1700 degrees Fahr. The gears are quenched from this temperature or the box may be allowed to cool 100 degrees or more before quenching. In cases where distortion requires closer control and maximum core properties are not essential, the gears are cooled in the carburizing box and reheated in cyanide to 1400-1500 degrees Fahr. for hardening.

Practice in Carburizing

The carburizing furnaces are usually of the continuous type with automatic temperature control and may be either fuel-fired or electric. Boxes generally are made of heat-resisting alloy and are either cast, or fabricated from rolled steel by welding. Both cast and rolled steel often are used in the same box. An arrangement sometimes used to insure uniform quenching conditions consists of a frame in the quenching tank, similar to the partitions in an egg crate, which provides a separate compartment for each gear.

Two different methods are used in the cyanide hardening of high-carbon gears. The one consists of a complete heating cycle in cyanide, and the other, a cycle which starts in an atmospheric furnace and finishes in cyanide. The first method is the one in most general use.

In the first method, the gears are usually preheated to a low temperature before they are placed in the cyanide bath. This removes moisture and prevents explosions which might otherwise occur. The preheat also lessens the time required to reach full temperature in the cyanide. The preheat furnace may be independently fired or it may be heated by the products of combustion from the cyanide pot.

In the second method, the stock is brought to temperature in an electric or fuel-fired atmospheric furnace and transferred to the cyanide bath. Before placing in the cyanide, the gears usually are given a rapid wire-brushing to remove the scale which forms in the first furnace. The time in the cyanide varies from a few seconds, sometimes called a "dip," to an exposure of several minutes. The temperature of the cyanide may be the same as that of the atmospheric furnace or it may be lower. It is generally believed that a drop in temperature to just above the upper critical point before

quenching tends to reduce distortion.

The correct time-temperature cycle for hardening can best be determined by experiment. Not only the composition of the steel but the grain size, the annealed structure, the size and shape of the gears, and the equipment available, all have a bearing on the time-temperature combination required to produce the best results.

Equipment for cyanide hardening comprises a multitude of different designs and arrangements. The simplest form consists of a manually operated single pot furnace with the gears placed on the brickwork around the flange of the pot for preheating. A more advanced design is shown in the drawing, Fig. 2, where the stock is carried automatically through the preheat, the four cyanide pots, the quench, the wash and the rinse.

Procedure for Drawing Gears

Transmission gears usually are drawn at temperatures ranging from 300 to 500 degrees Fahr. Although drawing at these low temperatures is usually considered a comparatively simple operation, the importance of accurate heating cycles cannot be disregarded. Continuous salt baths are being successfully employed in one of the larger transmission plants. Electric furnaces with forced draft for circulation of the atmosphere have overcome many of the difficulties previously encountered and are now in general use. Gas-fired continuous furnaces with automatic temperature control also have gone through a period of development and are giving satisfactory results. Fig. 3 is a diagram of a vertical furnace of this type.

Low-carbon gears are characterized by a heavy case and a soft core, and high-carbon gears by a light case and a hard core.

The case and core characteristics of low-carbon gears usually fall within the following ranges: Case depth, 0.03 to 0.05-inch; case hardness, Rockwell C-55 to 62; core hardness, C-30 to 40. A rule for depth of case, which has been found satisfactory for low-carbon gears in a number of instances, specifies "twice as much core as case." Correctly interpreted, this means a case depth equal to 1/6 the thickness of the tooth at its base. Thus, a tooth 0.24-inch thick at the base would require a case of 0.04-inch.

With high-carbon gears, the case and core characteristics usually range as follows: Case depth, 0.001 to 0.010-inch; case hardness, C-48 to 58; core hardness, C-45 to 55. As core hardness increases, less case is required until a point is reached where the slightly higher hardness of the case over that of the core is insufficient to justify more than a slight depth, such as that obtained with the "dip" method of hardening

previously described. A suggested rule for case depth of high carbon gears, where more than a slight skin is desired, specifies 0.001-inch of cyanide case for each point of core hardness below C-55. Thus, a core hardness of C-48 would require a case depth of 0.007-inch.

The physical properties essential to durability in service are those which provide adequate resistance to surface wear, fatigue breakage and impact breakage.

Wear resistance is primarily a matter of surface hardness together with sufficient depth of case to prevent crushing.



There is a relation between depth of case and the resistance of case and core to compressive stress. This relation, however, is such that the case depth required to prevent fatigue breakage is always adequate to prevent crushing.

Fatigue breakage is caused by bending stresses which exceed the fatigue limit of the material. A gear tooth may be regarded as an intermittently loaded cantilever beam in which the bending stress varies from a maximum at the surface to zero at the center. Since the bending stress decreases from the surface inward, the outer portions of the core are stressed to a degree dependent upon the depth of case. A relation, therefore, exists between depth of case and the resistance of case and core to fatigue. In high-carbon gears with a core hardness of C-50 or more, this relation is usually ignored, but in low-carbon gears with large differences in hardness between case and core, case depth becomes a factor of major importance. Fatigue may start in either case or core, depending upon which is overstressed.

Effect on Impact Properties

Impact failures are caused by brittleness, or perhaps more accurately, by low resistance to impact. While resistance to impact is primarily dependent upon material and heat treatment, it is also seriously affected by depth of case. The cores of low-carbon gears usually provide sufficient toughness to prevent impact failure regardless of any depth of case likely to be used. High-carbon gears, however, are much more susceptible to this effect and should not be cased too deeply if adequate toughness is to be maintained.

Unfortunately, exact stress analysis of gear teeth is impossible due to certain factors, such as variations in tooth contact, surface roughness and other defects which cause concentration of stress. Moreover, these same irregularities tend to destroy the theoretical relations which should

determine depth of case. As a result of these complications, it is necessary to use high factors of safety in designing transmission gears and some simple rule for case depth based on experience as suggested in preceding paragraphs.

The tensile strength of the core of low-carbon gears varies from about 125,000 to 175,000 pounds per square inch, while that of high-carbon gears covers a range of approximately 200,000 to 325,000 pounds per square inch. Fatigue strength is seriously affected by residual stress from the quenching operation and has a much lower value than when higher drawing temperatures are used. A draw of 750 degrees Fahr. has been known to improve fatigue resistance greatly, but the lower hardness produced serious wear problems. Since actual values of fatigue limit for case and core are much in doubt at the present time, the safest plan is for the engineer to base his calculations upon maximum values for permissible stress which have been proved adequate by experience.

(To be Concluded)

Handbook on Worm Gear Speed Reducers Issued

A convenient pocket-size *Handbook on Worm Gearing and Hygrade Worm Gear Speed Reducers* has been issued by the Foote Bros. Gear & Machine Co., 5301 South Western avenue, Chicago. The 86-page booklet contains engineering data on the selection of worm gear reducers of proper capacity, input horsepower ratios and ratings on the company's products, tables on the ratios and torque of double reduction speed reducers, specifications and dimensions of Hygrade reducers, information on proper lubrication, and weight and price lists. The first 19 pages cover the evolution of worm gearing and problems of efficiency, selection, and the helix angle faced by users of reducers.

Alloy Steel Press Bed Provides Durability

Full steel bed motion has been incorporated in all models of Simplex automatic flat bed cylinder presses, manufactured by the Miller Printing Machinery Co., Pittsburgh. The forged alloy steels used in the new beds provide durability and long life.

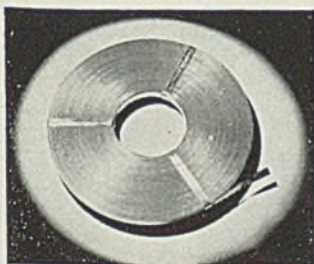
Installation of an automatic oiling system for all main and high speed bearings, and the addition of a tachometer and a totalizer are recent improvements in the Miller presses.

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Press Accidents Are Reduced By Safety in Die Design

BY R. A. SHAW

Department of Safety, Murray Corp. of America, Detroit

IN THE manufacture and fabrication of iron and steel, improved safety measures are effective in reducing accidents. In spite of the general progress, however, safety in die design and construction has been neglected in many pressed metal plants, principally because rush nature of the work does not allow sufficient time for designing and building the dies. Certain accidents occurring in the press room are traceable directly to the lack of safety provisions in dies.

Why isn't this important item considered and practiced? It is because the estimator of dies does not allow sufficient time for the designer to develop safety features. Furthermore, comparisons of estimated jobs always are a criterion. All departments like to estimate low; and the designer or die department never has been charged with die accidents.

It might be well to consider a few simple safety features which will materially reduce potential hazards when incorporated in the design of dies, for some of the most recent serious accidents in press rooms of our most modern plants have been caused by the lack of these features. As an example, a workman lost four fingers in an automobile fender press fully equipped with safety features—all because the top half of the large

die became loosened from its temporary U-clamps and dropped down.

Fenders are difficult articles to remove from their dies unless the workman reaches one hand between the dies. Why wasn't this die bolted properly? The answer is because the holes in the die had not been drilled to correspond with the holes drilled in the top bed of the press.

Correct Design Described

The accompanying illustrations show several improvements which the Murray Corp. of America, Detroit, has recently incorporated in die design and construction to promote safety in its press departments. Fig. 1 shows how large dies should be drilled and tapped to match the holes provided on the press. The illustration shows also the correct manner of incorporating chain slots in dies. Most companies adopted this feature in recent years, especially in the cases where the dies must be carried over presses to storage balconies. It is obvious that if one chain should break, the other chain will hold the load because of the slot arrangement.

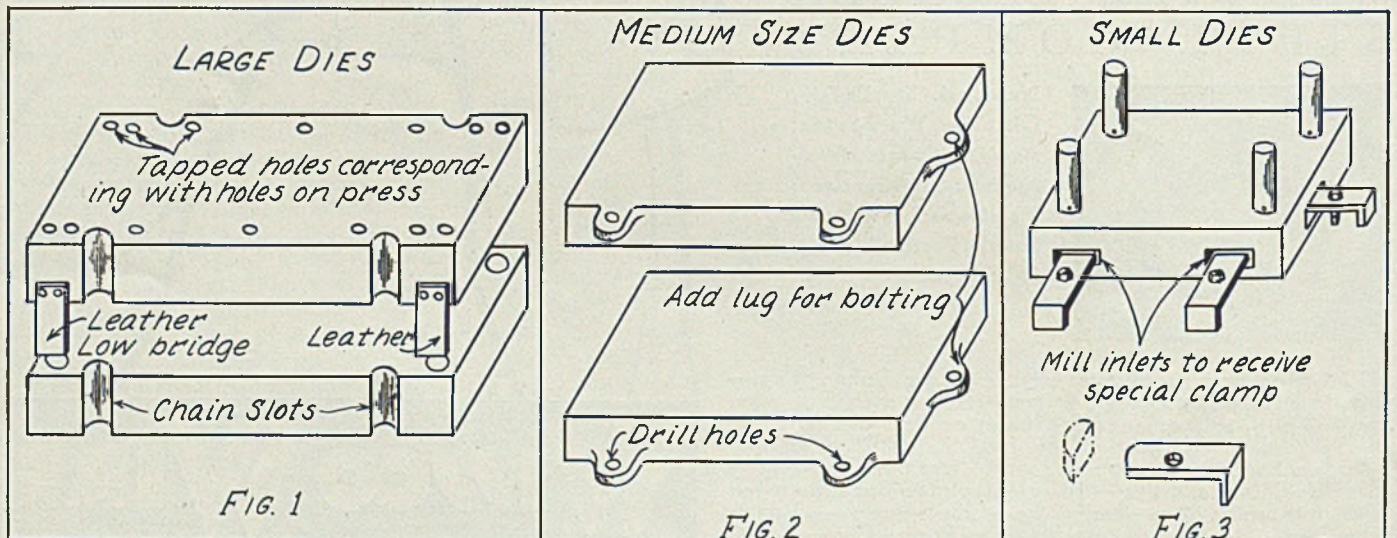
Because of the variety of dies used in certain presses, it is prevailing practice to equip the dies with open guide pins and the temptation for workmen to lay hands on these pins is great. All press rooms have experi-

enced this problem, therefore, precautionary devices incorporating springs and other ideas have been developed. The practice of the Murray Corp. of America is to attach strips of old ¼-inch belting to the top halves of the dies immediately in front of the guide pins, as shown in Fig. 1. These strips are fastened to the dies by machine screws and all dies are drilled and tapped for this purpose before leaving the die room. These strips are 100 per cent effective.

Medium sized dies can be equipped with drilled lugs for bolting the dies to the top and bottom beds of presses. This type of construction is shown in Fig. 2. Its advantage is that it eliminates the present method of using unsafe-built-up clamps and saves much time.

A method now used for fastening small dies to press beds is that shown in Fig. 3. Slots or inlets are milled in the die edges to receive special clamps. In the past, when small dies were used on long stroke presses the fillers and built-up clamping created more hazards than the dies themselves. It will be noted from Fig. 3 that the special clamps will remain in place; they cannot move back and allow the top of the die to drop, or become loose to cause die wear and subsequent breakage.

The Murray Corp. of America is firmly convinced that press accidents can be reduced through proper design of dies; accident records are proof of this. Accidents have been much fewer since die design and construction have incorporated safety features. For example, the record for the last half of 1935 showed an improvement of 65 per cent over the first half of the year. The company administers its own safety insurance and its accident experience in January this year was an all-time low.



Properly designed and constructed dies promote safety in the press shop. Fig. 1 shows the proper method for drilling holes, providing chain slots and protecting guide pins on large dies. Fig. 2 shows the provision of bolting lugs on medium-size dies. Fig. 3 shows how small dies with milled inlets can be attached to the press safely by special clamps



*I'm through
Guessing*



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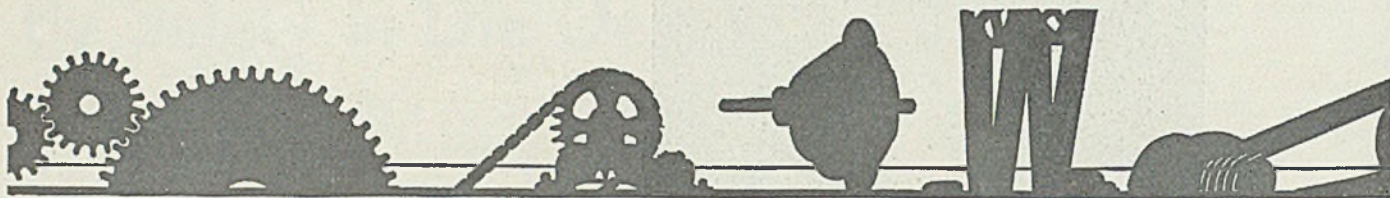
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Power Drives



Multi-Speed Drive Offers Wide Variations Without Gear Changes

SOMETHING new in power drives is embodied in a 200-horsepower multi-speed fan drive developed recently for the Laclede Gas & Electric Co., St. Louis. This drive is required by the public utility company to operate the forced draft fans when peak electric loads are demanded; at the low point in current demand, it is desirable to operate the fans at much slower speeds. As a matter of fact, four fan speeds are desirable to provide for all conditions, with a power demand varying from 50 to 200 horsepower.

This drive was developed by the Universal Gear Corp., Indianapolis, and four of the units, such as the one shown in Fig. 1 set up for factory test, are installed in the St. Louis power plant. Each drive consists of one 150-horsepower motor equipped with a backstop, one 50-horsepower reversible motor equipped with magnetic brake, multiple V-belt and line drives through a double-quill shaft to a specially-designed speed reducer.

Entirely New Application

So far as is known, the operating characteristics of this drive set-up have not previously been applied to any drive installations in industry. With two constant-speed 1750-revolution-per-minute motors of different power, one of the motors reversible, four speeds are attained with a constant torque at the output shaft. Incidentally, 1750 revolution per minute motors cost much less than slower speed motors or multiple-speed motors and this was a factor of considerable importance in an installation involving so much power. Specifically, approximately 12,000 inch-pounds torque and constant speed from each unit for fan drive speeds of 250, 500, 750 and 1000 revolution per minute, are available.

Four operating conditions are provided with this set up:

I. Both motors running in the same direction provide 200 horse-

power with 1000 revolutions per minute at output or fan drive shaft.

II. 50-horsepower motor held at stationary while 150-horsepower motor pulls the load, providing the same output torque at an output speed of 750 revolutions per minute.

III. 50-horsepower motor running in opposite direction from 150-horsepower motor, providing the same output torque at 500 revolutions per minute.

IV. 150-horsepower motor stationary, with 50-horsepower motor running in same direction as output providing the same output torque at 250 revolutions per minute.

In the accompanying graph, Fig. 2, the four operations just described are represented by the horizontal at the line "7:1" in the column designated "Ratio of Input Torque." This graph indicates the interesting output speed possibilities of a drive of this character. By changing the V-belt pulley ratios, the maximum out-

put speed of 1000 revolutions per minute for operation "I" has been maintained in connection with different input torque ratios, of from "4:1" to "10:1." The belt drives could as easily be designed for other top speeds, but the graph would be too intricate to be followed readily, thus it is here kept to simple values.

Other Settings Possible

The graph shows that four speeds of irregular variation could be obtained as readily as the ones selected for the Laclede installation. For instance, at the "4:1" point (left-hand column) speeds of 125, 440, 570 and 1000 revolutions per minute are derived. At the "10:1" horizontal, speeds of 175, 635, 825 and 1000 revolutions per minute are obtained. It is of interest, also, to note that operating condition "III" becomes the slowest output speed at "4:1" while operating condition "IV" becomes the slowest speed at most points in the graph.

This drive does not have to be shut down for operation changeover, it is pointed out, but can be switched from one operating speed to any other without stoppage of the output drive. While the change is practically instantaneous on the operator's

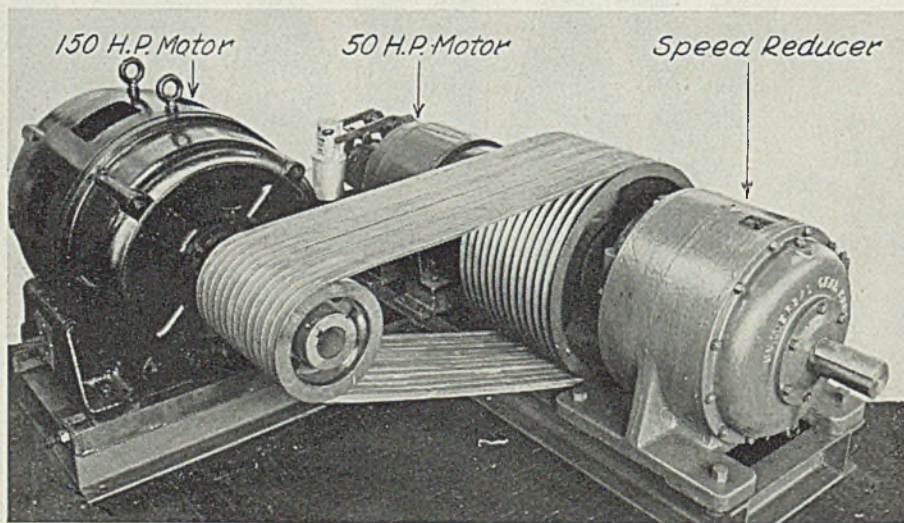
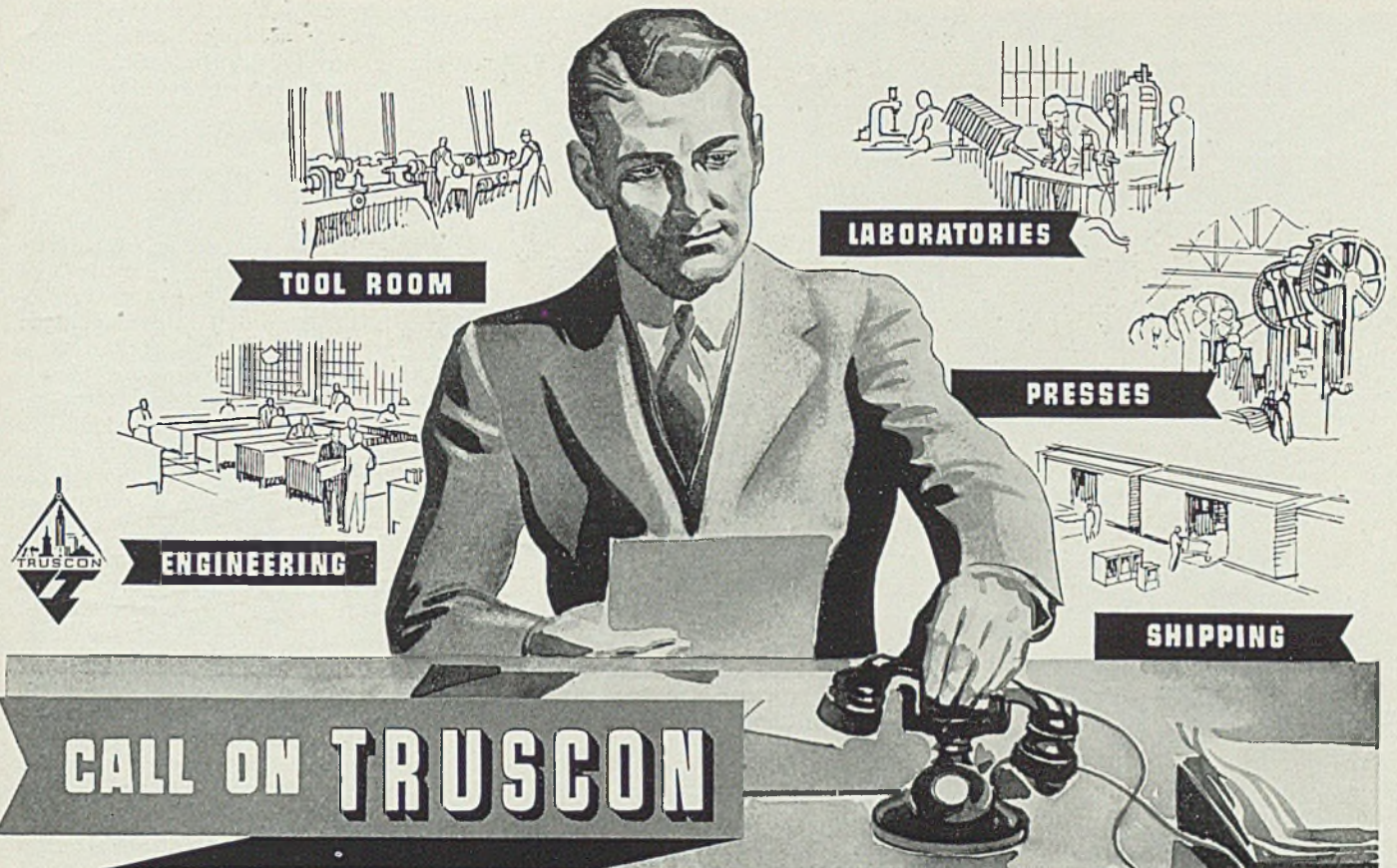


Fig. 1—This 200-horsepower power drive provides four speeds with a constant torque at the output shaft. It consists of a 150-horsepower motor equipped with a backstop, a 50-horsepower reversible motor equipped with magnetic brake, multiple V-belt and line drives through a double-quill shaft to a specially-designed speed reducer



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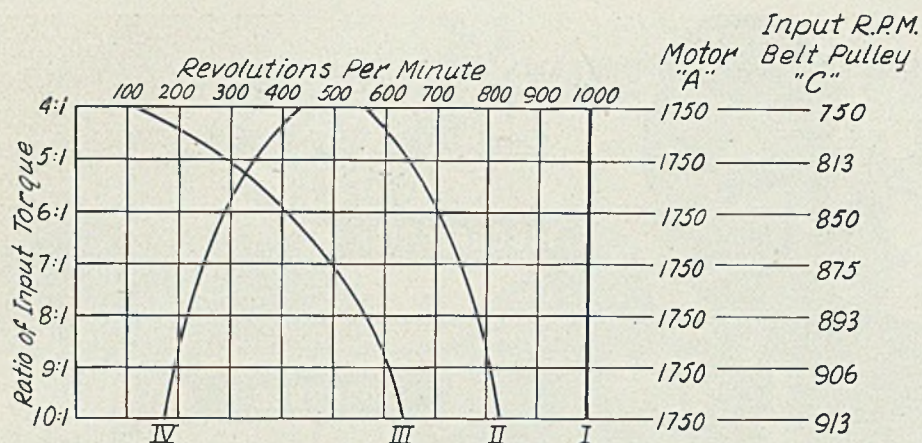


Fig. 2—Output speed possibilities of a drive of this character are indicated by this graph. Various combinations are obtained by changing the V-belt pulley ratios

part—merely throwing a switch—the speed change is gradual and picks up or slows down to the selected speed without shock or clatter. This characteristic is of importance wherever such drives might be applied to traveling conveyors in production lines as related to products that are fragile or easily toppled off a conveyor.

This general drive is said to be susceptible to almost infinite variations, depending upon the motor selections, the intermediate drive to the main speed reduction unit and the step-down ratio to the latter unit. The high and low revolution per-minute selections can be designed to embrace a wide range of speeds. The design can be somewhat simplified if only two speeds are required. On the other hand, if more than four drive speeds are required, the substitution of a four-speed motor in one position would provide as high as 13 different drive speeds.

Speed Unit Is Not Changed

Of interest to engineers and maintenance men is the fact that this multiple speed unit involves no mechanical changes or adjustments in the unit itself, other than the operation of the motor back stop and motor brake, which are automatic. Change from one speed to another is accomplished by means of motor switches. There are no actual gear changes.

While new, this drive involves no untried principles but merely a combination or assemblage of drive set-up factors that have been conventional usage for decades. In the factory of the Universal Gear Corp., drives of this type have been in use on machine tools for a long time. Because of the varying speeds of operation, these machines are quickly adapted to the best speed for the job. Such operation is advantageous in any plant in which machine tools do not remain on one type of work exclusively but are reset from day to day or week to week for various types of cutting or milling jobs.

Crooked Belts

CROWN keeps a belt on its pulley because the belt tends to ride to the highest point. Excessive slippage, in addition to burning and weakening the belt fibers which give flexibility and strength, tends to wear down the pulley face and as the crown is the highest point, and under the most tension, the pulley soon wears flat. Misalignment, which creates a side pull, also destroys the crown, the more rapidly if slippage and misalignment are combined. This side pull also produces a crooked belt.

An excellent example of this type of belt trouble occurred in a Mid-Western plant. The belt was blamed although, as is often the case, it was not responsible. The maintenance engineer returned the belt to the manufacturer's representative with the statement that evidently it was made of low side stock or it would not have become so crooked. When the belt was laid out on the floor it curved like a snake. With considerable labor the belt was straightened and returned with the suggestion that pulley misalignment be checked as the probable cause. This was found to be the case and corrected.

Soon, however, the belt was again returned about as crooked as before. An investigation by the service man showed that the crown of the pulley had worn until it was lower in the center and so the belt wove back and forth on the pulley, riding the high edge and occasionally slipping off.

A new pulley corrected the difficulty. Only parts of the belt, however, were still usable as it was beyond straightening again. The wearing and curvature of the belt were the result of its trying to adapt itself to the conditions. Almost any other transmission medium would have been quickly destroyed under similar service.

This is another instance of the difficulty of locating the cause of

drive trouble and the false deductions which may result from investigating only the transmission element that shows signs of trouble.

Dependable Drives

WITH the production executive's emphasis toward quantity and quality of work and the careful selection of machine tool equipment from this standpoint, the importance of applying the proper drive may sometimes be overlooked. Due to the increase of speed and cuts, which are necessary for increased quantity, comes greater demands for a dependable medium connecting the source of power to the machine.

Dependable power drives mean not only ample and continuous power to drive the equipment, but a smooth application of power, free from vibrations or pulsations which are detrimental to quality production. Also, cutting tools stand up better under even, steady drives and require less frequent changing than when the drive is irregular. This, too, affects both quantity and quality of output.

How machine tool manufacturers have recognized this requirement and are applying dependable drives was one of the outstanding features of the improved designs of machine tools shown at the recent exhibit in Cleveland. However, because such drives are built into the machines and operate without complaint until something goes wrong, is no reason for assuming that they can be neglected.

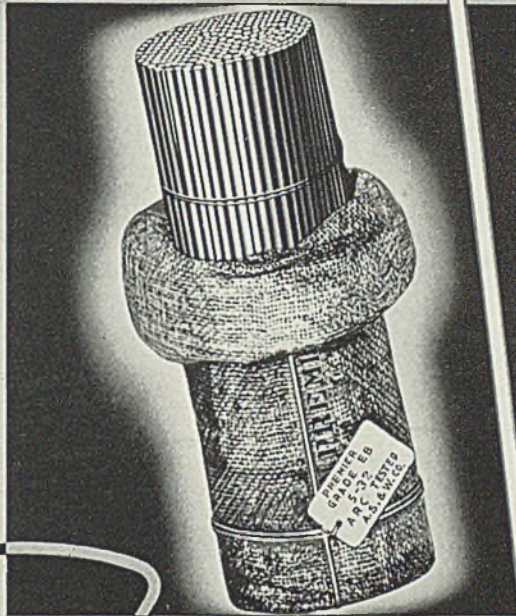
The day is past when any one man can be entrusted to general plant and equipment maintenance. Such work is a trade, almost a profession, and cannot be picked up over night or absorbed by being given a hammer, pliers, and an oil can.

A good workman needs little bossing. Similarly a properly designed and installed drive needs little attention. But both require some attention.

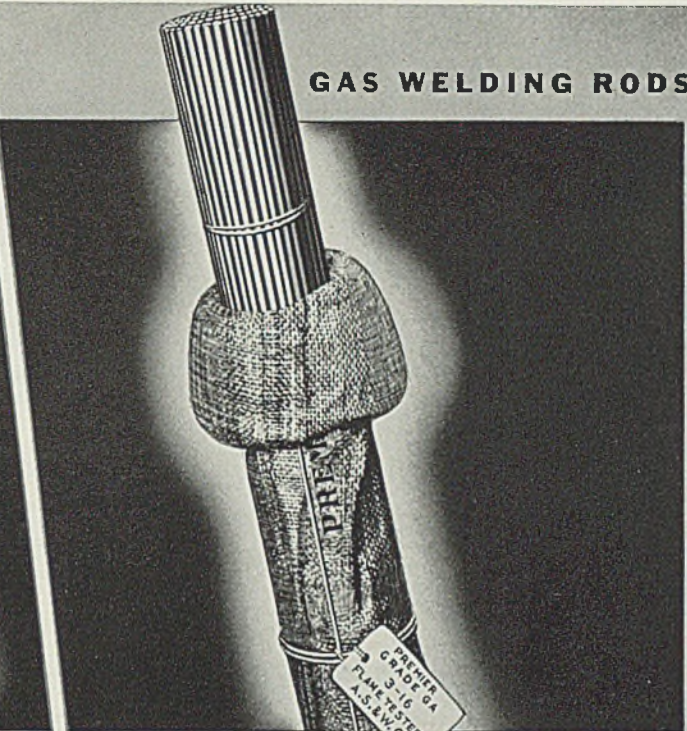
Custom and tradition are the greatest obstacles to modernization of machinery and its drives. Because anything has always been done a certain way is not always a justifiable reason for its continuance.

Metal tips on leather belt lacing not only save time, the same as when lacing shoes, but also permit punching smaller holes and so weaken the belt less.

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Surface Treatment

Control of Electroplating

Part IV

THIS is the fourth and concluding installment of a series on factors involved in the control of electroplating. Previous subdivisions of the subject covered relationships between weights of coatings and their thickness; a test for porosity; and determination of nickel, composite nickel and copper, copper, chromium, composite chromium and nickel, zinc and tin coatings on ferrous and nonferrous metals. The following discussion outlines tests for determination of precious metal coatings, and a second and more flexible porosity test.

DETERMINATION OF SILVER

Solutions

The acid stripping solution consists of 19 parts of concentrated sulphuric acid (sp. gr. 1.84) and 1 part of concentrated nitric acid (sp. gr. 1.41-1.42).

Potassium thiocyanate solution should be N/40 and should be standardized against a standard silver nitrate solution, prepared from pure silver or chemically pure silver nitrate, using the same procedure as described below for the analysis.

The ferric indicator used is a saturated solution of ferric ammonium sulphate, made acid with nitric acid.

Procedure

Place the silver-coated sample in as small a porcelain evaporating dish as will hold it conveniently and add enough of the cool acid stripping solution just to cover the sample. When the silver is completely dissolved from the base metal, decant the solution into a 150-cubic centimeter white porcelain evaporating dish. Wash the

base metal with distilled water and add the washings to the silver solution. If the solution contains an amount of silver in excess of about 15 milligrams, an aliquot part containing about 15 milligrams may be taken for the analysis.

Dilute the solution to not more than 30-40 cubic centimeters, with distilled water, add 0.5 cubic centimeter of the ferric indicator and titrate with N/40 potassium thiocyanate to a permanent reddish brown end-point. A 10-cubic centimeter burette should be used for the titration and the temperature of the silver solution should not be more than 30 degrees Cent. during the titration.

Calculations

The weight of silver per unit area may be calculated from the amount of N/40 potassium thiocyanate used in the titration by using the following formula:

$$\frac{\text{cc. of N/40 KCNS} \times \text{factor} \times 2.697}{\text{area of sample in sq. in.}} =$$

m.s.i. of silver where the factor = 1 if the potassium thiocyanate is exactly N/40.

This method has been found satisfactory for determining the weight of silver over brass and other copper alloys. It is doubtful whether this method would be satisfactory for determining plated silver on ferrous metals.

DETERMINATION OF GOLD

THE determination of gold is a comparatively simple matter and can be performed with a high degree of

accuracy if a few simple precautions are observed.

Procedure

When the gold plated parts are small, the most suitable procedure is to place the entire part in a suitable acid and dissolve all the base metal. The gold will remain unattacked and is washed, dried and weighed. The weight of the gold in milligrams divided by the area of the sample in square inches gives the weight of coating in m.s.i.

When the base metal is brass, use nitric acid of a fairly high concentration for dissolving. When the gold coating is applied over nickel plated brass, a slight modification is necessary. Use nitric acid to dissolve all the brass. After the brass is completely dissolved, the residue should be washed to remove all traces of nitric acid and then covered with hydrochloric acid (sp. gr. 1.06) and heated gently on a hot plate until all the nickel is dissolved. Wash, dry and weigh the gold residue as before.

If the base metal is steel, dissolve with hydrochloric acid (sp. gr. 1.06).

When the gold coating is on parts which are too large to be dissolved conveniently in this manner, the gold can be removed mechanically with a reamer or a file. Extreme care must be exercised that none of the gold is lost and all the filings or scrapings should be treated by one of the above methods to remove the base metal which has been scraped off with the gold.

In some cases where small parts are to be treated it may be necessary to scratch the gold coating to allow the acid to get at the base metal. Care should be exercised in such cases that no gold is lost during the scratching process.

IN GENERAL, when using the above methods of test, it is not satisfactory to use the "loss in weight stripping methods" for articles which

and Finishing

weigh over 100 grams. Heavy articles should be stripped completely, without weighing the sample, and the solution analyzed as described for composite coatings. Another method of checking the weight of coating is to place small, weighed plates in the plating bath along with the large articles and determine the weight of coating applied by the gain in weight of the plate. When this is done it must be remembered that the plate cannot be acid dipped between the weighing and placing in the plating bath. The plate must be thoroughly cleaned before weighing and handled with tweezers until it is placed in the tank. Where none of these things can be done, it will be necessary to cut sections from the large sample and subject them to loss in weight stripping methods.

Aerated Water Continuity Test

Before closing this discussion there remains one more test to be covered. This test is designed to determine the porosity of metal coatings over ferrous metals and is much more flexible than the porosity test described earlier in this article.

Apparatus

1. Hard glass vessel for holding water.
2. Series of air jets for aerating water.

Procedure

The test for continuity of coating should be carried out by immersion in aerated distilled water under the following conditions. The vessel in which the test is made should be made of hard glass and should be filled to a depth of at least 5 inches. To insure uniform aeration, air outlets of $\frac{1}{4}$ -inch inside diameter, one for each 600 cubic centimeters of water, should be distributed as evenly as possible over the bottom of the testing vessel.

The rate of air flow shall average 90 bubbles per outlet per minute and should not be less than 75 or more than 105 bubbles per minute.

Clean Free of Grease

Parts to be tested should be cleaned free from grease by washing in suitable solvents, and then rinsed in alcohol and dried. The parts then should be suspended in the test vessel by a clean thread and should be submerged completely in the water which should be maintained at a temperature of 60-90 degrees Fahr. The parts should be so arranged as to prevent contact with each other, with the walls of the vessel or with the bubbles of air issuing from the air jets.

The maximum surface under test shall not exceed 30 square inches per 600 cubic centimeters of water. The water in the testing vessel should be changed after each test.

This test is most suitable for zinc and cadmium coatings. When testing a sherardized coating it must be remembered that it contains some iron and when it is subjected to the action of the aerated water test some of this iron oxidizes and together with the zinc forms a slimy coating, at first ranging in color from white to reddish yellow and gradually turning darker. At the same time small spots of a reddish brown color appear, presumably marking points where the iron in the coating is undergoing more or less rapid oxidation. These do not necessarily indicate failure, however, since it seems that actual base metal rust does not always develop at these points. The formation of base metal rust is accompanied by, and can be distinguished by, a wart-like growth of iron rust of a deep brown color. This forms rapidly once the coating is broken down.

By noting the time necessary for the various coatings to break down in this test, the user will have a basis for comparing their corrosion-resisting

qualities, as well as the continuity of the coating.

This test is so simple to perform that it should be of interest to all users of electroplated products.

—THE END—

Improved Metal Cleaning Compounds Announced

A new emulsifying agent known as Magnus NX has been developed by the Magnus Chemical Co., Garwood, N. J. When added to any metal cleaning solution, in the ratio of approximately $\frac{1}{4}$ -ounce per gallon, it stimulates the action of the solution.

The company also has put out a new line of metal cleaners for cleaning aluminum, steel and brass. These are said to have superior wetting, emulsifying and rinsing qualities. The company has improved its Supersil line of cleaners for low cost work where the requirements are not difficult, particularly where the economy factor is important because of heavy drag-out or one-time use of the solution.

The company's Tripoli solvent also has been improved in its effectiveness in removing buffing compound and also in its non-staining properties. Other new products of the company are a jeweler's soap for cleaning fine brass, nickel, gold, rhodium and other metals without risk of staining or loss of color, a new bright burnishing compound for brass and nickel and Magnusol, a "precleaning" treatment for the removal of black smut, polishing abrasive, etc, from steel without scrubbing.

Emulsified Asphalt Paint Has Improved Properties

An improved emulsified asphalt coating material is announced by the Flintkote Co., 50 West Fiftieth street, New York. In addition to having all of the usual desirable properties of emulsified asphalt, the new product exerts an alkaline reaction and is not susceptible to re-emulsification. The new product is intended for waterproofing and dampproofing and for general protective purposes.

Clear Finishing Lacquer For Chromium Plate

Development of a clear finishing lacquer which adheres tenaciously to chromium surfaces is announced by Breinig Bros. Inc., Hoboken, N. J. It is said to impart a high luster to the chromium finish and without destroying any of the color of the chromium. Thorough tests indicate, the company states, that it lends longer life to chromium plated surfaces.



*The advertisement reproduced
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American railroads are heading toward a great future. And in this future United States Steel, world's largest maker of steel, is proud that it will play a part. Steel built the railroads. Now it is helping to make them even more efficient—with equipment that is stronger, lighter, more resistant to corrosion.

WE refer to the high tensile steels—Cor-Ten, Man-Ten, USS Stainless—perfected by the metallurgists of the United States Steel Corporation Subsidiaries. Through the use of these stronger steels and the lighter construction they make possible, revenue capacity in various types of cars is greatly increased, and, in all types, dead weight is substantially reduced.

The economic importance of the elimination of dead weight and its conversion into pay load should be apparent. Excessive weight has been unavoidable simply because the conventional steels of less strength required it. That need no longer exists.

Common sense tells you that it costs less to move a train of lighter equipment—that where fewer trains are needed to carry the same pay load, it is sound economy to build cars lighter, of steels resistant to corrosion, particularly in view of the fact that such steels need not materially increase the price of the cars.

This subject is of immediate importance to every railroad executive. We invite requests for further information and evidence of the sound economies to be effected through the use of these stronger and better steels.

UNITED STATES STEEL

Methods and Materials



Many Applications Foreseen for Newly Developed Light-Polarizing Glass

INVENTION of a light-polarizing glass, which promises innumerable scientific and industrial applications, has been announced by the Land-Wheelwright Laboratories Inc., 168 Dartmouth street, Boston. Known as Polaroid, the new glass was only recently demonstrated publicly. Manufacturing facilities have been arranged in anticipation of heavy demand for commercial use.

Demonstrated by the inventor, Edwin H. Land, Boston scientist, the new glass polarizes light by simple transmission. As shown in the accompanying illustration, resembles the material clear, colorless glass. Light that has passed through it appears as ordinary light; the light rays, however, are polarized so that all vibrations of the rays occur in one plane. The glass is said to be inexpensive and is available at present in disks approximately 2, 4 and 10 inches in diameter and in sheets in unlimited sizes.

Scientific Researches Aided

The new development is expected to result in advances in the practical perfection of television, in photometry, in ophthalmology, in polarizing microscopes, experiments in the psychology of vision, gloss meters in color matching and a number of other scientific fields, in some of which important areas have been unexplored because of the inconvenience and high cost of previous sources of polarized light.

Known applications for the glass include removal of glare from automobile headlights; commercial projection of life-like, three-dimensional movies; strain testing of engineering structures; theatrical color illumination; one-way vision window glass; colorless sun glasses; and improved illumination for oil paintings.

One of the uses for the new glass is in a strain tester, a device which operates on the well-known principle—"the interference color phenomena

shown by transparent doubly-refracting materials when viewed under polarized light." According to the inventor, the new strain tester simply extends the usefulness of the principle and makes it suitable for large scale work.

In the demonstration, a model of the framework of a building, made of transparent bakelite, was placed full length in the strain tester. When the framework was twisted, the points of strain in the framework immediately appeared in brilliant colors. Other structures, for example, as gears, machine parts, and bridges, can be made in model size from transparent material such as celluloid or transparent bakelite and tested similarly. In addition to di-



Single sheets of the new light-polarizing glass are clear and colorless. Two sheets, one over the other, may be clear or black, depending upon how they are turned in relation to each other. In the illustration, the sheets are being held with their polarizing axes at right angles, blocking out all the light. The light can be varied by simply turning one of the sheets

rect studies of stress, the results can be photographed to make permanent records. The test is sufficiently sensitive to show the strain produced in a celluloid rod by the pressure of one finger.

Transparent products, such as bottles and glassware, can be viewed directly, through the strain tester, thus strains left in them in manufacturing processes can be detected.

In principle, Polaroid depends for its polarizing effectiveness upon a property of certain crystals known as dichroism. Practically all natural crystals form two plane polarized beams moving at different speeds. Dichroic crystals absorb one of these two beams internally more strongly than the other. The new glass makes use of a synthetic organic crystal of this type which absorbs practically all of the visible light in one of its plane polarized components and transmits a large proportion of the other component.

The glass itself is a suspension of these minute artificial crystals in a cellulosic matrix. This matrix forms a flexible film which is only a few thousandths inch thick. However, each square inch of the film contains in the neighborhood of one thousand billion of the small crystals.

In the process of manufacture, all of these billions of crystals are uniformly oriented, lying side by side in the matrix. For this reason, says the inventor, the film is optically equivalent to a large single crystal. The crystalline structure is so minute that it remains invisible under microscopic examination at a magnification of 1100.

S S S

High-Tensile Alloy Steel Withstands Loading Test

Strength and load carrying ability of the new nickel-copper, high-tensile alloy steel, Yoloy, developed in 1935 by the Youngstown Sheet & Tube Co., Youngstown, O., was demonstrated recently by the Coburn Trolley Track Co., Holyoke, Mass.

A 3-foot section of regular No. 1 track formed from 16-gage hot rolled open-hearth steel stood up under load

DON'T TALK ABRASION-RESISTING STEEL TO ME

... I make my money on Replacements!



WELL! That's one way to look at it... but the fellow who must constantly be paying out perfectly good money for equipment replacements soon grows a bit exasperated. He knows that hi-manganese steels have been available, but the costs have always seemed entirely too high... and so he has suffered in silence and gone on paying for replacements of plain carbon steel.

However, Carnegie-Illinois Steel Corporation developed AR Steel... to meet the demand for a *low-price*

abrasion-resisting steel. It has established some outstanding records, in fact one customer found that it stood up better than 11/14% manganese steel, white cast iron, rubber and other high cost materials that had been tried.

We suggest you send for our new bulletin on AR abrasion-resisting steel.



CARNEGIE-ILLINOIS STEEL CORPORATION - *Pittsburgh - Chicago*

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UNITED STATES STEEL

of over five times its rated capacity—300 pounds on a 3-foot span—and failed finally with a load of 1670 pounds. A Yoloy section, made in the same gage, was loaded to 3320 pounds without appreciable failure and as the supporting members failed at this point, further work was discontinued. The nickel-copper track showed a permanent deflection of approximately ¼-inch in a 3-foot length, as compared with complete failure of the regular track.

Trolley track of the type manufactured by the Coburn company is overhead track used for monorail systems, sliding doors, and the like. The test indicated the extent to which high-tensile steel can carry heavier loads without increasing the weight of construction. Permissible unit stress is increased without change in design.

\$ \$ \$

Tools of New Molybdenum Steel Give Good Service

Broaches and reamers made of the new molybdenum high speed steel produced by the Jessop Steel Co., Washington, Pa., under the trade-name Mogul, are reported to be making a number of interesting service records. The company's announcement of this new molybdenum steel

appeared in the Oct. 28 issue of STEEL, page 22.

In one instance, a tool bit is still in service after being used in chamfering the ends of 75,000 screw machine parts. In another, a bit is said to be making ¼-inch cuts at a speed of 150 feet per minute, turning high carbon spindles, and showing exceptionally favorable results.

\$ \$ \$

Clean-Up Signs Encourage Good Plant Housekeeping

In the interest of good housekeeping, a southern plant places the responsibility of inspection in the hands of the employes themselves. The manager appoints a plant inspection group of three; the personnel of this group is changed each month and is drawn from employes in all departments.

This committee is supplied with signs 7 x 22 inches on which are painted in large red letters "Cleaning Up Needed Here—Inspection Committee." When the committee comes upon a condition requiring attention, it leaves a sign. The sign stands out so prominently that everyone in the department, and other departments as well, can see it. Department heads are told they have 24 hours in which to have the sign removed by cleaning up.

The committee keeps a record of locations where signs are left, and checks them off as department heads turn in the signs after clean-up jobs are completed. The results are said to be a rapid cleaning of departments that needed it, and greatly increased employe interest in good plant housekeeping.

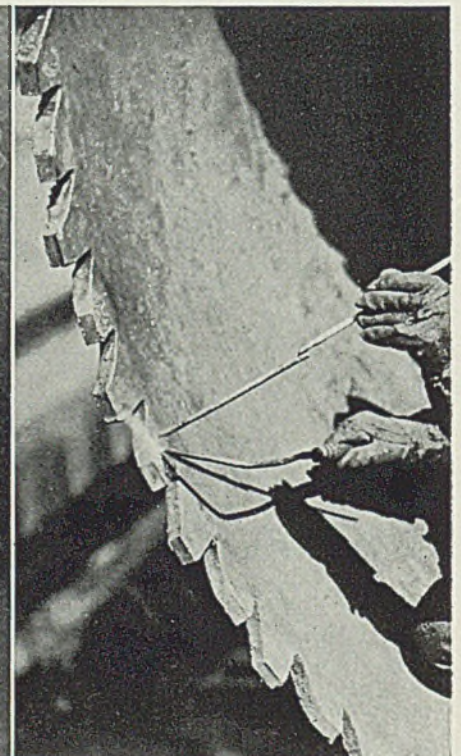
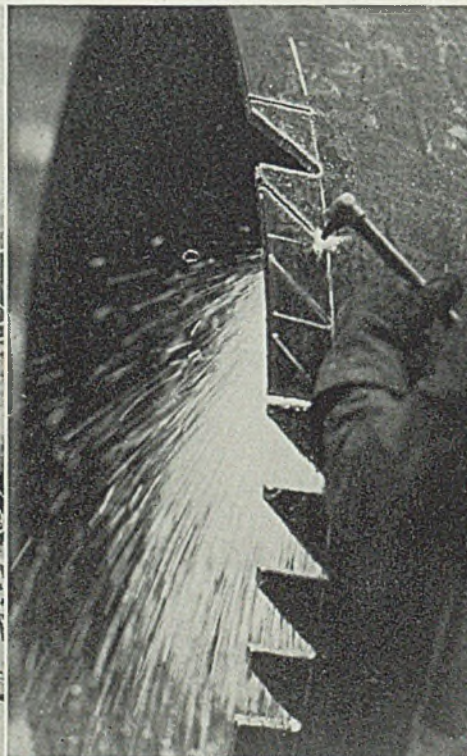
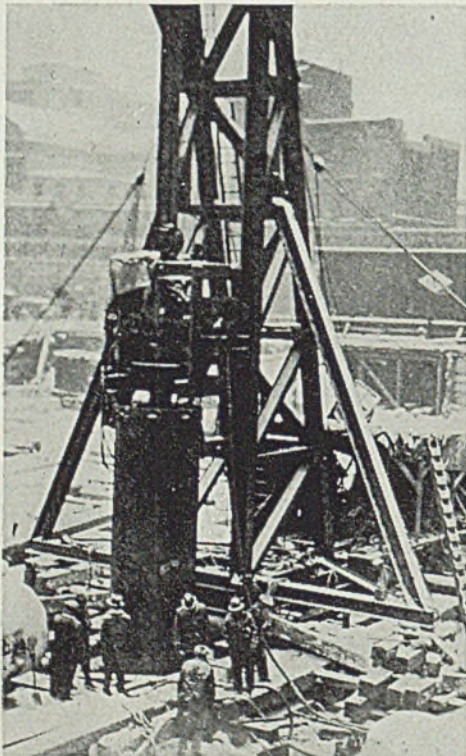
\$ \$ \$

Watch Cases of Stainless Steel in Unusual Position

Utility of stainless steel in many industrial usages is unsurpassed; often the only deterrent to its adoption is the high cost of the material. Recently experiments were conducted with the manufacture of watch cases of this steel. In this instance, the reverse of the above appears to be true—the material is actually too expensive to be popular.

In this connection, a leading watch manufacturer states: "There is no question but what stainless steel cases will outwear any chromium plate or some of the cheaper gold-filled cases. Its durability is without question, but its acceptance in the jewelry trade has been rather slow due to the fact it is not a precious metal. Our reason for using it is to permit us to get into a price range that is not possible by using filled cases."

Hard Faced Teeth Resist Wear



HARD facing has greatly facilitated one of the most important developments in recent years in the sinking of caissons. Vertical steel cylinders, up to 8 feet in diameter, with saw teeth cut in the lower end, rotate and cut

their way through earth and stone an approximate distance of 70 feet to bed rock. The teeth are cut with an oxy-acetylene torch after which they are hard faced with Haystellite composite rod. Photo courtesy Haynes Stellite Co.

Properties of Superheated Cast Iron

Discussed at Foundry Conference

EFFECTS of superheating upon physical properties of gray cast iron were considered at the annual foundry short course held at East Lansing, Mich., Feb. 7, under auspices of Michigan State college, American Foundrymen's association, and Detroit chapter of the A.F.A. Approximately 100 foundrymen attended.

Practically all discussion revolved around a report, "Properties of Gray Iron Castings as Affected by Superheating Temperatures," prepared by M. F. Surls and F. G. Sefing, Michigan State college engineering experiment station. The paper, result of two years research, contained the following conclusions:

1—Superheating of gray cast iron mixtures results in little or no increase in strength of metal provided chemical analysis remains constant.

2—Gray irons heated to 2900 degrees Fahr. or above show a definite dendritic formation when carbon content is 3 per cent or below.

3—Superheated irons show a dendritic structure when poured into light sections and a normal structure when poured into heavy sections.

4—Presence of a dendritic struc-

ture causes decrease in strength of gray iron.

5—Heating to superheating temperatures and holding the bath at these temperatures causes increase in strength, loss of carbon and gain in silicon. Much of this increase in strength can be attributed to changes in analyses.

V. A. Crosby, Climax Molybdenum Co., Detroit, presented a paper on "Structures of Gray Iron and Their Effects on Physical Properties." Mr. Crosby spoke on the various structures found in cast iron. He discussed the strengthening effect of silicon and stated that the study is complicated by various factors in addition to time and temperature. He showed that it is difficult to predict strength properties from a study of microstructures.

Silicon Content Discussed

H. S. Austin, Buick Motor Co., Flint, Mich., asserted that it is dangerous to go too high with the silicon in castings which have variations in sections. In small castings, 2.65 to 2.70 per cent is likely to be dangerous when castings have irregular sections. Mr. Crosby was in favor of employing irons having particular

structures for certain definite applications. Harry Rayner, Dodge Bros., Detroit, expressed the opinion that if the carbon content could be held low, high-silicon iron would prove better for cylinder block castings.

Armand Di Giulio, Ford Motor Co., Dearborn, Mich., presented a paper on "Effects of Superheating Temperature Alone on Gray Iron Mixtures." In introducing his discussion, Mr. Di Giulio questioned several phases of the test procedure followed by Mr. Surls and Mr. Sefing, among them the use of the optical pyrometer in measuring the temperature inside the electric furnace.

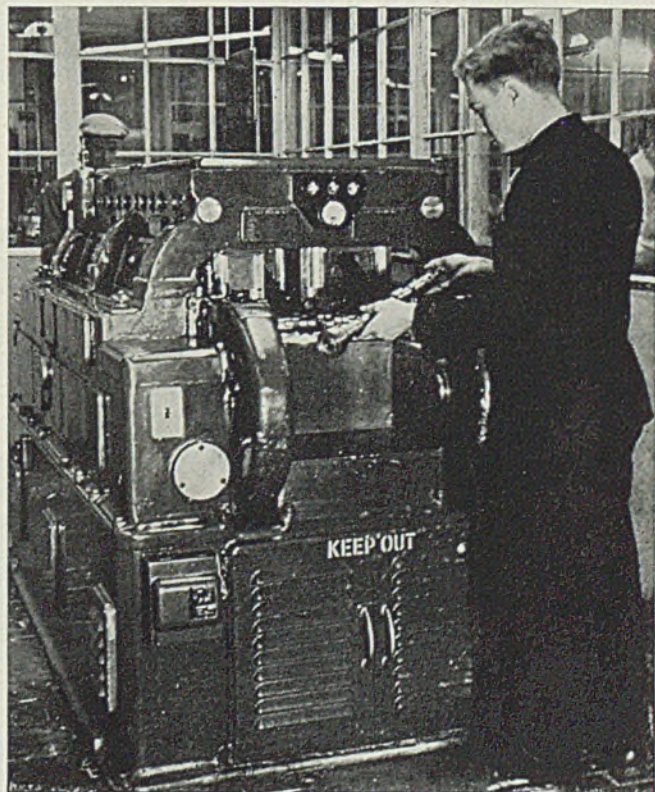
The speaker then discussed certain parts of a paper, "Factors Affecting the Structure and Properties of Gray Cast Iron" presented at the Toronto convention of the A.F.A., and representing work carried on at the University of Michigan, Ann Arbor, Mich., by Mr. Di Giulio and Prof. A. E. White. In that test, conducted in an indirect arc type electric furnace with metal charged consisting of 90 per cent remelt and 10 per cent steel scrap, it was found that superheating produced improvements of about 8.5 per cent in physical properties of the iron.

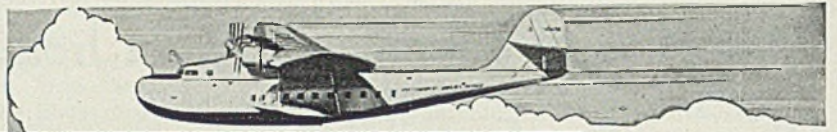
A. H. Dierker, research engineer, Ohio State university, Columbus, O., stated work on superheating has been under way at that university but no results have been published because as yet it is impossible to arrive at a point where composition of the metal

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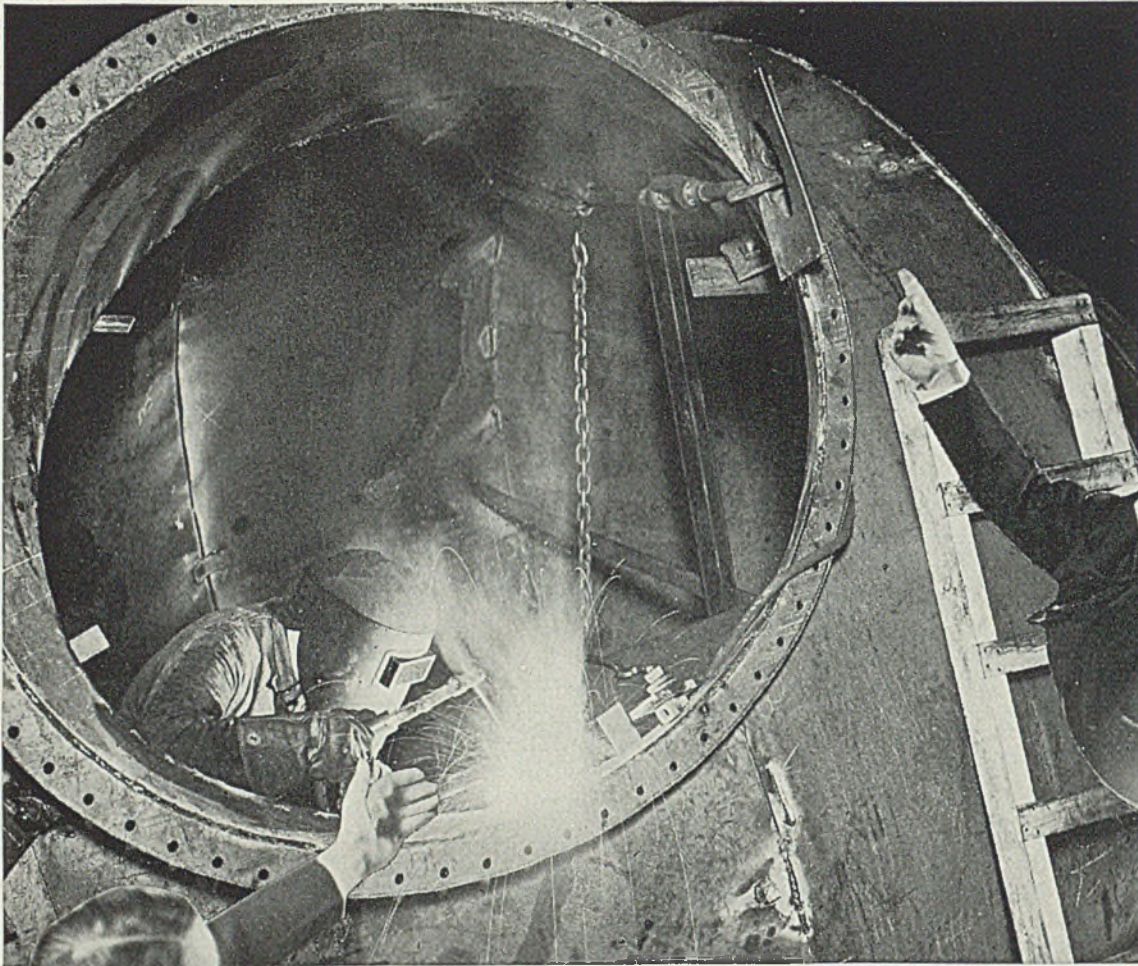
Automatic Camshaft Tester

INACCURACIES arising in former snap-gage measurement of camshafts in the Rouge plant of Ford Motor Co. have been overcome largely by this electrically operated, automatic tester designed by Ford engineers. If any of the 25 measurements made by the machine exceed the plus or minus tolerances of 0.00025-inch in some places and 0.0001-inch in others, the spot is marked and the shaft discharged through a chute separate from the accurate shafts. The machine, which inspects the entire Rouge output, also has made it possible to reduce rejections by revealing any slight inaccuracies resulting from grinding operations





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**"Righto, Pop . . . and here too
 ...A HOP THAT CLIPPED 25¢
 FROM EVERY WELDING \$"**

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"These high-capacity 'Shield-Arc' welders permit the operator to set a faster pace—to get more bead-feet per hour. Working at high-heat, he can use larger sized electrodes—which cost less per pound.

"Their welding current doesn't have the usual fire-cracker peaks; so it cuts down spatter, saves electrodes and kilowatt hours.

"Fly your ship of progress with 'Shield-Arc' aboard and you'll span many a sea of high costs!" THE LINCOLN ELECTRIC COMPANY, Dept. Y -210, CLEVELAND, O.

CUTS WELDING TIME 25% TO 50%
CUTS ELECTRODE COSTS 15% TO 25%
CUTS POWER COSTS 10% TO 20%

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 Arc Welding Equipment in the World**

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**BLAZE YOUR WAY TO PROFITS
 WITH "Shield-Arc" WELDING**

Historical Notes On Diamonds in Industry

When diamonds are mentioned, it is customary to think at once of jewelry and precious stones. A second important use of diamonds, discovered shortly after the value of their decorative effect was realized, is in industrial processes, such as for drawing dies, grinding wheels and the like.

Since the first discovery of diamonds by the Hindus of India between 800 and 600 B. C. and the subsequent application of them industrially, people in all continents have become aware of their commercial as well as decorative possibilities. Diamonds were in industrial use in China in the third century, they are mentioned commercially in the *Arabian Nights* and in the tale of Sinbad the Sailor.

The romantic story of the commercial applications of diamonds is set forth in a 1600-word detailed account prepared by Sydney Hobart Ball, prominent mining engineer and member of the firm of Rogers, Mayor & Ball, New York, for *Diamonds in Industry*, published by J. K. Smit & Son Inc., New York. Copies are available upon request to this company.

Turning and Boring in Modern Machine Shops

Turning and Boring Practice, by Fred H. Colvin and Frank A. Stanley; 453 pages, 6 x 9 inches; published by McGraw-Hill Book Co., New York; supplied by STEEL, Cleveland, for \$4, plus 15 cents for postage; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

Machine shops have developed practices that use so many tools that it is impossible to discuss them all in one volume and the authors have specialized in this volume, limiting themselves to those used in turning and boring operations. These include engine and turret lathes in automatic and semiautomatic types and three types of boring machines used in modern shops.

Elements of lathe work are given first and then modern examples of turret lathe and screw machine work. This section is particularly complete as a guide to operation of automatic screw machines and methods of tooling for a variety of work.

Boring operations include horizontal and vertical machines and the new single-point machines now used where great accuracy is required.

Particular attention is paid to the new cutting alloys and new materials the shop man must know how to handle.

Welding, etc. . . .



by Robert E. Kinkead

Wisdom Born of Experience

THE metallurgy and heat cycle of welding operations would seem to be the basis of all engineering in connection with welding. But there is something else. It is experience in making, rolling and forming metals.

Recently a fine old steelmaker told us that all this recent development in welding had left him far behind and that he knew nothing of welding. In the course of a half-hour conversation, it developed that he had welded many of the alloy steels which are bothering the welding fraternity and that the work had been done 15 and 20 years ago. An unusual welding job on an alloy was in progress at the time and, without an instant's hesitation, he specified the only method by which it could be accomplished successfully. He actually knew more about welding than most people who deal with it.

Scattered through the steel mills of the country are these fine old master craftsmen who have fought with, have been defeated by, and have conquered their fickle mistress, steel, all their lives. The welding fraternity needs their council and wisdom born of experience.

Markets for Metal

WELDING of steel furniture is the battleground of the welding processes. Resistance welding, arc, gas and atomic hydrogen processes are in continual competition to do the best job at the least cost. Steel producers who are impatient at the delays in designing an acceptable steel home would do well to make themselves acquainted with the work the steel furniture industry is doing. This industry is already equipped to manufacture in steel any metal assemblies which might ever be required in a home.

The market for the products the industry makes is far less than 1 per cent saturated. If the reader is sitting in a wood chair at a wood desk in a room with wood trim, the

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.

point should be self evident. The steel industry does not have to wait for someone to invent a new kind of a home to sell more steel. The market is waiting for action which may be roughly described as lifting the seat of the pants off the chair and going out to sell steel.

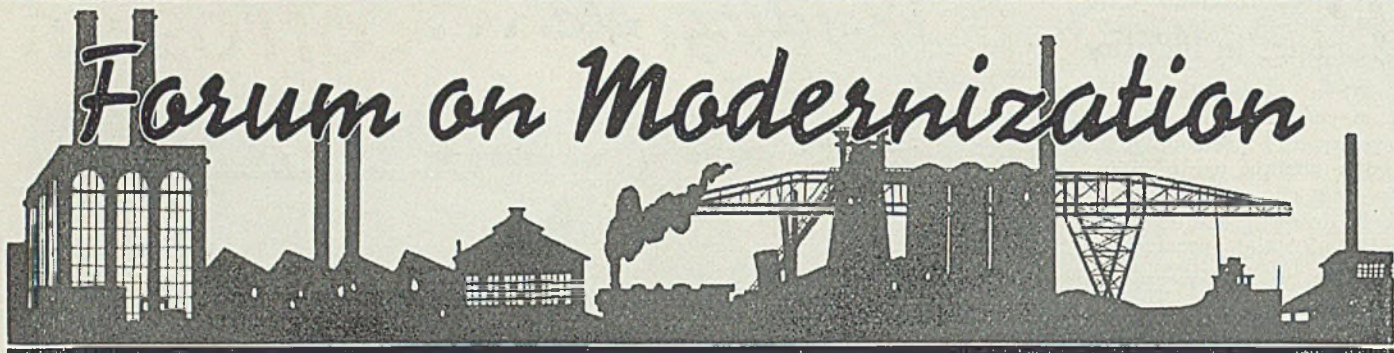
Build It or Buy It?

INCREASED requirements for welded steel construction have brought up the question in many companies of whether to do the work in the plant or to buy it on the outside from those who have the equipment and facilities. If the work is to be done outside, the purchaser should specify with reasonable precision the type and size of the welds he wants. Failure to do this makes it impossible to compare prices.

While the vendor's background of experience in the particular work involved is important, that does not eliminate the necessity of common understanding of what is to be furnished in the line of welding.

Inspection should be used to establish the fact that the welds specified are actually furnished. The vendor's honesty is not questioned in insisting on inspection; the financial responsibility for safety of the job in the interest of the purchaser is at stake. Honesty of intent is the least factor in the situation which requires inspection.

Paying fancy prices for welded construction may come about because the purchase price appeared low due to the fact that the supplier did not know what he was supposed to furnish. It is also a fact that many suppliers will submit a price without reading the specifications and do the work without reference to them. That kind of performance costs money.



Automatic Combustion Control for Furnaces and Boilers Improved

BY E. W. WAGENSEIL
General Sales Manager, Hagan Corp., Pittsburgh



SIX years ago when steel production, along with other business, abruptly started down hill, the application of automatic combustion control to metallurgical furnaces was receiving the active consideration of engineers and operators in a large number of steel plants. Prior to that time, automatic control had been in general use in steel mill boiler plants, but comparatively few installations had been made on open-hearth furnaces, billet, and slab-heating furnaces. The curtailment of expenditures for new equipment, which quickly followed the general decline in business, put an end temporarily to further installations; but engineers, encouraged by favorable results obtained on installations previously made, continued to lay plans for additional equipment when business again picked up.

Concentrated on Developments

Results obtained on some furnace installations had not been entirely satisfactory due to lack of sensitivity and reliability of some of the control equipment available at that time. Wise control manufacturers, when new business became scarce, directed the activities of engineers and designers toward the improvement of their apparatus and the development of new equipment capable of controlling pressures and flows within closer limits than had previously been thought possible. The Hagan

Corp., for instance, not only kept its entire engineering staff busy on such development work during the depression years, but actually employed additional expert designers for this purpose. As a result, our automatic combustion control equipment available today is far superior to that offered prior to the depression.

Improves Quality of Steel

This improvement in design is of vital interest and of real advantage to the steel industry. The ever increasing demands of steel purchasers for greater uniformity of steel quality and reduced tolerances have presented new problems in the making of steel in open hearths and the heating of ingots, billets and slabs, which can be met successfully and economically only by the close control of furnace operation made possible by accurate and reliable automatic control equipment.

Engineers and operators in the mills are fully aware of this situation and practically all new furnaces installed during the past two years or so have been equipped with modern control apparatus. In many cases, however, mill managements have failed to heed the pleas of their engineers for funds to purchase control equipment for existing furnaces, thereby failing to attain the better practice and reduction in costs that moderate expenditures would make possible. Where progressive management has granted expenditures for such equipment, the improvement in quality of product and the reduction in costs per ton of steel produced has far more than offset the cost of the installation in a short period of time. In those mills where

initial installations have been made, the results have quickly demonstrated the value of automatic control and additional installations have usually followed.

Fuel Saving Effected

Nor are the advantages of the improved types of control equipment by any means limited to metallurgical furnaces. A few mills are now installing high pressure boilers and these, of course, will be completely equipped with the modern combustion control apparatus. A large percentage of the older boiler plants, however, are either operating under the handicap of manual control or with inadequate or antiquated types of control which render high operating efficiencies impossible. Engineers and operators of such plants usually are aware of the satisfactory returns in the way of fuel saving, uniform maintenance of pressure and labor saving that could be secured with modern control equipment, but are frequently unable to interest the management in the spending of the necessary funds. Those few plants which have realized the advantages to be gained and have made such improvements are getting excellent returns on the money they have spent. As an example, during the past year, we installed automatic combustion control on six stoker-fired boilers in one of the boiler houses of a large steel plant. The resultant saving in fuel has been approximately 5 per cent, which will pay for the total cost of installation in less than six months. As a result of this showing, this plant has recently purchased control equipment for eight boilers in another of its plants.

Those steel mills, particularly where blast furnace gas, coke oven gas, or coke breeze are burned in boilers, in addition to coal, and which are not now equipped with satisfactorily functioning automatic combustion control should give careful consideration to the coal and labor saving which could be made by the installation of a modern control system. This system would utilize their

(Please turn to Page 65)

Prevent Intergranular Corrosion OF AUSTENITIC CHROMIUM-NICKEL STEEL with Ferrocolumbium

• Ferrocolumbium provides a simple and economical means of adding columbium to chromium-nickel steels. Columbium inhibits intergranular deterioration of the austenitic chromium-nickel steels when exposed concurrently to high temperatures and chemical corrosion. It makes possible the use of 18-8 stainless steel at temperatures between 1000 deg. F. and 1500 deg. F. without developing intergranular

corrosion. The valuable properties of 18-8 stainless steel are not impaired.

Columbium-bearing 18-8 stainless steel can be used after welding with columbium-bearing welding rod without subsequent annealing. Columbium is retained in the weld metal and adjacent areas to such an extent that susceptibility to intergranular corrosion is eliminated. There is no increased susceptibility to intergranular attack along the weld seam.

Electromet can supply you with Ferrocolumbium and assist you in its advantageous use. The booklet "Effects of Columbium in Chromium-Nickel Steels" will be sent you on request. Write for your copy today.


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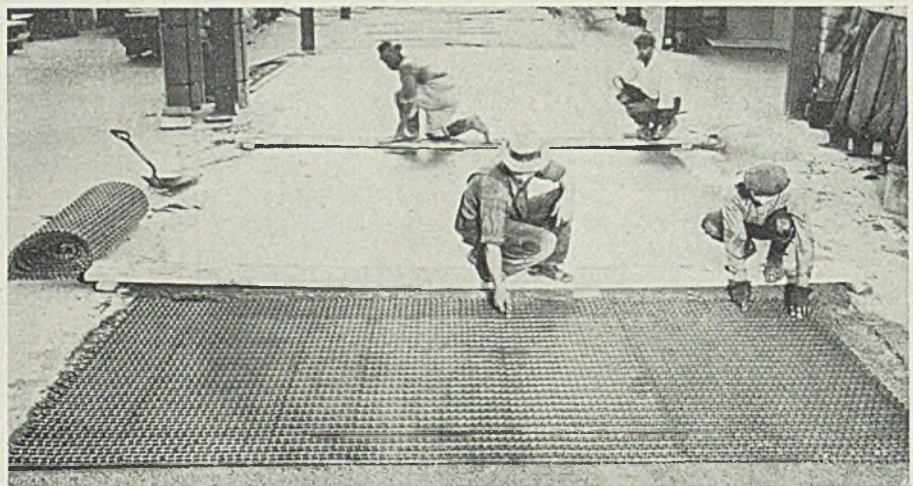
Truck Powers Welding Generator



POWER for field arc welding generators now can be supplied by the motor of the truck hauling the equipment through the application of a power take-off either directly to the drive or to the side. Made of chrome-nickel steel, power take-off in the above unit weighs 100 pounds installed. Antifriction ball and roller bearings are used. The unit will transmit 120 brake horsepower at 2800 revolutions per minute on a 220-pound torque. Either a 200- or 300-ampere welding generator can be operated by a 1½-ton truck motor. The unit, manufactured by the Hercules Steel Products Co., Galion, O., in conjunction with the Lincoln Electric Co., Cleveland, is adaptable to all makes and models of trucks

Parade of Progress in Pictures

No Skidding Here



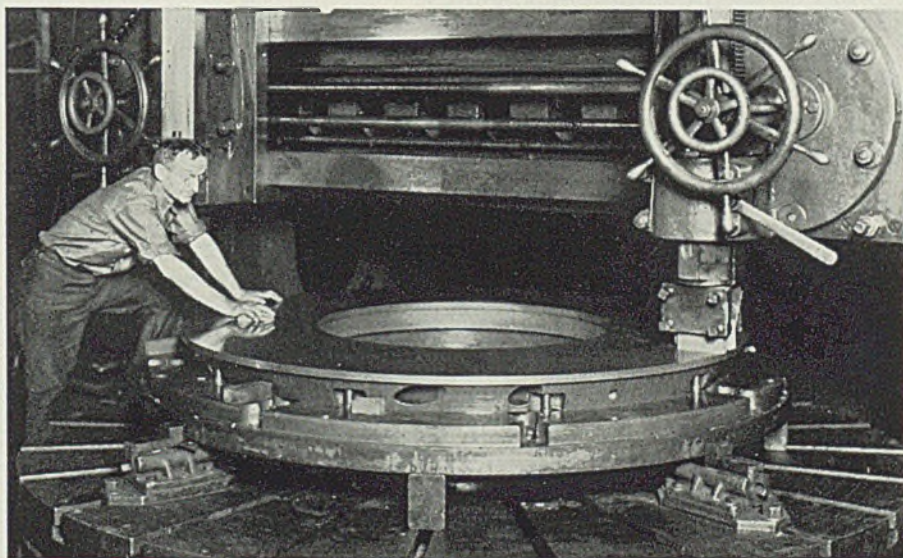
HEAVER sections of rolled steel than were formerly used are fabricated in the illustrated network of small mesh for industrial plant floor armoring. It provides a long-wearing, nonskid floor surface at a low annual maintenance cost. The mesh can be used on both old and new floors and over concrete, brick, wood and other types of surfaces. It is laid flush with the finished floor line and filled with concrete or asphalt, giving a smooth and even surface. Installation is quick and easy because these large sections simply are rolled out like rugs and joined together with steel pins inserted three to the lineal foot. The photograph shows a section of mesh, made by Acme Steel Co., Chicago, being installed

"Dairy Bar" Finished in Porcelain Enamel



BEAUTY and uniqueness are combined in this porcelain enameled, frameless steel "Dairy Bar" erected recently in Cincinnati by Cincinnati Mfg. Co. This building, 38 feet long and 24 feet wide, is utilized as a lunch room and confectionery. The chassis is entirely of frameless steel, the side walls and flat roof being made from steel sheets. The materials were prefabricated by Insulated Steel Construction Co., Middletown, O., in co-operation with American Rolling Mill Co. Exterior and interior walls are covered with black and white porcelain enameled panels applied with frameless steel clip-strip. Made of stainless steel, this clip-strip provides two continuous tension points which hold the enameled sheets in place; at the same time it flashes the joint and leaves a bead of stainless steel covering the joint. Metallic and porcelain enameled effects are carried out in interior fixtures and decorations

Bearing Plate Hand Finished



GROUND and hand lapped within 0.0005-inch, this runner plate for a Kingsbury thrust bearing for one of the Norris dam generators was made in the East Pittsburgh, Pa., works of the Westinghouse Electric & Mfg. Co. It is 75 inches in diameter and $4\frac{1}{2}$ inches thick. A "dead-smooth" finish free from scratches is required to prevent wear of the bearing materials, therefore, it was necessary to hand finish the plate with special oil stones

Announcing . . .

THE ACQUISITION OF THE WOOSTER, OHIO PLANT
OF THE MACKINTOSH-HEMPHILL COMPANY

BY

United Engineering and Foundry Company



UNITED Engineering and Foundry Company is pleased to announce they have acquired by outright purchase, February 5th, {1} *the manufacturing plant* at Wooster, Ohio of Mackintosh-Hemphill Company, and {2} *all drawings and patterns* of that company used in the manufacture of rolling mill equipment.

Replacement parts, both rough and machined castings, and complete mills and machines which the Mackintosh-Hemphill Company designed and built are now offered by UNITED; such equipment includes:

Universal Mills

3-High Balanced Sheet Mills designed for application of automatic tables and continuous furnaces

Cut Mill Pinions

Hot Strip Mills for modified tonnages

Precision Thrust Bearings for rod and merchant bar mills,

And other rolling mill equipment

The Wooster, Ohio plant will be an active production unit of UNITED. It covers eleven acres with machine shop, forge shop, and fitting and erecting floor. The heavy machinery section is entirely modernized. Single pieces up to about 300,000 pounds may be handled and the largest rolling mill machinery may be assembled.

The plant, one hundred and fifty miles northwest of Pittsburgh, is well situated to serve the steel districts of Chicago, Detroit, Ohio and Pittsburgh.

A direct company telephone connects UNITED'S plants at Wooster, Youngstown, Canton, Vandergrift, Pittsburgh and the general offices at Pittsburgh.

Progress in Steelmaking



Hot Rolled Sheet Packs Are Delivered To Shears by System of Conveyers

Conveying hot rolled sheets from the finishing stand to the squaring shear with the added feature of permitting sheet packs to be removed and returned for a reheat and additional rolling is accomplished at a sheet mill in the Pittsburgh district by a novel conveyer system. The combination system of hot rolling is employed, each stand of rolls being equipped with a feeder and catcher table furnished by the Wean Engineering Co. Inc., Warren, O.

Diverted Through Doubler

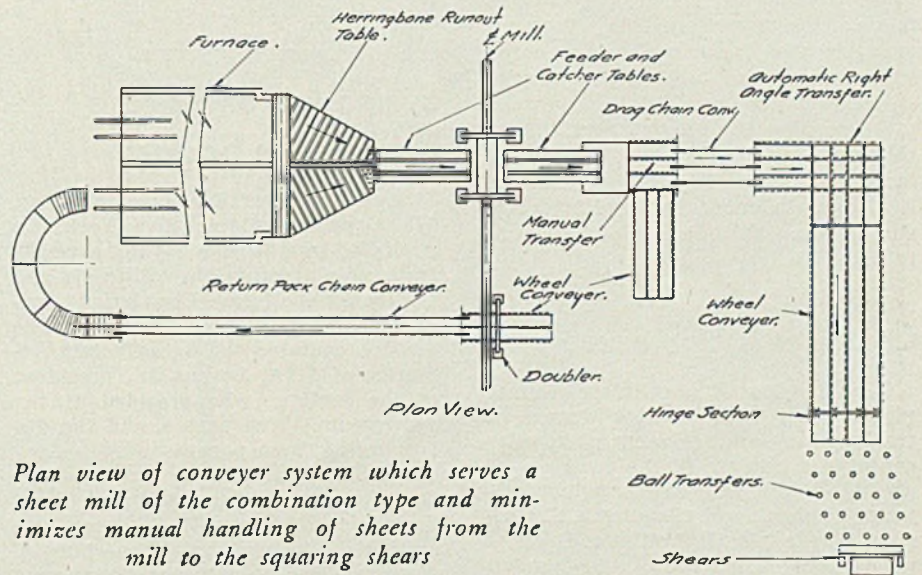
As the roughed down sheets come from the mill and are received by the catcher table they continue straight ahead on a wheel conveyer. When near the end of this conveyer, a workman with a pair of tongs pulls the sheet onto another wheel conveyer placed at right angles which discharges it onto the floor near the mechanical doubler. After the sheets are matched they automatically are returned to the charging end of the sheet furnace by a chain conveyer for reheating.

When the pack has received its

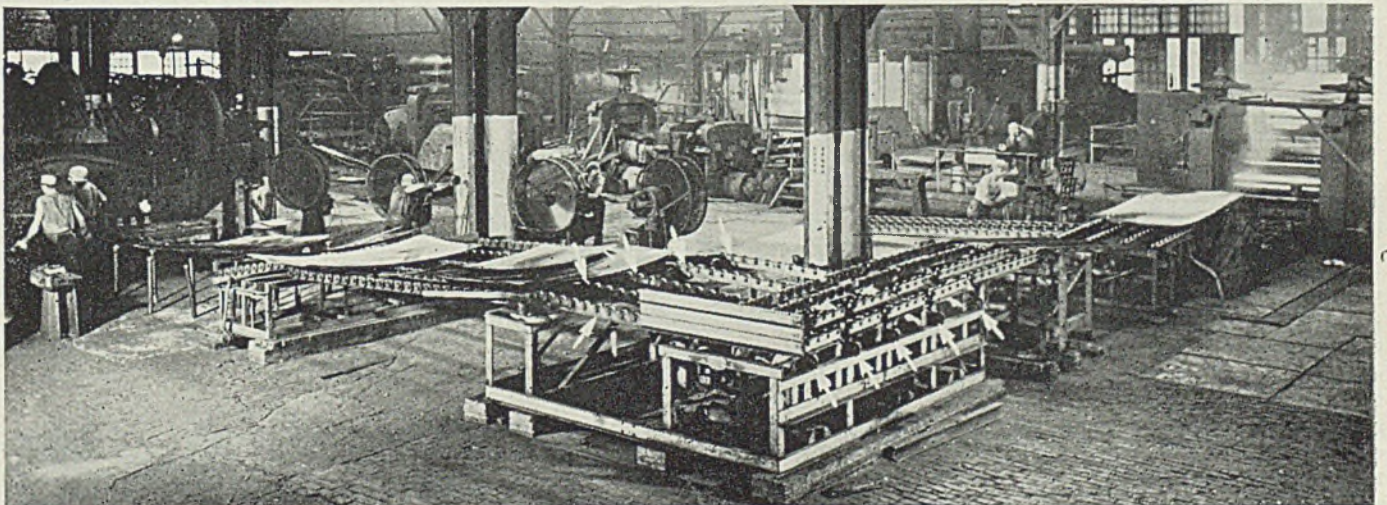
finishing pass and is received by the automatic catcher table and wheel conveyer, it is conveyed up a slight incline by a drag chain conveyer and delivered to a right angle automatically operated transfer. This is built

of a series of parallel bars on which ball bearing wheels are mounted.

The pack striking the bumper plate engages an electric limit switch which starts the motor operating a mechanism to lift the five parallel bars so as to discharge the packs by gravity from this point to the squaring shears. This is shown in the accompanying illustration. A feature of the use of parallel bars on the wheel conveyers in this case is to afford quick cooling of the sheets so that they may be handled conven-



Plan view of conveyer system which serves a sheet mill of the combination type and minimizes manual handling of sheets from the mill to the squaring shears



System of conveyers for transferring sheets from the hot mill to the shears. When the parallel bars (indicated by arrows) are elevated, the sheets are discharged by gravity to the transfer bed

iently at the shears. This is depicted by the illustrations.

A series of ball transfers on vertical standards are located in front of the shears, spaced far enough apart so that the operators can work in and around about the shears while manipulating the hot pack, placing it in position for shearing to size.

The conveyer system was built by the Mathews Conveyer Co., Ellwood City, Pa.

Curtails Radiation Losses

Stripping large ingots one at a time and immediately charging them into the soaking pits has been adopted as standard practice by a steel-maker in the Great Lakes district. The ingot mold train is shunted into the soaking pit building over a track which parallels the ingot chariot track. Spanning the soaking pit department are three cranes—two for serving the pits and one for stripping. As soon as an ingot is stripped of its mold one of the pit cranes charges it into the furnace. The other pit crane is used for transferring heated ingots from the pits to the chariot which delivers them to the approach table serving the blooming mill. By this arrangement of quick charging a large portion of the original heat of the ingot is conserved and a better surface on the finished steel is obtained.

Container is Unbreakable

Oiler bottles of a cellulose acetate plastic and with a high degree of transparency are replacing glass oiler containers because of the tendency of glass to crack and shatter when subjected to shock and vibration. The design of the plastic bottle and stem, which is attached to a hinged metal fitting through which oil is fed to the housing of the bearing, permits ready inversion of the container for filling. Even though a careless oiler should allow the bottle to strike against the machine the toughness of the plastic prevents breakage. The bottle is molded in two pieces and cemented together.

Provides Graphic Record

Temperature of steel being rolled is recorded graphically and automatically on a chart moved according to time by a newly devised instrument, thus providing the superintendent of the mill with a production and temperature record of each piece of steel rolled. The measuring element, mounted near the mill, is a small thermocouple which receives through a lense the heat radiated from the steel. Current generated by the thermocouple is measured by

a high-speed recording galvanometer. A dot made on the chart shows the temperature of each piece of steel.

Develops Special Oils for Roll Neck Bearings

An important development in bearing design for rolling mills is the recent introduction of sleeve-type bearings on roll necks, such as the Morgoil bearing manufactured by Morgan Construction Co., Worcester, Mass., and the Iverson bearing supplied by Mesta Machine Co., Pittsburgh.

These bearings are lubricated with a high viscosity oil in a circulating system under pressure. The oil must possess high demulsibility in order to separate out any water which may find its way into the oiling system. Standard Oil Co. of New Jersey, New York, and Penola Inc., are supplying a line of oils for this service, known as Teresso 100, 120 and 140. The numerical designations refer to their approximate viscosities at 210 degrees Fahr.

Symposium on Silicosis Published in Booklet

Steel Founders' Society of America, 1732 Graybar building, New York, has published in a 36-page booklet excerpts from a symposium on "Silicosis and Occupational Disease Legislation" conducted in Cleveland, Nov. 15. The booklet contains the introductory remarks of F. A. Lorenz Jr., president of the society, who presided at the symposium, three papers, and the discussion of these papers.

The three papers were presented by O. E. Mount, secretary, American Steel Foundries, Chicago; E. O. Jones, consultant, industrial relations bureau, National Founders association; and Donald Cummings, field director, Saranac Laboratories, Saranac Lake, N. Y.

Prepares Supplement on Crane Roller Bearings

A 20-page crane section, constituting a supplement to the Timken Engineering Journal, has just been issued by the Timken Roller Bearing Co., Canton, O. In this section are illustrated typical layouts for the application of the company's tapered roller bearings to all types of crane machinery.

Applications to cross travel, hoist, line and drum shafts, together with drive mountings, wheel mountings for tapered tread track wheels, as well as flat or radius treads, sheaves, blocks and hooks, are shown as equipped with Timken bearings. A table gives bearing recommendations

for crane bridge track wheels from 18 to 30 inches in diameter and wheel loads from 15,000 to 130,000 pounds. A second table lists tolerances and fits for cones and cups in housings and on shafts from 1 to 8 inches diameter, while a third table lists crane hook bearing recommendations for loads ranging from 2000 to 400,000 pounds.

This crane supplement, 8½ x 11 inches, punched to fit a standard 3-ring binder, will serve a useful purpose in making up preliminary drawings and tentative bearing selections. Copies may be obtained by addressing the company.

Mechanical Properties of Tin-Base Alloys Studied

A paper on the mechanical properties of tin-base alloys and two on the electrodeposition of bronze have been issued by the International Tin Research and Development council, 149 Broadway, New York. Publication No. 26 of series A is a report on researches into the possibility of obtaining tin-base alloys, as bearing metal, solders and pewter, with greater strength than is now possible. D. J. Macnaughtan, director of the council, and B. P. Haigh are authors of the paper.

An alkaline stannate-cuprocyanide type bath, which has given promise of suitability for industrial use in the electrodeposition of bronze, was used by Mr. Macnaughtan and S. Baier in researches described in publication No. 27. Bronze deposits up to 1/32-inch or more in thickness were produced.

M. C. Bechard is the author of publication No. 28, which deals with experiments with bimetallic anodes of tin and copper.

Directory of Iron and Steel Plants Is Revised

Directory of Iron and Steel Plants, 1936; fabrikoid, 449 pages, 5 x 7½ inches; published by Steel Publications Inc., Pittsburgh; supplied by STEEL, Cleveland, for \$10, postpaid; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

In the form and style of previous editions this handy volume presents a list of companies and officials operating blast furnaces, steel plants, rolling mills, by-product coking plants, structural steel plants and boiler and tank shops in the United States and Canada.

In addition to the alphabetical arrangement by company names a geographical index is provided for each division, under state and city names.

The listings also give equipment, products, capacity, capital and railroad facilities, as well as branch offices and subsidiaries.

TIMKEN

Out of the TIMKEN Ladle

THE DAWN OF A
NEW DAY FOR USERS
OF ALLOY STEELS
AND ALLOY STEEL
SEAMLESS TUBES



Men are no longer handicapped by material in the practical interpretation of their dreams and ideals. Timken Alloy Steels and Alloy Steel Seamless Tubes have made important contributions to many recent developments in industry and transportation where higher speeds, increased safety

and greater economy have been sought and attained. Timken technicians are constantly striving to discern and anticipate future needs. We invite discussion of your manufacturing problems and service requirements in the modernization of existing products and the creation of new ones.

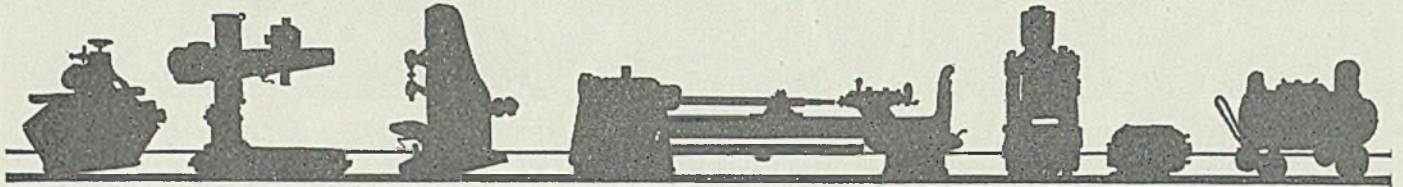
THE TIMKEN STEEL & TUBE COMPANY, CANTON, OHIO

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TIMKEN ALLOY STEELS

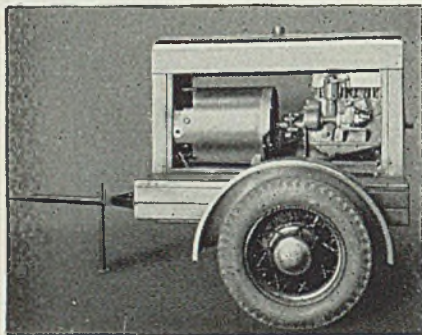
ELECTRIC FURNACE AND OPEN HEARTH • ALL STANDARD AND SPECIAL ANALYSES

New Equipment



General Utility Welder—

Harnischfeger Corp., Milwaukee, recently introduced a new arc welder of 150-ampere capacity and powered by a small air-cooled gasoline engine. Designated model W-150, this new unit uses bare or coated electrodes from 3/32 to 3/16-inch for welding materials of varying thicknesses. Welding is simplified through single current control accomplished by shifting brush holders for current setting over the entire welding range. For field service, the standard unit can be mounted on a two-wheel highway trailer as shown herewith. It also is available on a small four-wheel industrial truck or for factory use, with

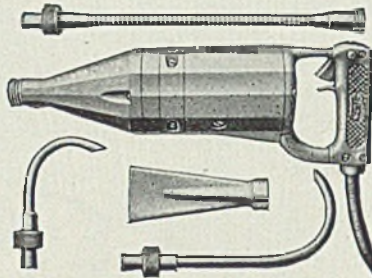


Harnischfeger general utility welder mounted on trailer unit

skid mounting. Electric motor equipped models, either stationary or portable, are driven through a V-belt, while the gasoline motor equipped units are driven direct-connected at 2200 revolutions per minute.

Electric Heat Gun—

Independent Pneumatic Tool Co., 600 West Jackson boulevard, Chicago, recently brought out an electric heat gun, shown herewith. Instantaneous heat is generated to a maximum temperature of 400 degrees. Air forced through nozzle at a high velocity makes this heat gun suitable for thawing out frozen differentials and transmissions, radiators, water pumps, spring shackles, hose connections, warming up stiff crankcase oil, drying distributor

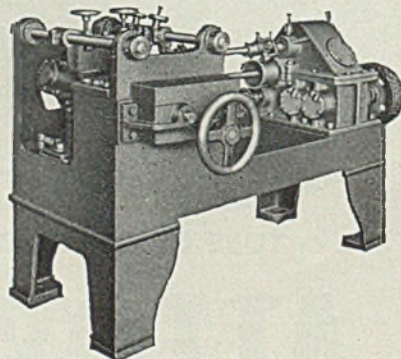


Electric heat gun developed by Independent Pneumatic Tool Co.

heads, spark plugs and ignition systems, touching up paint jobs, etc. It is equipped with 850W heat unit and four attachments, long and short goose neck, wide nozzle and flexible hose which permit operation in inaccessible places.

Automatic Straightening and Polishing Machine —

Medart Co., 3600 DeKalb street, St. Louis, is announcing a new No. 00 continuous automatic straightening and polishing machine for wire, bars and tubular products, from 1/8 to 3/4 inch diameter. The unit, shown herewith, is of the roll type—one concave and one straight-face roll. The wire (or bars) is rotated as it advances between these two revolving rolls. Straightening is accomplished by the roll pressure which causes a flexing of the wire as it passes between the rolls. The action of the concave roll polishes the wire as it

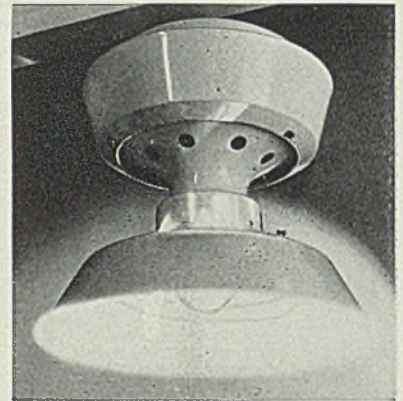


Medart continuous automatic wire and bar straightening and polishing machine

passes through the machine. Out-of-roundness of the wire, due to wear of the drawing die, is corrected by the roll pressure, plus the action of the revolving of the roll. The higher the roll pressure, the more pronounced is the correcting action.

Industrial Lighting Unit—

General Electric Vapor Lamp Co., Hoboken, N. J., recently introduced a self-contained industrial lighting unit with color characteristics said to approach actual daylight more closely than any commercial light source heretofore available. Known



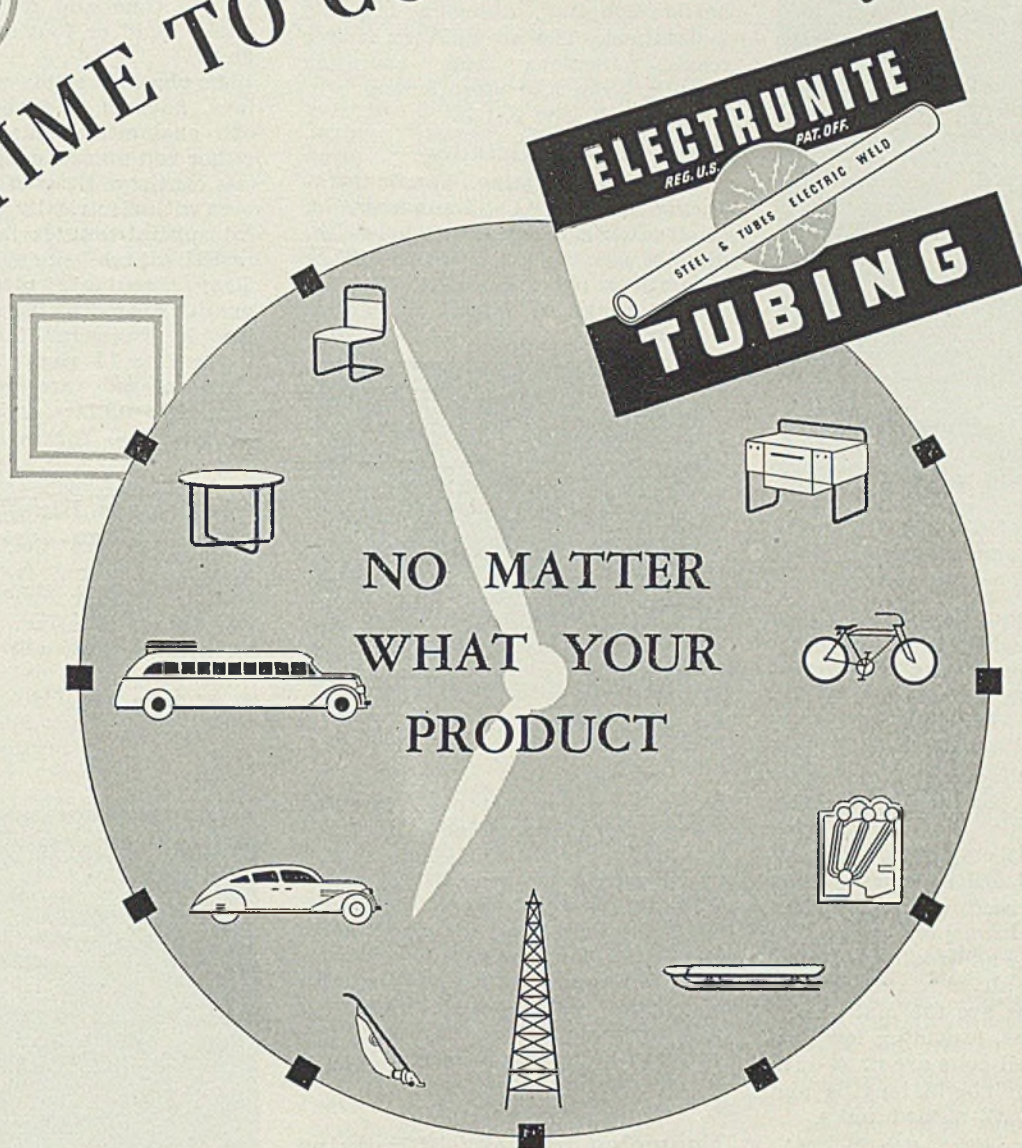
Mercury-vapor tube and incandescent lamp are combined in General Electric Vapor Lamp Co. industrial lighting unit

as the circular mercury-incandescent, the light, shown herewith, consists of a unit in which a circular mercury-vapor tube and an incandescent lamp are combined beneath one reflector to provide the desired spectral balance. The new light is particularly recommended for industrial lighting applications involving accurate color differentiation, critical inspection or manufacturing operations which involve difficult visual problems.

Air Conditioning Units—

York Ice Machinery Corp., York, Pa., is bringing out a line of industrial air conditioning units to meet a

IT'S TIME TO CONSIDER . . .

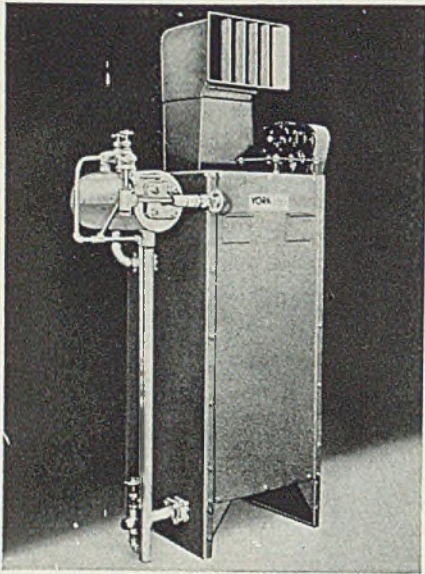


Tubing, in most cases, is the strongest structural shape for the weight involved. Electrunit tubing is unsurpassed for fine surface and accuracy to size and gauge. It possesses great strength. Inside and outside surfaces are smooth and free from defects. These features make Electrunit the best tubing available for boiler and pressure work as well as mechanical and structural applications. • When you want to save weight—when you design or re-design for increased sales appeal—when tubular mechanical parts must be absolutely accurate—when you buy or re-tube a boiler or condenser—then it's time to consider seriously the many advantages of this better tubing made by electric resistance welding of cold-formed, flat-rolled steel.



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

When writing Steel and Tubes Inc., for further information, please address Department ST.

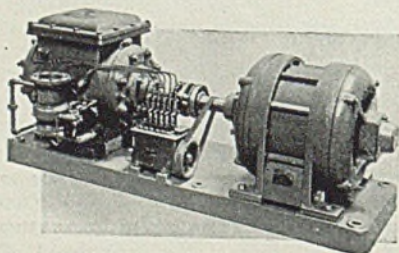


York industrial air conditioning unit is sturdy and compact

wide range of requirements. The new models, one of which is shown herewith, can be installed in any industrial plant, with or without distributing ducts. Furnished in either high or low pressure type, a float control permits accurate and automatic control of the refrigerant, whether ammonia, circulating brine or cold water is employed. The entire unit is enclosed in a heavy steel casing, fully braced, which provides a strong rigid frame for supporting the fan assembly and cooling surface, and maintains all moving parts in alignment. Fans are the multi-blade double inlet type, providing low outlet velocities. All coils are of $\frac{3}{4}$ -inch pipe, bent from single lengths and fabricated into all-welded units.

Two-Stage Air Compressors—

Allis-Chalmers Mfg. Co., Milwaukee, announces a new line of two-stage sliding vane rotary air compressors for pressures up to 100 pounds G. The design is unique in that both stages as well as the inter-cooler are contained in a single casing. Known as the "Ro-Twin," the unit, shown herewith, offers the advantages of reduced length and floor space, less weight, only one stuffing box and one coupling, no external air

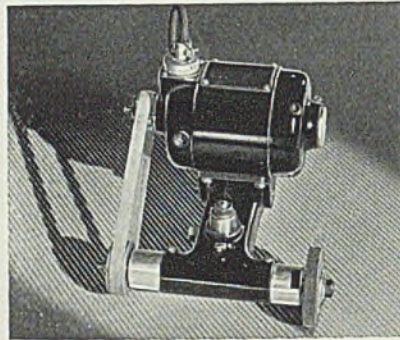


Allis-Chalmers two-stage sliding vane rotary air compressor

pipng between stages to keep tight and a simple lubrication system. Having only two bearings and one flexible coupling, alignment is easily maintained. The air delivery is free from pulsations and operation smooth, quiet and vibrationless.

Small Lathe Grinder—

Dumore Co., Racine, Wis., is introducing its No. 44 "Toolmaker," a small lathe grinder, shown herewith. Spindle speeds from 7000 to 44,000 revolutions per minute adapt it for a wide range of work. Each unit

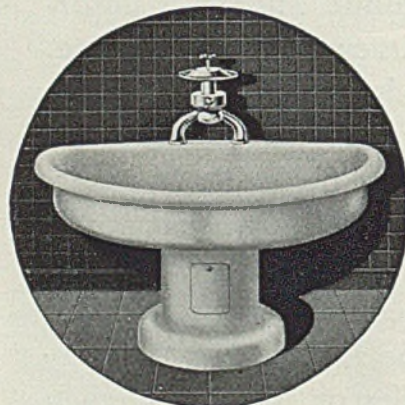


Dumore "Toolmaker" lathe grinder

comes in a compact steel carrying case, with equipment including three mounted wheels with $\frac{1}{8}$ -inch shank, one mounted wheel with $\frac{1}{4}$ -inch shank, a 2-inch vitrified wheel, a 3-inch vitrified wheel, two high speed fabric belts, and three assorted wrenches. The universal motor develops $\frac{1}{4}$ horsepower and is mounted pivotally, with a simple belt adjustment. The unit can be used for internal or external grinding.

Enameled Iron Washfountains

Bradley Washfountain Co., 2203 Michigan street Milwaukee, announces extension of its line of enam-



Hand-controlled semi-circular enameled iron Bradley washfountain

eled pressed iron washfountains to include 36-inch diameter circular and 54-inch diameter semi-circular units. Subject to the limitations of their smaller size and capacity the new

fixtures incorporate all the advantages of the larger full circular models. They accommodate six users at one time and may be had with either hand or foot control of water flow.

Bowls are solid one-piece pressings, finished in acid-resisting vitreous enamel and may be had with either roll rim or deep apron. Pedestals consist of pressed iron base members with electrically welded cylindrical superstructures finished in acid-resisting high-bake synthetic enamel. They are fabricated from high quality deep drawing annealed stock. No. 10 gage for the semi-circular units, No. 11 gage for the 36-inch circular, and are reinforced with special annular and semi-annular disks.

Continuous Blueprinter—

C. F. Pease Co., 813 Franklin street, Chicago, is announcing a model 7 printer developed to provide continuous printing. The new unit, shown herewith, will reproduce trac-



Pease mercury vapor tube printer

ings, charts, diagrams, bulletins, etc. in a variety of forms including blueprints, brown-prints or direct process prints in any dimensions up to 42 inches in width. Uniform illumination in the printer is provided by an arrangement of $3\frac{1}{2}$ -ampere fifty-inch mercury vapor tubes. Each tube is mounted independently and is connected to an auxiliary starting apparatus and reactance unit mounted within the machine underneath the feed table. When the machine is equipped with three tubes, sufficient illumination is produced to provide a printing speed of two linear feet per minute, and when equipped with four tubes, of two and one-half linear feet per minute using good tracings and a fast blueprint paper or direct process paper.

Properties of Superheated Cast Iron

(Concluded from Page 51)

at superheating temperatures could be held constant.

Considerable discussion was centered on the time for adding ferro-silicon. Mr. Di Giulio pointed out that in his tests, the addition was made 10 minutes before the furnace was tapped. He also stated that the tests were carried on with a furnace rather tightly sealed when operated. R. H. Bancroft, Perfect Circle Co., Newcastle, Ind., stated he has encountered a silicon pick-up when superheating iron. Prof Sefing pointed out that no carbon drop was experienced in the heats which were brought to the superheating temperature and tapped immediately; however, carbon drop was experienced when the metal was held at that heat for a predetermined time.

In a paper, "Effect of Time at Superheating Temperatures on Gray Iron Mixtures," by H. S. Austin described work which he has done on superheating and the effect of properties on holding time. His tests showed holding gray iron at 2900 degrees Fahr, invariably produced an inferior metal, the condition of the metal depending upon the length of time of holding. In duplexing, where the metal is melted in the cupola and refined in the electric furnace, this does not apply.

Mr. Austin discussed the use of test bars and stated that in his opinion it is advisable to use a size of bar test suited to show the true qualities of the particular type of iron under test. It is not good practice, he said, to hold any iron for any period of time at high temperatures.

Casting Defects Eliminated

Harry Rayner presented a paper, "Relation Between Superheating, Size of Section and Structure," in which he concluded that size of section of superheated iron is not as great a factor in determining structure of castings as composition of the metal, degree of superheat, pouring temperature, length of time metal held above critical superheating temperature, method of mold gating, and cooling rate after casting.

Mr. Rayner said many casting defects had been eliminated by use of superheated irons. Blowholes in large sections, chilled or cold shut thin sections, and shrinkage between thick and thin sections due to uneven cooling have been practically eliminated. Superheating plain cast iron has the effect of making large section castings of uniform texture throughout the entire cross-section, materially strengthening the casting. A. E. Rhodes, Detroit Electric Furnace Co., Detroit, stressed the point

that rate of feeding of certain castings has much to do with final properties obtained from superheated iron.

Mr. Rayner reported his company now is using baled sheet metal in the charge. While some doubt was experienced when this material first was proposed, its use has been found highly satisfactory and the foundry now tries to use as much as possible in the charge. A higher coke bed is used in melting this material.

Suggests Further Tests

R. G. McElwee, Vanadium Corp. of America, Detroit, presented a discussion on "The Influence of High Furnace Temperatures on the Chemical Analysis and the Effect of Small Changes in Chemical Analysis on the Physical Properties of Gray Cast Iron." He pointed out that while considerable discussion centered around holding the metal at superheated temperatures, he doubted if from the practical point of view anyone would hold the heat. In the foundry, it has been the policy to heat the iron to the desired point and then get it into the mold as soon as possible.

The speaker discussed certain irons presented in the report of Mr. Surls and Mr. Sefing which seemed to him to be abnormal to the remaining irons in the group, or to irons normally used in foundry practice. He stated that with irons containing a low amount of carbon, it has been the policy to add silicon just before tapping to obtain the best possible physical properties. He said that this is common practice, not only with the electric furnace, but with the air furnace.

Mr. McElwee also suggested that further tests be undertaken to see what effect the dendritic structure may have on subsequent heat treatment. He urged greater use of the Mauer diagram in studying the relation of carbon and silicon within a certain range.

Forum on Modernization

(Concluded from Page 54)

by-product fuels to the highest degree of efficiency, thereby reducing the amount of coal required and at the same time would burn the coal with increased efficiency. Boiler operators, no matter how closely they may watch combustion conditions, cannot possibly obtain the continuously high efficiencies that are ensured by modern, sensitive, stable and reliable automatic control.

Steel plant managements can

profitably give favorable consideration to the recommendations of their engineers and operating officials covering the advantages to be obtained by the installation of automatic combustion control on their furnaces and boilers and thus obtain the improvement in operation and reduction in costs which the installation of modern control equipment insures.

New Trade Publications

Letters—American Rolling Mill Co., Middletown, O. The sixth edition of "Making Letters Talk Business." Revealing in illustrated form the technique of writing effective, interesting letters, it also lists a group of now defunct words.

Precision Lathe—South Bend Lathe Works, 749 East Madison avenue, South Bend, Ind. Bulletin No. 7-B alludes to the 1936 model South Bend 9-inch "Workshop" precision lathe, including principal units, features, attachments, and applications.

Machines—Niagara Machine & Tool Works, 637 Northland avenue, Buffalo. Bulletin No. 70-C covers the complete line of Niagara machines for cutting circles and rings and for slitting and flanging, adding data on their economy and adaptability.

Abrasion Resisting Steel—Carnegie-Illinois Steel Corp., Pittsburgh. G12849 VM 1235 is pertinent to the uses, physical characteristics, chemical analysis, shearing, punching, flame cutting, welding, forming, corrosion, and size of this product.

Gaskets and Assemblies—Steel Improvement & Forge Co., 960 Addison road, Cleveland. Two bulletins: One shows distinguishing features of diamond drop forged steel handhole assemblies for boilers and tanks, and the other applies to gruv-seal drop forged iron ring gaskets.

Gear Finishing—Michigan Tool Co., 7171 East McNichols road, Detroit. A bulletin showing this company's finishing process for lowering of gear production cost, and increasing accuracy in heat treatment. A listing of the various advantages and characteristics of this process is included.

Microscope Illuminators—Bausch & Lomb Optical Co., Rochester, N. Y. Booklet D-119,3,X11-35 is a compilation of information on microscope lamps for routine and research, with suitable types for both individual and group work. Illustrations, specifications, and description are a part of this data.

Dust Collectors—Pangborn Corp., Hagerstown, Md. Bulletin 636-5-1235 contains briefly industry's reply to the menace of dust, and first steps towards its control. Principles of construction of this company's all metal frame, cloth screen, dust collector, are presented. Bulletin No. 197 will give further details of specifications, requirements, and prices.

Activities of Steel Users and Makers

STEEL PRODUCTS ENGINEERING CO., Springfield, O., has merged with Combustioneer Inc., Chicago. Automatic furnace stokers formerly made by Combustioneer will be manufactured in the Steel Products company plant, which recently doubled its capacity. The new company operates under the name of Steel Products Engineering Co. John E. McAdams is president.

Keystone Steel & Wire Co., Peoria, Ill., has been elected to membership in the Association of National Advertisers Inc., New York. O. A. Brock will represent the company in the A. N. A.

Hedstrom-Danforth Stoker Corp., Buffalo, has been incorporated to serve as exclusive western New York distributor for the Fairbanks-Morse stokers and automatic burners. N. Loring Danforth is president.

Albra Castings Corp., Huntington, Ind., recently organized, has an especially equipped modern foundry for the production of aluminum, brass, bronze, monel, and other non-ferrous castings. Herman Voges Jr. is president.

Assets of Vulcan Wheels Inc., Newark, N. J., have been purchased by the American Brake Shoe & Foundry Co., Newark, N. J., and the Vulcan Wheels division has been organized to carry on the business conducted by the former. The same staff will be maintained.

Kasle Steel Corp., Detroit, has opened a new warehouse. The company is engaged in a general warehouse business in sheets and hot and cold-rolled bars. Abe Kasle, president, A. Kasle Co., Detroit, also is president of the Kasle Steel Corp. Harold Trunsky is vice president.

Two well-known Cleveland welding firms were merged as of Jan. 1, when Contract Welders Inc. acquired Industrial Welding & Cutting Co. The two plants will be operated as divisions of Contract Welders Inc. until April 1, when equipment and organization will be consolidated as Contract Welders Inc. in large quarters at 2545 East Seventy-ninth street, Cleveland.

Combined facilities will provide customers with complete fabricating service from raw materials to finished products or structures. Equipment will include arc welding generators, electrodes and accessories

supplied by the Lincoln Electric Co., Cleveland, and complete metalworking equipment including oxygraph, sandblast and metal spray facilities.

C. C. Peck, president of Contract Welders Inc. since its founding, will head the consolidation, and Everett Benedict, formerly manager of Industrial Welding & Cutting Co., will serve as vice president in charge of sales.

Penn Steel Castings Co., Chester, Pa., has opened a branch office at 30 Vesey street, New York, with R. Royal Roane, consulting engineer, acting as its representative.

Denman & Davis, iron and steel jobbers, 930 Thirty-eighth street, North Bergen, N. J., opened their new steel warehouse Dec. 23 to the inspection of more than 100 guests, with the occasion featured by a venison dinner and reception.

Newman Bros. Inc., Cincinnati, successor to the Newman Mfg. Co., has moved into a new large plant at 666-670 West Fourth street. The company has a well-lighted, modern factory building in which has been installed new foundry equipment, with five new crucible furnaces for nonferrous metals. The firm specializes in architectural metal work, including doors, store fronts, lighting fixtures, elevator doors, hardware, grilles, etc. Other types of castings also are made.

Whitehead Metal Products Co. of New York Inc., New York, has leased 5000 additional square feet of space in a building at 304-314 Hudson street, as part of an expansion program. This will be used for office space, and follows within a few months the addition of similar space for warehouse purposes.

The company some months ago took over the manufacture and distribution of monel metal sinks and other household equipment for the International Nickel Co. Inc., New York. It also does a general supply business in monel metal, nickel and other metals in a variety of commercial forms.

The partnership heretofore existing between Sam Keener and M. H. Mawhinney, under the firm name of Salem Engineering Co., Salem, O., and known in Canada as Salem Engineering Co. of Canada, Welland, Ont., has been dissolved by mutual consent, and Mr. Mawhinney has retired as a partner of the firm. He will, however, continue to be associated with the company as consulting engineer, supervising all of the engineering and development activities of the company. The business will be continued by Mr. Keener under the same corporate name, and

Mr. Keener will adjust and settle all unfinished transactions.

Ferro Enamel Corp., Cleveland, has booked an order from the Glenwood Range Co., Taunton, Mass., for a large electrically-heated continuous porcelain enameling furnace.

Reed Iron & Steel Co., Warren, O., manufacturer of steel building supplies and specialties, has moved to the newly-modernized building formerly occupied by the Superior Bronze & Aluminum Co. at Griswold and Paige avenues, Warren.

Albert J. Saute has acquired the Randolph Iron Foundry, Pleasant street, Randolph, Mass., and is operating a jobbing shop for light and medium castings. Yale D. Sawtelle, formerly foreman, General Electric Co., Lynn, Mass., and General Alloy Foundry, Boston, is shop superintendent.

Detroit Rex Products Co., Detroit, manufacturer of Detrex solvent degreasers, and a complete line of Triad alkali cleaning compounds and enamel strippers, has moved the offices of its eastern sales region to 630 Bush Terminal Sales building, New York, under the supervision of D. E. Williard, eastern sales manager.

Briggs Mfg. Co., Detroit, has appointed Noland Co. Inc., Newport News, Va., as wholesale distributor of the complete line of Briggs formed metal plumbing ware, known as Brigsteel beautyware, on the Atlantic seaboard. This company operates branch plants in other cities, ranging from Washington to Macon, Ga., and includes Maryland, Virginia, West Virginia, North and South Carolina, Tennessee and portions of Alabama.

Briggs has also appointed W. A. Case & Son Mfg. Co., Buffalo, to distribute Brigsteel beautyware in cities as far south as Nashville, Tenn., including Brooklyn, Syracuse, Niagara Falls, and Jamestown N. Y.

Timken Roller Bearing Co., Canton, O., will supply bearings on the backup and work roll necks of five of the seven stands of the 100-inch semicontinuous sheared plate mill being built for the Homestead works of the Carnegie-Illinois Steel Corp. by the United Engineering & Foundry Co., Pittsburgh. Two of the roughing stands are mounted on plain bearings.

The backup roll neck bearings represent a new size, 31 x 48 x 33 inch, each weighing 8167 pounds. Work roll neck bearings will also be four row Timken units 24 x 14½ inch, weighing 1030 pounds, and those on the finishing end being 18 x 23½ x 11 inch, weighing 445 pounds.

Heavy Railroad Buying Again Lifts Steel Rate

Structurals, Automotive

Cramped by Weather;

Action on Prices Near

RESISTING adverse weather conditions which slowed shipments, suspended outdoor construction, and hampered automobile sales, steelworks operations last week again advanced, $1\frac{1}{2}$ points to $54\frac{1}{2}$ per cent.

The influence of railroad purchasing still is dominant. Additional orders for freight cars and rails, a steady demand from the farm equipment industry, and broadening manufacturing requirements are effectually bridging the gap in automotive and structural activity.

Still larger tonnages are accumulating, and an appreciable improvement in specifications soon, combined with advancing production costs, may serve to stabilize prices. If the steel industry follows its recent custom it will announce prices Feb. 20 and open books March 1 for second quarter.

Despite efforts to strengthen the market at Detroit, the \$3 a ton concession on sheets and strip, heretofore limited to automobile tonnage, has become general, and in some instances there has been a further reduction of \$2 a ton. Also, carbon steel bars in the Detroit area have been cut \$2 a ton, and cold-finished steel prices are being shaded. In other districts, a \$1 a ton quantity extra on carbon bars has been waived.

Temporarily, at least, scrap as a price indicator has lost some of its significance, due to difficulties in collections and shipments. STEEL's scrap composite has advanced 29 cents to \$13.71, but it is generally believed that scrap prices have reached a peak, and with open weather some adjustments are looked for.

Rail orders in the week included 38,000 tons, with 3500 tons of fastenings, for New York Central, and 10,000 tons for Denver & Rio Grande Western. Rock Island is preparing to close on 38,000 tons. Kansas City, Oklahoma & Gulf was authorized to buy 5700 tons.

Santa Fe has awarded 550 freight cars, and Western Pacific 100 ballast cars. Chicago, Milwaukee, St. Paul & Pacific has decided to build 1500 freight cars and 37 coaches in its shops. Great Northern is in the market for 500 iron ore cars; Northern Pacific for 500 gondola and 250 flat cars.

MARKET IN TABLOID

DEMAND . . . Railroad, farm implement, miscellaneous, strong.

PRICES . . . Sheets, strip, bars easier.

PRODUCTION . . . Ingots up $1\frac{1}{2}$ points to $54\frac{1}{2}$ per cent.

SHIPMENTS . . . Rising.

While structural shape awards last week dropped to 9350 tons, the total so far this year is 150,240 tons, compared with 98,129 tons in the like period in 1935, while reinforcing bar awards amount to 67,564 tons, against 29,521 tons last year. Great Lakes Steel Corp. is taking bids on 16,000 tons of shapes for a plant extension at Detroit. For Chicago's outer drive, bids will be opened March 3 on 21,000 tons of shapes and bars. Additional pipe line projects are maturing. Standard Oil of Indiana is expected shortly to award 8000 tons for a 75-mile connection. Lever Bros. placed 3300 tons of plates for tank construction at Hammond, Ind.

Automobile production rebounded 5300 units to 75,000, Chrysler increasing more than Ford and General Motors retrenched. Large retooling and die programs for 1937 models are expected out in March.

Notwithstanding slackened automotive foundry operations, pig iron consumption has increased. Carnegie-Illinois Steel Corp. has broadened its merchant iron sales to include eastern states, as well as Pittsburgh and Ohio districts, and is offering 40-pound "piglets", for easy melting. Lake iron ore shipments for 1936 are estimated to rise 25 per cent to 35,000,000 tons.

STEEL's London correspondent cables steel production in Britain in January, 912,500 tons, was the second highest on record, exceeded only by 949,600 tons in March, 1927.

Chicago steelworks operations last week advanced $1\frac{1}{2}$ points to $59\frac{1}{2}$ per cent; Wheeling 3 to 84; Cleveland 5 to $66\frac{1}{2}$; Buffalo 2 to 34; Detroit 6 to 94; eastern Pennsylvania $\frac{1}{2}$ -point to 37; Youngstown 1 to 62. Others were unchanged.

STEEL's iron and steel price composite is up 1 cent to \$33.45. The finished steel index continues at \$53.70.

COMPOSITE MARKET AVERAGES

	Feb. 15	Feb. 8	Feb. 1	One Month Ago Jan., 1936	Three Months Ago Nov., 1935	One Year Ago Feb., 1935	Five Years Ago Feb., 1931
Iron and Steel	\$33.45	\$33.44	\$33.40	\$33.34	\$33.15	\$32.54	\$31.64
Finished Steel	53.70	53.70	53.70	53.70	53.70	54.00	49.42
Steelworks Scrap....	13.71	13.42	13.29	13.15	12.92	11.66	10.39

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

A COMPARISON OF PRICES

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

	Feb. 15, 1936	Jan., 1936	Nov., 1935	Feb., 1935	Feb. 15, 1936	Jan., 1936	Nov., 1935	Feb., 1935
Finished Material								
Steel bars, Pittsburgh	1.85c	1.85	1.85	1.80				
Steel bars, Chicago	1.90	1.90	1.90	1.85				
Steel bars, Philadelphia	2.16	2.16	2.16	2.09				
Iron bars, Terre Haute, Ind.....	1.75	1.75	1.75	1.75				
Shapes, Pittsburgh	1.80	1.80	1.80	1.80				
Shapes, Philadelphia	2.01½	2.01½	2.01½	2.00½				
Shapes, Chicago	1.85	1.85	1.85	1.85				
Tank plates, Pittsburgh	1.80	1.80	1.80	1.80				
Tank plates, Philadelphia	2.00	1.99	1.99	1.98½				
Tank plates, Chicago	1.85	1.85	1.85	1.85				
Sheets, No. 10, hot rolled, Pitts.	1.85	1.85	1.85	1.85				
Sheets, No. 24, hot ann., Pitts...	2.40	2.40	2.40	2.40				
Sheets, No. 24, galv., Pitts.....	3.10	3.10	3.10	3.10				
Sheets, No. 10, hot rolled, Gary...	1.95	1.95	1.95	1.95				
Sheets, No. 24, hot anneal, Gary	2.50	2.50	2.50	2.50				
Sheets, No. 24, galvan., Gary.....	3.20	3.20	3.20	3.20				
Plain wire, Pittsburgh	2.30	2.30	2.30	2.30				
Tin plate, per base box Pitts.....	5.25	5.25	5.25	5.25				
Wire nails Pitts.	2.40	2.40	2.40	2.60				
Semifinished Material								
Sheet bars, open-hearth, Youngs.	\$30.00	30.00	29.50	28.00				
Sheet bars, open-hearth, Pitts...	30.00	30.00	29.50	28.00				
Billets, open-hearth, Pittsburgh...	29.00	29.00	28.50	27.00				
Wire rods, Pittsburgh	40.00	29.00	38.00	38.00				
Pig Iron								
Bessemer, del. Pittsburgh.....	\$20.8132	20.8132	20.8132	19.76				
Basic, Valley	19.00	19.00	19.00	18.00				
Basic, eastern, del. eastern Pa.	20.8132	20.8132	20.8132	19.76				
No. 2 fdry., del. Pittsburgh.....	20.8132	20.8132	20.8132	19.26				
No. 2 fdry., Chicago	19.50	19.50	19.50	18.50				
Southern No. 2, Birmingham...	15.50	15.50	14.75	14.50				
Southern No. 2, del. Cincinnati	20.2007	20.2007	20.2007	19.13				
No. 2X eastern, del. Phila.....	21.6882	21.6882	21.6882	20.63				
Malleable, Valley	19.50	19.50	19.50	18.50				
Malleable, Chicago	19.50	19.50	19.50	18.50				
Lake Sup. charcoal, del. Chi....	25.2528	25.2528	25.2528	24.04				
Ferromanganese, del. Pitts.....	80.13	90.13	90.13	89.79				
Gray forge, del. Pittsburgh.....	19.6741	19.67	19.67	18.63				
Scrap								
Heavy melting steel, Pittsburgh..	\$15.00	14.50	13.65	13.25				
Heavy melt steel, No. 2, east Pa.	11.75	11.37½	11.00	10.15				
Heavy melting steel, Chicago.....	14.00	13.40	13.20	11.65				
Rails for rolling, Chicago	15.25	14.25	14.30	12.55				
Railroad steel specialties, Chicago	15.25	14.40	13.75	12.50				
Coke								
Connellsville, furnace, ovens	\$3.50	3.50	3.55	3.60				
Connellsville, foundry, ovens	4.25	4.00	4.35	4.60				
Chicago, by-product foundry, del.	9.75	9.75	9.75	9.25				

Steel, Iron, Raw Material, Fuel and Metals Prices

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

Sheet Steel		Tin Mill Black No. 28		Corrosion and Heat-Resistant Alloys		Structural Shapes	
Hot Rolled No. 10, 24-48 in.		Pittsburgh	2.75c	Pittsburgh base, cents per lb.		Pittsburgh	1.80c
Pittsburgh	1.85a	Gary	2.85c	Chrome-Nickel		Philadelphia, del.	2.01½c
Gary	1.95a	St. Louis, delivered	3.08c	No. 302 No. 304		New York, del.	2.06½
Chicago, delivered..	1.98c	Cold Rolled No. 10		Bars	23.00 24.00	Boston, delivered....	2.20½c
Detroit, del.	1.90c	Pittsburgh	2.50c	Plates	26.00 28.00	Bethlehem	1.90c
New York, del.	2.20c	Gary	2.60c	Sheets	33.00 35.00	Chicago	1.85c
Philadelphia, del.	2.16c	*Detroit, delivered..	2.55c	Hot strip	20.75 22.75	Cleveland, del.	2.00c
Birmingham	2.00c	Philadelphia, del.	2.81c	Cold strip	27.00 29.00	Buffalo	1.90c
St. Louis, del.	2.18c	New York, del.	2.85c	Straight Chromes		Gulf Ports	2.20c
Pacific ports, f.o.b.	2.18c	Pacific ports, f.o.b.	3.10c	No. 410	No. 430	Birmingham	1.95c
cars, dock	2.40c	cars, dock	3.10c	442	446	Cleveland	1.90c
Hot Rolled Annealed No. 24		Cold Rolled No. 20		Bars	17.00 18.50 21.00 26.00	Buffalo	1.95c
Pittsburgh	2.40c	Pittsburgh,	2.95c	Plates	20.00 21.50 24.00 29.00	*Detroit, delivered..	1.90c
Gary	2.50c	Gary	3.05c	Sheets	25.00 28.00 31.00 35.00	Pacific ports, f.o.b.	2.40c
Chicago, delivered....	2.53c	*Detroit, delivered..	3.00c	Hot strip	15.75 16.75 21.75 26.75	cars, dock	2.35c
*Detroit, delivered..	2.45c	Philadelphia, del.	3.26c	Cold stp	20.50 22.00 27.00 35.00	Bars	
New York, del.	2.75c	New York, del.	3.30c	Soft Steel		(Base, 5 to 25 tons)	
Philadelphia, del.	2.71c	Enameling Sheets		Pittsburgh		Pittsburgh	1.85c
Birmingham	2.55c	Pittsburgh, No. 10..	2.50c	Chicago or Gary....		Chicago or Gary....	1.90c
St. Louis, del.	2.72c	Pittsburgh, No. 20..	3.10c	Duluth		Duluth	2.00c
Pacific ports, f.o.b.	2.72c	Gary, No. 10	2.60c	Birmingham		Birmingham	2.00c
cars, dock	3.05c	Gary, No. 20	3.20c	Cleveland		Cleveland	1.90c
Galvanized No. 24		Tin and Terne Plate		Steel Plates		Rail Steel	
Pittsburgh	3.10c	Gary base, 10 cents higher.		Pittsburgh		To Manufacturing Trade	
Gary	3.20c	Tin plate, coke base		New York, del.		Pittsburgh	
Chicago, delivered..	3.23c	(box) Pittsburgh		Philadelphia, del.		Chicago or Gary	
Philadelphia, del.	3.41c	Do., waste-waste..		Boston, delivered....		Moline, Ill.	
New York, del.	3.45c	Do., strips		Buffalo, delivered....		Cleveland	
Birmingham	3.25c	Long ternes, No. 24		Chicago or Gary		Buffalo	
St. Louis, del.	3.43c	unassorted, Pitts.		Cleveland, del.		Pittsburgh	
Pacific ports, f.o.b.	3.70c	Do., Gary		Birmingham		Chicago or Gary	
cars, dock	3.70c			Coatesville, base		Moline, Ill.	
				Sparrows Pt., base		Cleveland	
				Pacific ports, f.o.b.		Buffalo	
				cars, dock		Pittsburgh	
				St. Louis, delivered..		Chicago or Gary	
						Moline, Ill.	
						Cleveland	
						Buffalo	

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

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

Wire Products

(Prices apply to straight or mixed carloads; less carloads \$4 higher; less carloads fencing \$5 over base column.)

Base Pitts.-Cleve. 100 lb. keg. Standard wire nails	\$2.40
Cement coated nails	2.40
Galvanized nails, 15 gage and coarser	4.40
do. finer than 15 gage..	4.90
(Per pound)	
Polished staples	3.10c
Galvanized fence staples	3.35c
Barbed wire, galv.	2.80c
Annealed fence wire	2.45c
Galvanized fence wire....	2.80c
Woven wire fencing (base column, c.l.).....\$61.00	
To Manufacturing Trade	
Plain wire, 6-9 gage.....	2.30c
Anderson, Ind. (merchant products only) and Chicago up \$1; Duluth up \$2; Birmingham up \$3.	
Spring, wire, Pittsburgh or Cleveland	2.90c
Do., Chicago up \$1, Worcester, \$2.	

Cold-Finished Carbon Bars and Shafting

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

Alloy Steel Bars (Hot)

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

Piling

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Strip and Hoops

Hot strip to 23½-in.	
Pittsburgh	1.85c
Chicago or Gary..	1.95c
Birmingham base	2.00c
*Detroit, del.	1.90c
Philadelphia, del....	2.16c
New York, del....	2.20c
Cooperage hoop,	
Pittsburgh	1.95c
Chicago	2.05c
Cold-strip, Pitts.	
Cleve.	2.60c
Detroit, del.	2.65c
Worcester, Mass..	2.80c

Rails, Track Material

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

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots, Dec. 1, 1932, lists, 10% extra for less full containers.

Carriage and Machine	
½ x 6 and smaller....	70-10-5 off
Do. larger	70-10 off
Tire bolts	55 off
Plow Bolts	
All sizes	70-10 off
Stove Bolts	
In packages with nuts attached 72½-10 off; in packages with nuts separate 72½-10-5 off; in bulk 82½ off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.	
Step bolts	65-5 off
Elevator bolts	65-5 off
Nuts	
S. A. E. semifinished hex.; ½ to ⅝-inch	60-20-15 off
Do., ½ to 1-inch	60-20-15 off
Do., over 1-inch	60-20-15 off
Hexagon Cap Screws	
Milled	80-10-10 off
Upset, 1-in., smaller	85 off
Square Head Set Screws	
Upset, 1-in., smaller	75-10 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	2.90c	
Struc., c. l., Chicago	3.00c	
⅝-in. and smaller, Pitts., Chi., Cleve.	70 and 5 off	
Wrought washers, Pitts., Chi., Phila. to jobbers & large nut, bolt mfrs....		\$6.25 off

Cut Nails

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

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

Pipe and Tubing

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

Welded Iron, Steel Pipe

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

Butt Weld Steel	
In.	Blk. Galv.
¼ and ⅜	53½ 35
½	58½ 47
¾	62 52
1-3	64 55
Iron	
½	31½ 15
¾	36½ 20½
1-1¼	39½ 25½
2	41½ 26
Lap Weld Steel	
2	60 51
2½-3	63 54
3½-6	65 56
7 and 8	64 54
9 and 10	63½ 53½
Iron	
2	37 22½
2½-3½	38 25
4-8	40 28½
Line Pipe Steel	
½, butt weld	57½
½-inch butt weld	50½
¾-⅝, butt weld	52½
¾, butt weld	61
1-3, butt weld	63
2-inch, lap weld	59
2½-3, lap weld	62
3½-6, lap weld	64
7-8, lap weld	63
Iron	
¾-1½ inch, black and galv. take 4 pts. over; 2½-6 inch 2 pts. over discounts for same sizes, standard pipe lists, 8-12-inch, no extra.	
Boiler Tubes	
C. L. Discounts, f.o.b. Pitts.	
Lap Weld Steel	
2-2¼	33 1¾
2½-2¾	40 2-2¼
3	47 2½-2¾
3¼-3½	50 3
4	52 3¼-3½
4½-5	42 4
.....	4½
Charcoal Iron	
.....	8
.....	13
.....	16
.....	17
.....	18
.....	20
.....	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 points under base.

Seamless Boiler Tubes

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet

and per pound. Less-carloads revised as of July 1, 1935, 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 also being on a lb. and 100 ft. basis.

Seamless Tubing

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

Cast Iron Water Pipe

Class B Pipe—Per Net Ton	
6-in. & over, Birm....	\$39.00-40.00
4-in., Birmingham..	42.00-43.00
4-in., Chicago.....	50.40-51.40
6 to 24-in. Chicago..	47.40-48.40
6-in. & over, east. fdy.	43.00
Do., 4 in.	46.00
Class A pipe \$3 over Class B	
Std. ftgs., Birm, base..	\$100.00

Semifinished Steel

Billets and Blooms	
4 x 4-inch base; gross ton	
Pitts., Chi., Cleve., and Youngstown..	\$29.00
Philadelphia	34.67
Duluth	31.00
Forging Billets	
6 x 6 to 9 x 9-in., base	
Pitts., Chi., Buff....	35.00
Forging, Duluth	37.00
Sheet Bars	
Pitts., Cleve., Young, Chi., Buff., Canton, Sparrows Pt.	30.00
Slabs	
Pitts., Chi., Cleve., Young.	29.00
Wire Rods	
(Common; combination up \$2)	
Pitts., Cleveland	40.00
Chicago	41.00
Worcester, Mass.	42.00

Coke

Price Per Net Ton	
Beehive Ovens	
Connellsville, fur....	\$3.50-3.65
Connellsville, fdry....	4.25
Connell, prem. fdry.	5.50-5.75
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.	9.70-10.15
Chi. ov., outside del.	9.00
Chicago, del.	9.75
New England, del....	11.50
*St. Louis, del.	10.00-10.50
Birmingham, ovens	6.50
Indianapolis, del.	9.40
Cincinnati, del.	9.50
Cleveland, del.	9.75
Buffalo, ovens	7.50-8.00
Detroit, ov., out, del	9.00
Philadelphia, del.	9.38

Coke By-Products

Per gallon, producers' plants.	
Tank lots	
Pure and 90% benzol....	Spot
Toluol	30.00c
Solvent naphtha	30.00c
Commercial xylol	30.00c
Per lb. f.o.b. New York.	
Phenol (200 lb. drums)..	16.30c
Do. (100 lbs.)	17.30c
Eastern Plants, per lb.	
Naphthalene flakes and balls, in bbls., to jobbers	6.75c
Per 100 lb. Atlantic seaboard Sulphate of ammonia....	\$1.20
†Western prices, ½-cent up.	

Pig Iron

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

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

Delivered from Basing Points:

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

Delivered from Basing Points:	No. 2 Fdry	Malle-able	Basic	Besse-mer
St. Louis, northern	20.00	20.00		19.50
St. Louis from Birmingham	19.62			19.50
St. Paul from Duluth	21.94	21.94		22.44

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., \$24.00, Phila. base, standard and copper bearing, \$25.13.				
Gray Forge				
Valley furnace	19.00			Lake Superior fur. \$22.00
Pitts. dist. fur.	19.00			Do., del. Chicago 25.25
				Lylees, Tenn. 22.50

Silvery†

Jackson county, O., base; 6-6.50 per cent	\$22.75; 6.51-7—\$23.25; 7-7.50—\$23.75; 7.51-8—\$24.25; 8-8.50—\$24.75; 8.51-9—\$25.25; 9-9.50—\$25.75. Buffalo \$1.25 higher.
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Bessemer Ferrosilicon†

Jackson county, O., base: Prices are the same as for silveries, plus \$1 a ton.
†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

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

Refractories

Per 1000 f.o.b. Works		timore bases (bags)....	40.00
Fire Clay Brick		Domestic dead-burned gr. net ton f.o.b. Chelwah, Wash. (bulk)..	22.00
Super Quality		Basic Brick	
Pa., Mo., Ky.	\$55.00	Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.	\$45.00
Pa., Ill., Md., Mo., Ky.	\$45.00	Chrome brick	\$45.00
Alabama, Ga.,	\$38.00-45.00	Chemically bonded chrome brick	45.00
Second Quality		Magnesite brick	65.00
Pa., Ill., Ky., Md., Mo.	40.00	Chemically bonded magnesite brick	55.00
Ga., Ala.	35.00		
Ohio			
First quality	\$40.00		
Intermediary	37.00		
Second quality	28.00		
Malleable Bung Brick			
All bases	50.00		
Silica Brick			
Pennsylvania	\$45.00		
Joliet, E. Chicago	54.00		
Birmingham, Ala.	48.00		
Magnesite			
Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)..	\$45.00		
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Bal-			

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	\$20.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all-rail	\$17.50
Do., for barge	\$17.50

Ferroalloys

Dollars, except Ferrochrome	
Ferromanganese, 78-82% tidewater, duty paid	75.00
Do., Balti., base	75.00
Do., del. Pittsb'gh	80.13
Spiegeleisen, 19-20% dom. Palmer-ton, Pa., spot	26.00
Do., New Orleans	26.00
Ferrosilicon, 50% freight all., cl.	77.50
Do., less carload	85.00
Do., 75 per cent. Spot, \$5 a ton higher.	126-130.00
Silicomane, 2½ carb. 2% carbon, 90.00; 1%	85.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del.	100.00
Ferrotungsten, stand., lb. con. del.	1.35- 1.45
Ferrovandium, 35 to 40% lb., cont.	2.70- 2.90
Ferrotitanium, c. 1, prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt. allow., lb.	7.00
Do., under 1 ton	7.50
Ferrophosphorus, per ton, c. 1, 17-19% Rockdale, Tenn., basis, 18%, \$3 unitage	58.50
Ferrophosphorus, electrolytic, per ton c. 1, 23-26% f.o.b. Anniston, Ala., 24% \$3 unitage	75.00
Ferromolybdenum, stand., 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80
†Carloads, Quan. diff. apply.	

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

Copper		Straits Tin		Lead		Alumi-		Antimony		Nickel	
Electro, del.	Lake, del.	Casting, Conn. Midwest	refinery	Spot	Futures	Lead N. Y.	East St. L.	Zinc St. L.	99%	Chinese Spot, N. Y.	Cath-odes
Feb. 8	9.25	9.37½	8.85	47.62½	45.55	4.50	4.35	4.85	*19.00	12.87½	35.00
Feb. 10	9.25	9.37½	8.85	48.00	46.10	4.50	4.35	4.85	19.00	12.87½	35.00
Feb. 11	9.25	9.37½	8.85	48.12½	46.25	4.50	4.35	4.85	*19.00	12.87½	35.00
Feb. 12—Holiday											
Feb. 13	9.25	9.37½	8.85	47.87½	46.25	4.50	4.35	4.85	*19.00	12.87½	35.00
Feb. 14	9.25	9.37½	8.85	47.87½	46.00	4.50	4.35	4.85	*19.00	12.87½	35.00

*Nominal range 19.00 to 21.00c.

MILL PRODUCTS

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

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

OLD METALS

Deal. buying prices, cents lb.

No. 1 Composition Red Brass		Heavy Copper and Wire		Composition Brass Borings		Light Copper	
New York	5.75- 6.00	*New York, No. 1	7.25- 7.50	*New York	5.25- 5.50	*New York	6.00- 6.25
Cleveland	6.50- 6.75	Chicago, No. 1	7.00- 7.50	Cleveland	6.75- 7.00	Chicago	5.50- 6.00
Chicago	6.00- 6.25	Cleveland	6.75- 7.00	St. Louis	7.00- 7.37½	Cleveland	6.00- 6.25
*St. Louis	5.75- 6.00	St. Louis, No. 1	7.00- 7.37½			St. Louis	5.75- 6.00

Light Brass

Chicago	3.50- 3.75
Cleveland	3.25- 3.50
St. Louis	3.50- 3.75
Lead	
New York	3.50- 3.75
Cleveland	3.50- 3.75
Chicago	3.37½-3.62½
St. Louis	3.25- 3.75
Zinc	
New York	2.00- 2.25
Cleveland	2.50- 2.75
*St. Louis	2.50- 3.00

Aluminum

Borings, Cleveland	9.00- 9.50
Mixed, cast, Cleve.	13.00-13.25
Mixed, cast, St. L.	12.50-12.75
Clips, soft, Cleve.	15.00-15.25

SECONDARY METALS

Brass ingot, 85-5-5-5	9.50
*Stand. No. 12 alum.	16.75-17.25

Iron and Steel Scrap Prices

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

HEAVY MELTING STEEL	COUPLERS, SPRINGS	Buffalo	7.75- 8.25	Chicago, iron	13.50-14.00
Birmingham	Buffalo	Cincinnati, dealers..	6.00- 6.50	Chicago, rolled steel	14.50-15.00
Boston, dock, expt.	Chicago, springs	Cleveland	8.75- 9.00	Cincinnati, iron.....	11.50-12.00
Boston, domestic	Eastern Pa.	Detroit	6.00- 6.50	Eastern Pa., iron.....	14.50-15.00
Buffalo, No. 1	Pittsburgh	Eastern Pa.	6.50	Eastern Pa., steel....	16.00-16.50
Buffalo, No. 2	St. Louis	New York, dealers..	3.25- 3.75	Pittsburgh, iron.....	14.75-15.25
Chicago, No. 1 .....	.....	Pittsburgh	8.50- 9.50	Pittsburgh, steel	17.00-17.50
Chicago, No. 2 .....	.....	Toronto, dealers	4.00	St. Louis, iron	11.00-11.50
Cleveland, No. 1.....	ANGLE BARS—STEEL	.....		St. Louis, steel	12.25-12.75
Cleveland, No. 2.....	Chicago .....	.....		Toronto, net	8.50
Detroit, No. 1	Chicago	CAST IRON BORINGS			
Detroit, No. 2	St. Louis	Birmingham, plain..	5.00- 6.00	NO. 1 CAST SCRAP	
Eastern Pa., No. 1..	Buffalo	Boston, chemical	5.50- 6.50	Birmingham	11.00-12.00
Eastern Pa., No. 2..	.....	Boston, dealers	3.50- 4.00	Boston, No. 1 mach.	9.00- 9.25
Federal, Ill.	RAILROAD SPECIALTIES	Buffalo	8.25- 8.75	Boston, No. 2	8.75- 9.00
Granite City, R. R....	Chicago	Chicago	6.50- 7.00	Boston, tex. con.	8.50- 9.00
Granite City, No. 2..	.....	Cincinnati, dealers..	6.00- 6.50	Buffalo, cupola	12.25-12.75
N. Y., deal. No. 2....	LOW PHOSPHORUS	Cleveland	8.75- 9.00	Buffalo, mach.	13.25-13.75
N. Y., deal. barge	Buffalo, billet and	Detroit	6.00- 6.50	Chicago, agri. net....	10.50-11.00
(No. 1 for export) ..	bloom crops	E. Pa., chemical.....	10.00- 12.00	Chicago, auto	11.50-12.00
Pitts., No. 1 (R.R.) ..	Cleveland, billet,	New York, dealers..	3.50- 4.00	Chicago, mach. net	12.50-13.00
Pitts., No. 1 (dlr.)..	bloom crops	St. Louis	4.50- 5.00	Chicago, railr'd net..	11.25-11.75
Pittsburgh, No. 2....	Eastern Pa., crops..	Toronto, dealers	5.00	Cinci., mach. cup....	11.00-11.50
St. Louis	Pittsburgh, billet,			Cleveland, mach.....	14.50-15.00
Toronto, dealers	bloom crops	PIPE AND FLUES		Detroit, auto, net....	12.00-12.50
Valleys, No. 1	Pittsburgh, sheet	Cincinnati, dealers..	8.00- 8.50	Eastern Pa., cupola	13.50-14.00
	bar crops			E. Pa., mixed yard..	11.50-12.00
		RAILROAD GRATE BARS		Pittsburgh, cupola..	13.50-14.00
COMPRESSED SHEETS	FROGS, SWITCHES	Buffalo	10.25-10.75	San Francisco, del..	13.50-14.00
Buffalo, dealers	Chicago	Chicago, net	7.75- 8.25	Seattle	7.50- 9.00
Chicago, factory	St. Louis, cut	Cincinnati	7.00- 7.50	St. Louis, No. 1	11.25-11.75
Chicago, dealer .....	.....	Eastern Pa.	9.50-10.00	St. L., No. 1 mach.	12.50-13.00
Cleveland	SHOVELING STEEL	New York, dealers..	6.50- 7.00	Toronto, No. 1,	
Detroit	Chicago	St. Louis	7.50- 8.00	mach., net	9.00
E. Pa., new mat.....	Federal, Ill				
Pittsburgh	Granite City, Ill.	FORGE FLASHINGS		HEAVY CAST	
St. Louis	Toronto, dealers	Boston, dealers	6.75- 7.00	Boston, del.	7.75- 8.00
Valleys		Buffalo	11.25-11.75	Buffalo, break.	10.75-11.25
		Cleveland	11.50-12.00	Cleveland, break.	11.50-12.00
		Detroit	10.50-11.00	Detroit, No. 1 mach.	
		Pittsburgh	13.75-14.25	net	12.00-12.50
				Detroit, break.	10.00-10.50
				Detroit, auto net....	12.00-12.50
				Eastern Pa.	13.00-13.50
				N. Y., break. deal....	8.75- 9.25
				Pittsburgh	12.50-13.00
				MALLEABLE	
				Birmingham, R. R..	11.50-12.50
				Boston, consum.	13.50-14.50
				Buffalo	15.75-16.25
				Chicago, R. R.	16.50-17.00
				Cincinnati, agri. del.	13.00-13.50
				Cleveland, rail	16.50-17.00
				Detroit, auto, net....	14.50-15.00
				Eastern Pa., R.R....	16.50-17.00
				Pittsburgh, rail.....	17.25-17.75
				St. Louis, R. R.	14.25-14.75
				Toronto, net	7.00
				RAILS FOR ROLLING	
				<i>5 feet and over</i>	
				Birmingham	11.50-12.00
				Boston, dealers	9.00
				Buffalo	12.50-13.00
				Chicago	15.00-15.50
				Eastern Pa.	13.00-14.00
				New York, dealer....	9.75-10.25
				St. Louis	13.50-14.00
				LOCOMOTIVE TIRES	
				Chicago (cut)	15.50-16.00
				St. Louis, No. 1	12.00-12.50
				LOW PHOS. PUNCHINGS	
				Buffalo	14.75-15.25
				Chicago	15.50-16.00
				Eastern Pa.	16.00-16.50
				Pittsburgh (heavy)	16.75-17.25
				Pittsburgh (light)..	16.00-16.50

Iron Ore

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

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

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

Manganese Ore

(Nominal)

Prices not including duty, cents per unit cargo lots

Caucasian, 52-55%	26.00
So. African, 52%....	26.50
So. Afr., 49-51%....	25.50
Indian, 53-60%.....	nominal
Indian, 48-50%.....	nominal

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS	Cincinnati 3.25c	Buffalo 3.37c	Pittsburgh(h) 2.95c	Seattle 5.60c
Baltimore*..... 3.00c	Houston 3.25c	Chattanooga.. 3.56c	San Francisco 3.35c	St. Louis 3.55c
Boston†† 3.10c	Los Ang. cl. 2.45c	Chicago 3.20c	Seattle 3.70c	St. Paul 3.55c
Buffalo 3.00c	New Orleans 3.50c	Cincinnati 3.42c	St. Louis 3.45c	
Chattanooga.. 3.36c	Pitts., plain (h) 3.05c	Cleveland, ¼- 3.31c	St. Paul 3.30c	COLD FIN. STEEL
Chicago (j).... 3.00c	Pitts., twisted 3.175c	in. and over 3.42c	Tulsa 3.70c	Baltimore (c) 3.73c
Cincinnati 3.22c	squares (h) 2.45c	Detroit 3.65c		Boston 3.90c
Cleveland 3.00c	San Francisco 2.45c	Detroit, ⅜-in. 3.00c	NO. 24 BLACK	Buffalo (h).... 3.55c
Detroit 3.09c	Seattle 2.45c	Houston 3.60c	Baltimore*†... 3.60c	Chattanooga* 4.13c
Houston 3.00c	St. Louis 3.25c	Los Angeles.. 3.31c	Boston (g) ... 3.95c	Chicago (h).. 3.50c
Los Angeles.. 3.60c	Tulsa 3.25c	Milwaukee ... 3.55c	Buffalo 3.25c	Cincinnati ... 3.72c
Milwaukee ... 3.11c-3.26c	Young 2.30c-2.60c	New Orleans 3.40c	Chattanooga.. 4.16c	Cleveland (h) 3.50c
New Orleans.. 3.35c		New York†(d) 3.40c	Chicago 3.85c	Detroit 3.79c
New York†(d) 3.31c	SHAPES	Philadelphia* 2.98c	Cincinnati 4.02c	Los Ang. (f) (d) 5.85c
Pitts. (h)..... 2.95c-3.10c	Baltimore*.... 3.00c	Phila. floor... 4.95c	Cleveland 3.91c	Milwaukee ... 3.61c
Philadelphia* 3.03c	Boston†† 3.19c	Pittsburgh(h) 3.15c	Detroit 3.94c	New Orleans 4.30c
Portland 3.50c	Buffalo 3.25c	Portland 3.35c	Los Angeles.. 4.35c	New York†(d) 3.81c
San Francisco 3.25c	Chattanooga.. 3.56c	San Francisco 3.25c	Milwaukee ... 3.96c	Philadelphia.. 3.76c
Seattle 3.70c	Chicago 3.20c	Seattle 3.55c	New Orleans 4.50c	Pittsburgh ... 3.50c
St. Louis 3.25c	Cincinnati 3.42c	St. Louis 3.45c	New York†(d) 3.89c	Portland (f) (d) 6.15c
St. Paul 3.25c-3.40c	Cleveland 3.31c	St. Paul 3.45c	Philadelphia*† 3.60c	San Fran. (f) (d) 5.95c
Tulsa 3.25c	Detroit 3.42c	Tulsa 3.50c	Pitts.** (h).... 3.55c	Seattle (f) (d) 6.15c
	Houston 3.00c		Portland 4.40c	St. Louis..... 3.75c
IRON BARS	Los Angeles.. 3.60c	NO. 10 BLUE	San Francisco 4.00c	St. Paul 4.02c
Portland 3.40c	Milwaukee ... 3.31c	Baltimore*.... 3.10c	Seattle 4.40c	Tulsa 4.65c
Chattanooga.. 3.36c	New Orleans 3.55c	Boston†† 3.30c	St. Louis 4.10c	COLD ROLLED STRIP
Baltimore*.... 3.05c	New York†(d) 3.37c	Buffalo 3.62c	St. Paul 3.90c	Boston, 0.100-
Chicago 2.75c	Philadelphia* 2.98c	Chattanooga.. 3.36c	Tulsa 4.75c	in., 500 lb.
Cincinnati 3.22c	Pittsburgh (h) 3.15c	Chicago 3.05c		lots 3.245c
New York†(d) 3.36c	Portland (l).. 3.50c	Cincinnati ... 3.22c	NO. 24 GALV. SHEETS	Buffalo 3.39c
Philadelphia* 2.93c	San Francisco 3.25c	Cleveland 3.11c	Baltimore*†... 4.30c	Chicago 3.27c
St. Louis..... 3.25c	Seattle (i)..... 3.70c	Det., 8-10 ga. 3.14c	Buffalo 4.00c	Cincinnati (b) 3.22c
Tulsa 3.25c	St. Louis 3.45c	Houston 3.35c	Boston (g).... 4.65c	Cleveland (b) 3.20c
	St. Paul 3.45c	Los Angeles.. 3.75c	Chattanooga.. 4.86c	Detroit 3.33c
REINFORCING BARS	Tulsa 3.50c	Milwaukee ... 3.16c	Chicago (h).. 4.55c	New York†(d) 3.36c
Buffalo 2.60c	PLATES	New Orleans 3.55c	Cincinnati ... 4.72c	St. Louis 3.45c
Chattanooga.. 3.36c	Baltimore*.... 3.00c	New York†(d) 3.31c	Cleveland 4.61c	TOOL STEELS
Chicago 2.10c-2.60c	Boston†† 3.21c	Portland 3.75c	Detroit 4.72c	(Applying on or east of
Cleveland (c) 2.10c		Philadelphia* 3.08c	Houston 4.40c	Mississippi river; west
			Los Angeles.. 4.95c	of Mississippi 1c up)
			Milwaukee ... 4.66c	Base
			New Orleans 4.95c	High speed 57c
			New York†(d) 4.30c	High carbon, high
			Philadelphia*† 4.40c	chrome 37c
			Pitts.** (h) .. 4.15-4.45c	Oil hardening 22c
			Portland 5.00c	Special tool 20c
			San Francisco 4.50c	Extra tool 17c
			Seattle 5.00c	Regular tool 14c
			St. Louis 4.65c	Uniform extras apply.
			St. Paul 4.50c	BOLTS AND NUTS
			Tulsa 5.10c	(100 pounds or over)
				Discount
			BANDS	Chicago (a)..... 70
			Baltimore*.... 3.20c	Cleveland 70
			Boston†† 3.30c	Detroit 70-10
			Buffalo 3.42c	Milwaukee 70
			Chattanooga.. 3.61c	Pittsburgh 70
			Chicago 3.30c	
			Cincinnati 3.47c	(a) Under 100 pounds,
			Cleveland 3.36c	65 off.
			Detroit, ⅜-in. 3.39c	(b) Plus straighten-
			and lighter 3.25c	ing, cutting and quan-
			Houston 4.10c	ity differentials; (c)
			Los Angeles.. 4.10c	Plus mill. size and
			Milwaukee ... 3.41c	quantity extras; (d)
			New Orleans 3.95c	Quantity base; (e)
			New York†(d) 3.56c	New mill classif. (f)
			Philadelphia.. 3.18c	Rounds only; (g) 50
			Pittsburgh (h) 3.20c	bundles or over; (h)
			Portland 4.25c	Outside delivery, 10c
			San Francisco 4.10c	less; (i) Under 3 in.;
			Seattle 4.25c	(j) shapes other than
			St. Louis 3.55c	rounds, flats, fillet an-
			St. Paul 3.55c	gles, 3.15c.
			Tulsa 3.45c	†Domestic steel; *Plus
				quan. extras; **Under
			HOOPS	25 bundles; *†50 or more
			Baltimore 2.30c	bundles; ††New extras
			Boston†† 4.50c	apply; ††Base 40,000
			Buffalo 3.42c	lbs., extras on less.
			Chicago 3.30c	Prices on heavier lines
			Cincinnati 3.47c	are subject to new
			Det., No. 14 3.39c	quantity differentials;
			and lighter 3.39c	399 lbs. and less, up 50
			Los Angeles.. 5.85c	cts.; 400 to 999 lbs.,
			Milwaukee ... 3.41c	base; 10,000 to 19,999
			New York†(d) 3.56c	lbs., 15 cts. under; 20-
			Philadelphia.. 3.43c	000 to 39,999 lbs., 2½
			Pittsburgh (h) 3.70c	cts. under; 40,000 lbs.
			Portland 5.60c	and over, 35 cts. under
			San Francisco 6.15c	base.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Feb. 13

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

British gross tons U. K. ports	Continental Channel or North Sea ports, metric tons	
	Quoted in dollars at current value	**Quoted in gold pounds sterling
PIG IRON		
Foundry, 2.50-3.00 Silicon	\$15.54 3 2 6	£ 13 0
Basic bessemer.....	15.54 3 2 6*	12 13 1 10 0
Hematite, Phos. .03-.05..	16.19 3 5 0	.....
SEMIFINISHED STEEL		
Billets.....	\$27.39 5 10 0	\$18.99 2 7 0
Wire rods, No. 5 gage....	42.33 8 10 0	36.39 4 10 0
FINISHED STEEL		
Standard rails.....	\$41.09 8 5 0	\$44.47 5 10 0
Merchant bars.....	1.66c 7 10 0	1.13c to 1.18c 3 2 6 to 3 5 0
Structural shapes.....	1.66c 7 10 0	1.12c 3 1 6
Plates, ½ in. or 5 mm....	1.80c 8 1 3	1.55c 4 5 0
Sheets, black, 24 gage or 0.5 mm.....	2.16c 9 15 0	1.94c 5 6 0††
Sheets, gal., 24 gage, corr.	2.61c 11 15 0	2.29c 6 5 0
Bands and strips.....	1.88c 8 10 0	1.42c 4 0 0
Plain wire, base.....	2.05c 9 5 0	1.92c 5 5 0
Galvanized wire, base....	2.39c 10 15 0	2.15c 5 17 6
Wire nails, base.....	2.66c 12 0 0	1.74c 4 15 0
Tin plate, box 108 lbs....	\$ 4.67 0 18 9	.....

British ferromanganese \$75 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d \$ (43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d	French Francs	Belgian Francs	Reich Marks
Fdy. pig iron, Si. 2.5.....	\$17.43 3 10 0(a)	\$17.29 260	\$12.86 385	\$25.58 63
Basic bessemer pig iron...	17.43 3 10 0(a)	12.64 190	11.69 350	28.22(b) 69.50
Furnace coke.....	4.86 0 19 6	6.32 95	4.16 122	7.71 19
Billets.....	27.39 5 10 0	28.60 430	18.35 540	39.18 96.50
Standard rails.....	1.83c 8 5 0	2.02c 671	1.69c 1,100	2.43c 132
Merchant bars.....	1.86c 8 12 0	1.68c 560	.92c 600	2.02c 110
Structural shapes.....	1.95c 8 15 0	1.65c 550	.92c 600	1.97c 107
Plates, ½-in. or 5 mm....	2.01c 9 1 3	2.11c 700	1.07c 700	2.33c 127
Sheets, black, 24 gage or 0.5 mm.....	2.45c 11 10 0§	1.80c 600†	1.27c 825†	2.65c 144†
Sheets, gal., corr., 24 ga. or 0.5 mm.....	2.95c 13 10 0	2.86c 950	2.31c 1,500	6.80c 370
Plain wire.....	2.05c 9 5 0	2.71c 900	1.77c 1,150	3.18c 173
Bands and strips.....	2.07c 9 7 0	1.96c 650	1.23c 800	2.33c 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 66.00 per cent over paper sterling.

Bars

Bar Prices, Page 68

Cleveland—Prices for second quarter probably will be announced this week, following the former code custom of quoting ten days before the month prior to the new quarter. Bars are expected to be reaffirmed at 1.90c, base, Cleveland. While there has been no deviation from the base, warehouse interests claim that bar sellers in some instances have waved the \$1 a ton extra for lots under 5 tons to 3 tons. A considerable portion of mill business recently has been small miscellaneous orders. Automobile forge shops give indication of slightly improved activity. Machinery, road building and agricultural equipment manufacturers are buying regularly.

Pittsburgh—Specifications for bars from the bolt, nut and rivet trade, and manufacturers of numerous miscellaneous automotive parts have gained and indicate the needs of bolt, nut and rivet makers and automobile manufacturers. The carbon steel bar market, holding at 1.85c, Pittsburgh, is fairly firm, with the exception of Detroit-delivered prices where concessions have been granted in some cases.

Chicago—Steel bar business continues in good volume despite the reduced rate of automotive demand. Farm implement manufacturers continue busy, with operations of some plants equal to those of 1929. Miscellaneous bar consumers are taking shipments in steady volume.

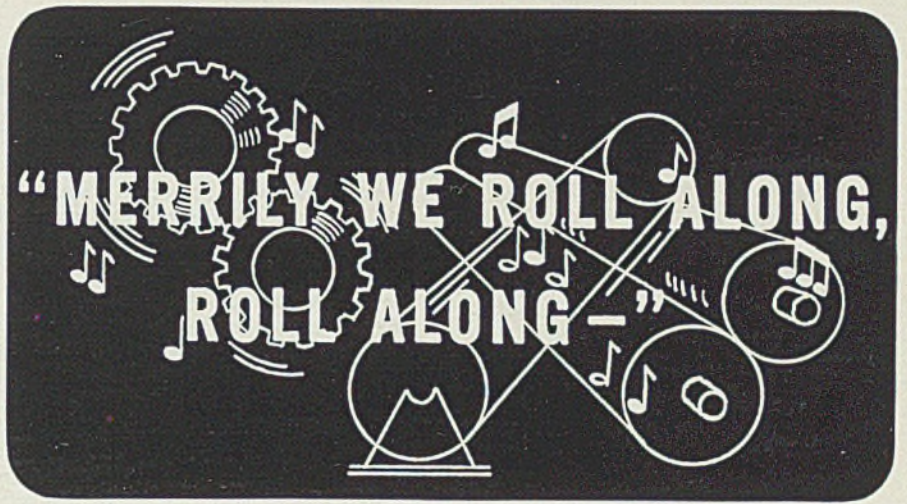
New York—Buying of steel bars is steady at the moderate rate of the past few weeks, at firm prices. Scattering orders are being booked from railroads and shipyards.

Philadelphia — Commercial steel bar prices are firm and there has been no suggestion of the alleged weakness discussed in trade circles with regard to certain other products. Specifications so far this month have been at a slightly better rate than in January.

Cold Finished

Cold Finished Prices, Page 69

Pittsburgh—Recent Detroit-delivered buying has uncovered certain price concessions from 2.20c, delivered, Detroit, or 2.25c, eastern Michigan, both based on 2.10c, Pittsburgh, base, for one size, shape, grade and shipment at one time to one destination on 10,000 to 19,999-pound lots of cold-drawn bars. Weakness in this market is isolated and not comparable with the unsteadiness in flat-rolled finished steel. Entry of the Electric Autolite Co., Toledo, into the



*Bearing, gear, bearing, gear—roll along another year.
While you're rolling merrily, watch your rolling warily—
Friction gets you bit by bit, rolling up big deficit!*

Apparently the "wheels" of your machinery may be rolling along smoothly—or at least all right, but "all right" often turns out to be very expensive in the long roll!

Lubrication has a lot to do with it. It may be over-lubrication, or the wrong grade of oil, or wrong methods of application, or other things that shoot up costs through repairs and idle machine time—and yet the correction of any of these can be very simple! In most plants lubrication costs can be substantially reduced by the Standard Oil engineer.

There's the case, for instance, in which \$12,000 per year was saved on petroleum solvents for one plant. "That'd pay my salary!" winked the plant superintendent.



A metal-working plant was reaming a tapered hole in heat-treated alloy steel of unusual hardness. Grinding burned drills was a daily routine. A Standard Oil engineer made tests and recommended a cutting oil that not only increased the life of the drills by a wide margin but also resulted in a much smoother finish of the work.



Then, there were the five public school buildings using a cylinder oil which was getting back into the boilers. It was evident to the Standard Oil engineer that the oil was too heavy for the separator to handle. Capitol Cylinder Oil did the trick!

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(259)

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- "The Lubrication Engineer—His Value to You"

- "Lubrication in Grinding Operations"
- "Lubrication in Gear Cutting Operations"

**STANDARD OIL COMPANY
(Indiana)**

CORRECT LUBRICATION

manufacture of spark plugs sometime in March will account for a sizeable new buyer in hexagon and other cold-drawn bar sizes.

Plates

Plate Prices, Page 68

Pittsburgh — A large part of the steel required to build 3000 hopper and gondola cars for the Bessemer and Union railroads will be in plates. Including wheel and axle requirements, the Pittsburgh district will roll 46,854 tons and the Chicago district, 7818 tons. A Mahoning valley plate mill is supplying plain material requirements of Treadwell Construction Co., Midland, Pa., to build 10 coal barges for Pittsburgh Coal Co.; about 1400 tons of plates will be fabricated. A leading Pittsburgh mill received orders last week for 3200 tons of plates for miscellaneous barge repair work. Treadwell Construction Co., Midland, Pa., is low at \$22,900 for a steel derrick boat for the Vicksburg, Miss., engineers. Steel plates remain based on 1.80c, Pittsburgh.

Cleveland — Plates continue least active of heavy finished products, while the price is steady at 1.99½c, delivered, Cleveland. Several hundred tons were purchased recently for Great Lakes vessel repairs, and more of this work is expected shortly. There is the possibility of one boat being built this year for a Chicago steel company, the first new construction since 1929. Material for freight car repairs is purchased frequently, but tonnage is relatively light.

Chicago — Railroad buying continues a fairly strong support to plate demand and with additional orders in sight for new freight cars and repair work, railroad plate consumption is expected to increase further. Tank orders are featured by 3300 tons for the new plant of Lever Bros. at Hammond, Ind. Additional pipe line orders are in prospect and will serve to bolster plate buying further.

New York — Plate tonnage is confined to relatively small orders including boilers for the New York Edison Co. to be built by the Combustion Engineering Co., New York. Miscellaneous repairs for the Texas Co. will require about 190 tons and a small vessel hull to be built at the Ira Bushing yard in Brooklyn, N. Y., about 150 tons. Ten steam locomotives for the New York, New Haven & Hartford, which are now becoming active, will require about 400 tons of plates.

Philadelphia — While plate tonnage continues spotty, sellers gen-

erally are reasonably optimistic over prospects for the remainder of this quarter. Good ship tonnage is still pending and some attractive railroad tonnage is in sight. While the price situation is being closely watched, 1.90c, Coatesville, Pa., continues representative of the general market.

Birmingham, Ala. — Better demand for steel plates is noted here. Chicago Bridge & Iron Works has booked several contracts recently for tanks, including about 7000 tons for the Pan-American Refining Corp., Texas City, Tex., a small tank for the Tennessee valley authority, and a number of smaller tanks for various waterworks systems in the South.

Seattle — While no large tonnages are pending, dealers report a good volume of buying in both heavy and light gages, most for tank construction and replacements. Barde Steel Co., Seattle, is furnishing 150 tons for a fuel tank at Hoquiam, Wash., for Grays Harbor Pulp & Paper Co.

Contracts Placed

3300 tons, tanks, Lever Bros. plant addition, Hammond, Ind., to Hamler Boiler & Tank Co., Chicago.

150 tons, fuel tank for Grays Harbor Pulp & Paper Co., Hoquiam, Wash., to Barde Steel Co., Seattle.

Contracts Pending

Unstated tonnage, one, two, three or four 175 or 25-foot steel barges for use on the rivers in the Pittsburgh district, for Standard Oil Co. of New Jersey, New York.

Sheets

Sheet Prices, Page 68

Cleveland — An effort will be made by sheet producers to strengthen the market when prices are announced this week for second quarter, books to be opened March 1. Sheetmakers have refused to book tonnage for automobile and parts manufacturers for that period at \$3 a ton under the official price, the concession at which a considerable proportion of the first quarter tonnage was taken. Some interests have favored a general advance, applicable to automotive as well as other consumers. Only moderate improvement is noted in demand for automobile material, while refrigerator and miscellaneous manufacturing interests are more active.

New York — Leading sheet sellers have noted improvement during the past week, some for the first time this year. The trade anticipates a brisk market by this time next month, if weather moderates, as considerable tonnage is said to be accumulating.

While weakness has been reported in some quarters, an appreciable improvement in specifications, combined with advancing production costs, might result in actual advance in prices for next quarter, in the opinion of some leading trade interests.

Chicago — Sheet business is fairly heavy, notwithstanding continued quietness in automotive consumption. Occasional gains in releases from motor car interests are noted, though no sustained pickup is anticipated for 30 days. Active call from manufacturers of farm implements, domestic equipment and miscellaneous products, to a large degree, is offsetting the curtailment in automotive consumption since December.

Pittsburgh — Buyers with sheet specifications of carload sizes still are frequently in the market, but larger tonnage accounts are continuing to cut down on specifications, with the result that sheet mill operations are tending about 5 points lower for the second consecutive week, and now average 50 per cent. Common black operations are at 65 per cent, full finished 55 per cent, galvanized 50 per cent, and jobbing mills at 40 per cent. Pittsburgh base prices are unchanged.

Philadelphia — Sheet specifications are being sustained, with indications of substantial improvement as the spring season approaches. Prices generally are unchanged, although weakness is noted in galvanized sheets and hot strip sheets.

Buffalo — Production at the Seneca works of the Bethlehem Steel Corp. continues at 75 per cent. Sheet demand is expected to tax capacity of mills here in the late winter and early spring months.

Cincinnati — Rolling schedules are unchanged at about 80 per cent. Demand is diversified, and steady improvement is shown in tonnage for refrigerators and stoves.

St. Louis — Cold weather continues to have a depressing effect on sheet demand, but producers and distributors report a fair volume of new orders and specifications.

Birmingham, Ala. — All sheet mills in the South still are active, with a fairly good market. Early spring promises increased demand.

Tin Plate

Tin Plate Prices, Page 68

Pittsburgh — Production of tin plate producers last week averaged 5 points higher to 65 per cent of capacity, mainly because the leading interest scheduled its mills at 77 per cent. Many canmakers are anticipating a heavy packers' can requirement next quarter and apparently are specifying against these needs. The Pittsburgh base quotation per

box on standard tin plate remains at \$5.25 and on tin mill black, 2.75c, Pittsburgh.

New York—Tin plate specifications are more active, canners anticipating their needs for the fishing pack.

Amtorg Trading Corp., New York, has placed several thousand tons of tin plate for Russia with the American Sheet & Tin Plate Co., and the Bethlehem Steel Corp.

Pipe

Pipe Prices, Page 69

Pittsburgh — The long delayed Dana, Ind.-Detroit natural gas pipe line, under the sponsorship of Columbia Gas & Electric Co. and others, may reach the contract stage soon. The line will be of 22-inch welded pipe, approximately 285 miles in length, requiring 45,000 to 50,000 tons. Receivers of the Missouri-Kansas Pipe Line Co. have until Feb. 20 to accept or reject the plan proposed by Columbia for the reorganization of Panhandle Eastern Pipe Line Co., a subsidiary. Under recent court order, the Columbia company may be free after Feb. 20 to construct the line and finance changes in the Panhandle company regardless of the attitude of the Missouri Kansas company.

Chicago—A few orders are pending, though in the case of certain of these, including the Detroit link and the proposed line from Texas to the central west, early awards are not looked for. Standard Oil Co. of Indiana is expected to place about 75 miles of 12-inch pipe, around 8000 tons, for a connecting line. Cast pipe orders continue small individually. Delays in PWA and WPA projects largely account for the slowness of releases.

New York—Cast pipe in this district reflects a quiet market. The continued severe weather appears to be a factor in the present scarcity of new projects. Prices are unchanged and firm.

Merchant pipe demand is fairly active, with several large jobs pending for utility and oil companies, including over 1000 tons of pipe and tubing for Pan-American Refinery Co.'s equipment, which is being fabricated by W. M. Kellogg Co., Jersey City, N. J. Approximately 1900 tons of 36 to 61-inch steel pipe for Queens, New York, will be fabricated by Alco Products Inc., New York. Humble Oil & Refining Co., Houston, Tex., will build a casinghead gasoline line from East Texas to Baytown, Tex., and install additional equipment, at a cost of \$3,500,000.

Cleveland—The market is not

brisk, pipe projects being held back by continued bad weather. Tubing demand is quiet. Prices are steady.

Cast Pipe Placed

1900 tons, 36 to 61-inch, for Queens, New York, to Alco Products Inc., New York.

406 tons, 6 and 12-inch, to Warren Foundry & Pipe Corp., Phillipsburg, N. J., through procurement division, United States treasury department, New York.

190 tons, 4-inch, Public Service Corp. of New Jersey, Newark, N. J., to

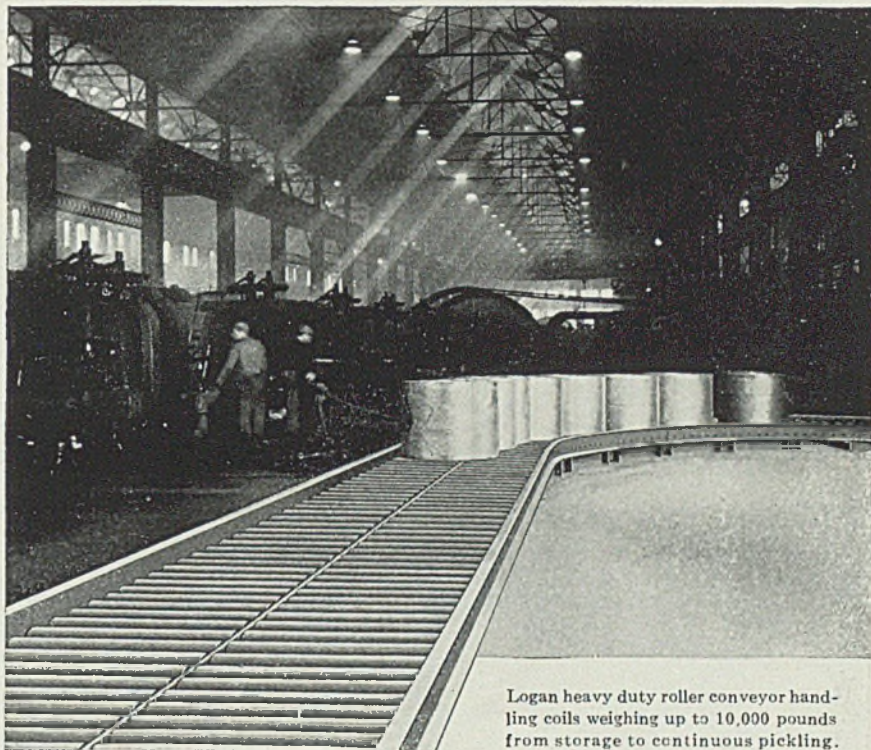
United States Pipe & Foundry Co., Burlington, N. J.

Steel Pipe Placed

17,000 tons, 100 miles of 20-inch electrically welded pipe from Stevens county, Kansas, to a point 100 miles east, for the Natural Gas Co., to A. O. Smith Corp., Milwaukee; noted in STEEL for Feb. 10 for unidentified buyer.

Steel Pipe Pending


100 tons or more, 4 to 8-inch standard galvanized, for Port Orford, Oreg.; Hauser Construction Co., Portland, Oreg., general contractor.



Logan heavy duty roller conveyor handling coils weighing up to 10,000 pounds from storage to continuous pickling.

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Logan Conveyors

LOUISVILLE

Transportation

Track Material Prices, Page 69

Buying of steel by railroads, in rails and material for new cars, is assuming greater importance than for several years, tonnages currently in process exceeding demands from this source for several years.

New York Central has awarded 38,000 tons of rails and 3500 tons of fastenings, the rails going to Bethlehem Steel Corp., Bethlehem, Pa.,

Carnegie-Illinois Steel Corp., Pittsburgh, Inland Steel Co., Chicago and Algoma Steel Corp., Sault Ste Marie, Ont. The fastenings were divided among a large number of suppliers.

Steel for the 3000 cars to be built for the Bessemer & Lake Erie and the Union, subsidiaries of the United States Steel Corp., will total 40,000 tons for the car bodies and 14,672 tons for wheels and axles. Of this total 46,854 will be rolled in the Pittsburgh district and 7818 in the Chicago district.

Northern Pacific is inquiring for

500 gondolas and 250 flat cars and the Great Northern for 500 ore cars. An inquiry from the Rock Island for 35,000 tons of rails is expected soon.

Chicago, Burlington & Quincy has awarded two 3000-horsepower and two 1800-horsepower diesel-electric locomotives to Electro-Motive Corp., LaGrange, Ill., subsidiary of General Motors Corp. These are for four streamlined trains recently let to Edward G. Budd Mfg. Co., Philadelphia.

St. Louis Southwestern has been authorized by federal court to spend \$217,306 on equipment in 1936. This will include automobile loading devices on 100 cars, 10 new automobile and box cars and other betterments.

St. Louis Public Service Co., St. Louis, will buy 10 motor buses at once and plans to acquire 72 more during the present year.

Seattle plans to rebuild a mile of municipal street railway track at cost of \$53,000 and has awarded 75 tons of street car wheels to American Steel Foundries, Chicago.

The Wabash will spend \$476,694 for repairing 1310 freight cars and dismantling 394 cars and 16 locomotives.

Kansas, Oklahoma & Gulf has asked the interstate commerce commission for authority to spend \$285,600 on rails and fastenings.

The Erie is seeking \$2,191,000 from PWA for the purchase of 500 box cars and 300 automobile cars, of which 100 are to be equipped with patent loaders.

Rail Orders Placed

New York Central, 38,000 tons and 3500 tons of track accessories; rails divided among Carnegie-Illinois Steel Corp., Bethlehem Steel Corp., Inland Steel Co., and Algoma Steel Corp. Track fastenings allocated among a number of suppliers.

3000 tons, for Brazilian government, to United States Steel Products Co., New York.

Rail Orders Pending

Kansas, Oklahoma & Gulf railway, 5200 tons of 110-pound rails and 500 tons of 90-pound rails; interstate commerce commission authorization to spend \$235,000 for this purpose given.

Car Orders Placed

Atchison, Topeka & Santa Fe, 500 box cars to Pullman-Standard Car Mfg. Co., Chicago; fifty 70-ton hoppers to American Car & Foundry Co., New York.

Chicago, Milwaukee, St. Paul & Pacific, 1500 freight cars and 37 passenger cars, to own shops in Milwaukee.

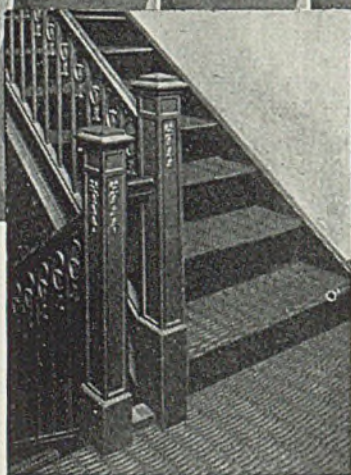
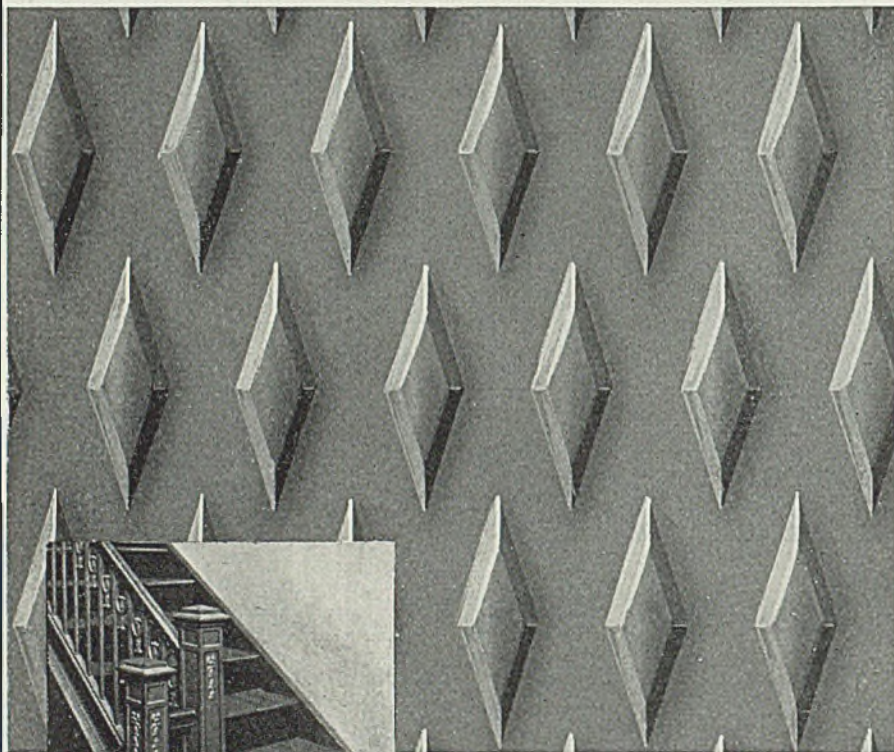
Panama Canal commission, six ballast cars for Panama railroad, to Hoffner-Thrawl Car Co., Chicago.

Western Pacific, 100 fifty-ton steel ballast cars, to American Car & Foundry Co., New York.

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prevents slippage of foot or wheel



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American Pressed Steel Co.
Commercial Trust Bldg.
Phila., Pa.

NEVERSLIP

Car Orders Pending

Northern Pacific, 500 gondolas and 250 flat cars.

Great Northern, 500 ore cars.

Aluminum Co. of America, Pittsburgh, 22 to 44 hopper cars of 70 tons capacity each, bids asked.

Western Maryland, 20 to 25 caboose cars, bids asked.

Locomotives Placed

Chicago, Burlington & Quincy, four diesel-electric locomotives for four new streamlined trains recently placed with Edward G. Budd Mfg. Co., Philadelphia, to Electro-Motive Corp., subsidiary of General Motors Corp., Detroit.

Chicago, Milwaukee, St. Paul & Pacific, one steam streamlined locomotive, to American Locomotive Co., New York.

Lehigh & New England, special six-wheel switching locomotive, to Baldwin Locomotive Works, Eddystone, Pa.

Locomotives Pending

New York, New Haven & Hartford railroad, ten diesel switching engines to replace 15 obsolete light switching engines. Purchase approval given by federal court, Feb. 10.

South African Railways & Harbors, Pretoria, South Africa, 50 locomotives, bids asked by A. G. Watson, chief mechanical engineer.

Buses Booked

American Car & Motors Foundry Co., New York; Twelve city coaches for Columbus Railway, Power & Light Co., Columbus, O.; five city coaches for Boston Elevated Railway, Boston; ten city coaches for Worcester Street Railway, Worcester, Mass.

Wire

Wire Prices, Page 69

Pittsburgh—The 2.30c, Pittsburgh or Cleveland, base for bright wire and 2.90c, base on spring wire are remarkably firm under today's market conditions. On the other hand, the nail market has been widely erratic and has found prices such as the recent Branchville, Md., order for 38,000 kegs, which went for 35 cents a keg under the market, as carrying delivery over the ensuing eight months. Most jobbers and distributors of nails appear to be getting an extra 10 cents per keg over their usual 20-cent per keg allowance. Buying in all wire products, both merchant and manufacturing grades, is declining in aggregate.

Chicago—Wire demand is steady, though lighter than four to six weeks ago. A gain in rural buying of merchant products is expected later this year, with the outlook for favorable crops enhanced by heavy snows over a wide section of the Central and Mid-

dle West lately. Wire prices are steady.

Cleveland — Not much change is indicated in the market, although a slight drop below normal in jobber's demand has been experienced due to slow railroad and automotive pick-up. With the seasonal increase in the latter demand, a gain in demand is anticipated.

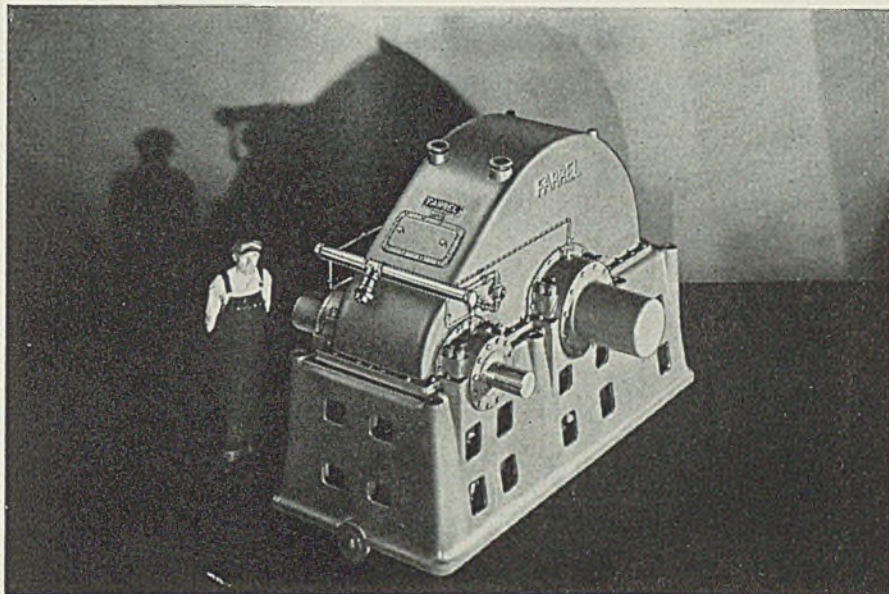
Designers For Industry Inc., Terminal building, Cleveland, has established a new branch office at 304 Wrigley building, Chicago, in

charge of Charles W. Jack, assistant to president. The company specializes in industrial design, product development and sales presentation.

Ferroalloys

Ferroalloy Prices, Page 70

New York—Ferromanganese producers have ample stocks and are able to make prompt shipments, volume keeping pace with steelworks operations. Spiegeleisen specifications are fair. Prices are steady.



QUIET DEPENDABLE POWER

THE ILLUSTRATION — 800 H.P. Heavy Duty Rolling Mill Drive . . . Sykes continuous tooth herringbone gears . . . roller bearings . . . central lubricating system . . . built-in sprays for the gear teeth . . . flood lubricated bearings.

FARREL ROLLING MILL EQUIPMENT also includes: Rolling Mills—Chilled Iron and Special Alloy Iron or Steel Rolls—Universal Mill Spindles—Rod Mill Tables and Manipulating Equipment—Rod Coilers—Lead Presses for Pipe or Rod—Roll Grinding Machines—Roll Calipers—Gears—Mill Pinions—Drives up to 10,000 H.P.

Farrel Heavy Duty Mill Drives are designed by engineers with a thorough understanding of the conditions imposed by the higher speeds and heavier loads encountered in modern rolling mill operation.

The drives are scientifically proportioned, with large factors of safety, and are built of carefully selected materials, designed to provide great strength and rigidity. The continuous tooth herringbone gears are accurately generated by the Sykes process and mounted on roller bearings. (Sleeve bearings optional). Special attention is given to provide thorough lubrication.

Mechanical efficiency is high . . . vibration is absent . . . smooth, quiet, trouble-free operation and long life are assured.

FARREL - BIRMINGHAM
Company, Inc.
110 Main St., Ansonia, Conn.

Strip Steel

Strip Prices, Page 69

Pittsburgh—Further price pressure from important buyers in the Detroit district, as of Feb. 1, on both hot and cold-rolled strip continues to undermine the strip market, although 1.85c, base, Pittsburgh, on hot-rolled strip and 2.60, Pittsburgh or Cleveland, quotation on cold-rolled strip are nominally unchanged. Delivered prices in the Detroit consuming area

bear little relation to the former conventional way of quoting with a base price plus freight.

Cleveland—Strip steel orders from automobile manufacturers have picked up moderately. Producers believe that improvements in weather conditions would lead immediately to heavier commitments by the automobile industry. Demand from miscellaneous sources is fair.

Chicago—Strip demand continues restricted by reduced consumption at automotive plants. This is partially offset by heavier demand from mis-

cellaneous users, but total business has moderated from the active rate at the end of last year.

New York—Recent improvement in demand for cold-rolled strip continues. Automotive demand is light.

Philadelphia—Quotations on narrow strip appear to be holding, although with weakness in some descriptions of sheets reported, buyers are moving cautiously at the moment. Hot strip is generally quoted at 1.85c, Pittsburgh, or 2.16c, Philadelphia, and cold strip at 2.60c, or 2.91c.



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2. The thread surfaces of the worms are ground all over on precision grinders of our own design... assuring perfect thread contour and balance.
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4. Worms made from a special case hardened steel are hardened to double the usual depth of case... guaranteeing uniform glass hardness on all surfaces.
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6. Bronze for the worm gear is made to strict specifications from virgin metals for highest efficiency and greatest length of life.
7. Every set of worms and gears is inspected on micrometer inspection fixtures for tooth bearing and proper operation on specified center distances.

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GEARS AND SPEED REDUCERS

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Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 69

Pittsburgh bolt, nut and rivet makers are experiencing the heaviest inquiry in some months from railroad car building shops. Recent orders of the Bessemer & Lake Erie, Union and Pennsylvania for some 13,000 freight, hopper and gondola cars has meant an imposing tonnage of bolts, nuts and rivets. On the other hand, automotive and jobber demand is still declining. The market generally is quoted 70-10-5 off for small carriage and machine bolts and 70-10 off on large sizes. Large rivets hold at 2.90c, Pittsburgh or Cleveland, 3.00c, Chicago, and small rivets, 70-5 off, with wrought washers named at \$6.25 off.

At Cleveland a decline of 20 per cent from January is seen in new business but orders on books are keeping production up. Chicago suppliers find buying slightly less than in January in spite of increased consumption. Railroad buyers lead.

At New York prices are generally steady but on one lot of 220,000 lag screws of various sizes for the City Island warehouse for the local procurement division of the treasury department, Keystone Bolt & Nut Co., New York, quoted \$1494, or about 15 to 20 per cent under the going market.

Semifinished

Semifinished Prices, Page 69

Several large users of wire rods, finding a strong price situation with \$40 the market for common and \$42, Pittsburgh or Cleveland, the base on combination rods, have been circulating inquiries outside of their usual sources of supply with the hope that a lower market might be uncovered.

Contrasted to sheet bars, rerolling billets and tube rounds where the \$2 a ton higher asking price has yet to be adequately tested, the wire rod market is firm.

Continued heavy use of hot-rolled breakdowns is evident in the specifi-

cations of several former buyers of sheet bars. This class of buyers is obtaining breakdowns in coils and rolling out into sheets and strip, preferring to work down this class of material rather than straight semi-finished.

Shapes

Structural Shape Prices, Page 68

Pittsburgh—Viscose Co., Meadville, Pa., will close bids Feb. 18 for a 2500-ton manufacturing plant at Meadville, Pa., and another prominent inquiry is in a 546-ton plate girder overpass bridge in Delaware county for the state highway department, March 6. Guibert Steel Co., Pittsburgh, has been awarded 400 tons for a plant at South Charleston, W. Va. American Bridge Co. last week closed on 360 tons for a state highway bridge in Highland Park, Mich., although the largest contract of the week was in 2200 tons for navy department hangars at Pensacola, Fla., to Bethlehem Steel Corp., Bethlehem, Pa.

Chicago—Chicago park district takes bids March 3 on 15,000 tons of structurals for the outer drive link, including a single leaf bascule bridge, the south plaza and approach. The Randolph street connection will not be bid at that time. Awards continue light, but pending business is accumulating and a large tonnage is involved in public projects for which steel will be awarded soon. Operations of fabricators are fairly steady despite some decrease in backlogs recently, and increased operations are seen for later this quarter.

Cleveland—The market is featured by 16,000 tons pending for an extension to Great Lakes Steel Corp. plant in Detroit. Plans are being made for the Great Lakes exposition buildings, Cleveland, which will take a fair tonnage. PWA projects are slow in being released.

Philadelphia—Award of 3500 tons for the Federal Reserve building in

Washington, through the George A. Fuller Co., Washington, is outstanding among structural contracts in the East. Shape prices are steady at 1.90c, Bethlehem, Pa., but fabricated material prices remain unsettled.

St. Louis—Slackening in government projects and failure of private building undertakings has caused new orders to drop. Specifications, however, are in fairly large volume and improvement in the situation is looked for early next month.

Seattle—Shapes are in good demand, the week's awards aggregating

500 tons. Tonnages pending assure important orders in the near future.

Shape Contracts Placed

1200 tons, dock, Wheeling & Lake Erie railroad, Huron, O.; 1000 tons to Carnegie-Illinois Steel Corp., Pittsburgh, and 200 tons to Jones & Laughlin Steel Corp., Pittsburgh.
650 tons, building at 137 East Thirty-eighth street, New York, to Norton Steel Co., New York.
610 tons, bridge, St. Clair county, Missouri, to St. Louis Structural Steel Co., East St. Louis, Ill.
600 tons, building, Trico Products Co.,

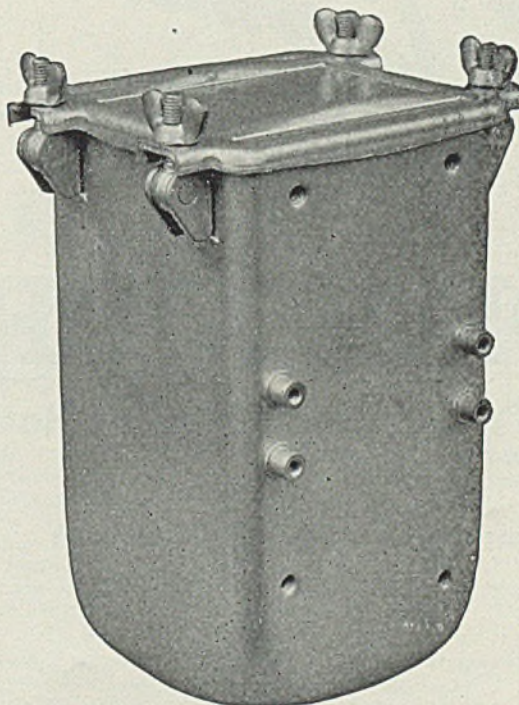
SPECIAL
SEAMLESS
HELLS
HAPES

**A
N
D**

**DEEP DRAWN
TANKS,
BOTTLES,
ETC.**

IS OUR SPECIALTY

**This Square Seamless Drawn Tank is
A Crosby Accomplishment**



**MADE
FROM
½" STEEL**

**12½"
DEEP
6¼"
SQUARE**

Stamping Specialists Since 1896

**An Experience You Should Not Overlook
Send Us Your Next Specification**

THE CROSBY COMPANY
BUFFALO, N. Y.

NEW YORK — CHICAGO — PHILADELPHIA — DETROIT — CLEVELAND

Shape Awards Compared

	Tons
Week ended Feb. 17	9,350
Week ended Feb. 10	17,093
Week ended Feb. 3	26,510
This week, 1935	12,535
Weekly average, 1935	17,081
Weekly average, 1936	21,402
Weekly average, January ..	28,322
Total to date, 1935	98,129
Total to date, 1936	150,240

to Bethlehem Steel Corp., Bethlehem, Pa.
 510 tons, Eastern high school, Baltimore, to American Bridge Co., Pittsburgh.
 500 tons, hangar, Philadelphia, for navy department, to Belmont Iron Works, Philadelphia.
 500 tons, bridge, section, East St. Louis, Ill., to Midland Structural Steel Co., Cicero, Ill.
 460 tons, state highway bridge, Francisville, Mo., to Stupp Bros. Bridge & Iron Co., St. Louis.
 440 tons, building for J. C. Penney Co. Inc., Denver, Colo., to E. Burkhardt & Sons Steel & Iron Works Co., Denver.
 440 tons, McMillen street bridge, Cin-

cinnati, to American Bridge Co., Pittsburgh.
 400 tons, plant, South Charleston, W. Va., for Westvaco Chlorine Products Co., to Guibert Steel Co., Pittsburgh.
 400 tons, armory buildings, Oklahoma, to Patterson Steel Co., Tulsa, Okla.
 360 tons, state highway bridge, Highland Park, Mich., to American Bridge Co., Pittsburgh.
 300 tons, plant extension, Hoover Vacuum Cleaner Co., to Canton Structural Steel Co., Canton, O.
 250 tons, state stationary bridge, Portland, Mich., to American Bridge Co., Pittsburgh.
 205 tons, Ward I building, Cranston, R. I., to Providence Steel & Iron

Co., Providence, R. I., through Carey Construction Co., Fall River, Mass.
 200 tons, Hardesty state bridge, Spokane, to Steel Fabricators Inc., Seattle.
 170 tons, Crown Cork & Seal Co. building, Baltimore, to Dietrich Bros., Baltimore.
 155 tons, bridge in Pettis county, Missouri, to Kansas City Structural Steel Co., Kansas City, Mo.
 155 tons, bottling house addition, Roxbury, Mass., to New England Structural Co., Everett, Mass.
 150 tons, almshouse, Lycoming county, Pennsylvania, to Steel Fabricating Co., Muskegon, Mich.
 150 tons, bridge, Vernon county, Missouri, to Missouri Valley Bridge & Iron Co., Leavenworth, Kan.
 135 tons, postoffice building, Reidsville, N. C., to Carolina Steel & Iron Co., Greensboro, N. C.
 110 tons, bus terminal extension, Detroit to Taylor & Gaskin Co., Detroit.
 100 tons, school, McDonald, Pa., to Guibert Steel Co., Pittsburgh.
 100 tons, rebuilding Fremont bridge, Seattle, to Pacific Car & Foundry Co., Seattle.
 100 tons, sheet steel piling, wharf improvement, Seattle, to Bethlehem Steel Corp., Seattle.

Shape Contracts Pending

16,000 tons, plant extension, Great Lakes Steel Corp., Detroit; bids this week.
 15,000 tons, outer drive link, including single leaf bascule bridge, Chicago. bids to be received by Chicago park district board, March 3.
 3200 tons, warehouse on Hudson street, New York; Wilton Construction Co., New York, general contractor.
 2500 tons, manufacturing building, Meadville, Pa., for Viscose Co.; bids Feb. 18.
 1275 tons, state bridges, Texas.
 1200 tons, paper mill, Houston, Tex.
 1100 tons, power house, Eastman Corp., Kingsport, Tenn.
 720 tons, Medary overhead, La Crosse county, Wisconsin; Worden-Allen Co., Milwaukee, low.
 675 tons, Rawson-Howell overhead, Milwaukee-Racine counties, Wis.; Worden-Allen Co., Milwaukee, low.
 550 tons, building for Hygrade Sylvania Corp., Salem, Mass.
 546 tons, plate girder overpass bridge, Ridley Park, Delaware county, Pennsylvania; bids to state highway department, Harrisburg, Pa., March 6. Included, 13 tons of plain steel bars.
 400 tons, permanent bridge, 184th street, New York; Boudin Contracting Co., New York, low.
 325 tons, state bridge, Kenosha, Wis.; Bethlehem Steel Corp., Bethlehem, Pa., low.
 250 tons, English Evangelical church, Brooklyn, N. Y.; bids asked.
 250 tons, school, Newburgh, N. Y.; William L. Crow, New York, low.
 150 tons, state dormitory and dining hall, Farmingdale, N. Y.
 150 tons, high school, Ansonia, Conn.
 100 tons or more, 483-foot overcrossing, Bingham county, Idaho; D. J. Cavanaugh, Twin Falls, Idaho, general contractor.
 100 tons, school, Woodmere, N. Y.; A. J. Perreta, Long Island City, N. Y.; general contractor.
 100 tons, repairs, Grand avenue bridge, Chicago; bids Feb. 19.
 100 tons or more, 272-foot overhead span, Power county, Idaho; bids Feb. 14.
 Tonnage unstated, warehouse for John Mullins & Son, Jamaica, N. Y.

A Popular Business Memo:

*"I'll be at
 The Commodore"*

Make it a habit for complete comfort and time-saving convenience.

THE

COMMODORE

"New York's Best Located Hotel"

Fine Food—Efficient Service
 Large, Comfortable, Outside Rooms

—all with private bath

from **\$3**



Just a Few Steps
 from Trains

FRANK J. CROHAN,
 President

RIGHT AT GRAND CENTRAL TERMINAL—NEW YORK

Reinforcing

Reinforcing Bar Prices, Page 69

Chicago—Only a few awards of concrete bars are noted, but a pick-up in releases is in early prospect. Shipments have been curtailed in some instances by zero weather. Only a few private jobs are up for bids, most pending work being for bridges and sewers. About 6000 tons will be required for part of the outer drive project. Wide variations continue in concrete bar prices.

Pittsburgh — Bids on 70,250 pounds of plain steel bars for Tioga county, 25,481 pounds for Delaware county, 24,700 pounds for Delaware county, and 18,359 pounds for Susquehanna county are asked by the state highway department, Harrisburgh, Pa., March 6. PWA will readvertise for contracts to build runways at the city-county airport, Pittsburgh, which is a part of a \$1,000,000 improvement program there. Previous bids were found to exceed estimates. The market is nominally quoted unchanged at 2.05c, Pittsburgh.

New York—Some sellers are quoting higher prices on concrete reinforcing bars and the market here is showing a tendency to stiffen around 2.05c base Pittsburgh or 2.40c delivered here. Recently large lots have gone as low as 2.05c delivered. Some of the business booked during the past week has been at 2.30c delivered. Actual lettings of tonnages are small, but a good deal of work is pending and the outlook for continued buying is considered good.

Cleveland—Fabricators look for increased demand toward the close of March. Municipal work is slow, but the aggregate of state tonnages is promising.

Seattle—Sustained activity features the market. While the week's awards were not outstanding, tonnages pending are of importance and new projects are developing rapidly.

Philadelphia—Tonnage is light but there is a substantial accumulation

of tonnage which should be released when weather conditions become more favorable. Incidentally, early announcement of the award of 600 tons for the federal reserve building in Washington is expected.

Reinforcing Steel Awards

754 tons, procurement division, treasury department, New York, to W. Ames & Co., Jersey City, N. J.
 525 tons, sewer, Oak Park, Ill., to Joseph T. Ryerson & Son Inc., Chicago.
 100 tons, state bridges in Latah county, Idaho, and Pierce county, Washington.


to Bethlehem Steel Corp., Seattle.
 100 tons, addition to normal school, Ellensburg, Wash., to Truscon Steel Co., Youngstown, O.
 100 tons, addition to Century brewery, Seattle, and miscellaneous, to Northwest Steel Rolling Mills, Seattle.
 100 tons, factory building, Iron Fireman Co., West 106th street, Cleveland, to Truscon Steel Co., Youngstown, O.
 100 tons, psychiatric building, Cranston, R. I., to Truscon Steel Co., Youngstown, O., through Olaf Ahlberg & Sons, Cranston.
 100 tons, state highway bridge, St. Johnsbury, Vt., to Truscon Steel Co., Youngstown, O., through Earl C. Hayden, Barre, Vt.

Concrete Awards Compared

	Tons
Week ended Feb. 17	1,979
Week ended Feb. 10	3,162
Week ended Feb. 3	24,196
This week, 1935	2,165
Weekly average, 1935	6,862
Weekly average, 1936	9,652
Weekly average, January ..	9,556
Total to date, 1935	29,521
Total to date, 1936	67,564

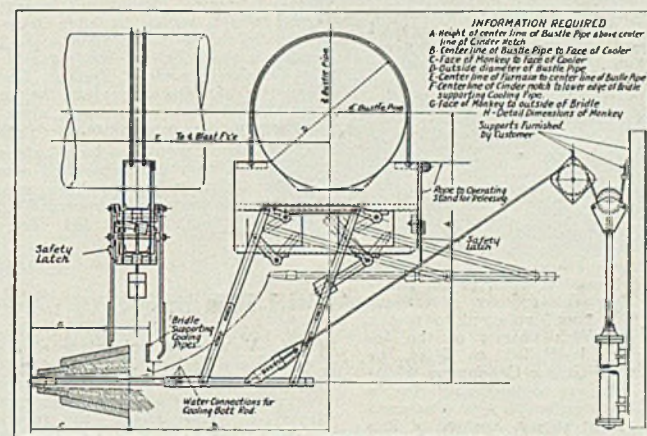
Bailey...

EQUIPMENT



The American SAFETY CINDER NOTCH STOPPER

(Patented)



INFORMATION REQUIRED
 A Height of center line of Blast Pipe above center line of Cooler
 B Center line of Blast Pipe to Face of Cooler
 C Face of Monkey to Face of Cooler
 D Outside diameter of Blast Pipe
 E Center line of Furnace to center line of Blast Pipe
 F Center line of Cooler notch to lower edge of Blast supporting Cooling Pipe
 G Face of Monkey to outside of Bridge
 H Detail Dimensions of Monkey
 Supports Furnished by Customer

This stopper, designed to meet the unusual conditions found at the blast furnace cinder notch will accommodate any notch, is heavily constructed to withstand severe service, is easily and safely operated, and it maintains its alignment with the notch at all times.

The safe, simple, and positive operation of this unit has won the recommendation of leading safety engineers and furnace operators.

A glance at the following list of users should induce you to make full inquiry at once. Write.

USERS

American Steel & Wire Co.	(4)	Hanna Furnace Corporation	(2)
Bethlehem Steel Company	(6)	Inland Steel Company	(1)
Carnegie-Illinois Steel Corp.	(6)	National Tube Company	(1)
Hamilton Coke & Iron Co.	(1)	Wheeling Steel Corporation	(2)
Youngstown Sheet & Tube Co.	(6)		

WILLIAM M. BAILEY COMPANY

Engineers

MAGEE BLDG. PITTSBURGH, PA.

European Agents—Ashmore, Benson, Pease & Co. Ltd., Stockton-on-Tees, England

100 tons, school, Rome, N. Y., to Concrete Steel Co., New York.

Reinforcing Steel Pending

600 tons, postoffice, Spokane; bids re-jected, new tenders to be taken.
375 tons, additions to statehouse, Olympia, Wash.; Sheble Construction Co., Seattle, general contractor.
250 tons, Rayson-Howell overhead pass, Milwaukee-Racine counties, Wisconsin; Worden-Allen Co., Milwaukee, low on general contract.
150 tons, Medary overhead pass, La Crosse county, Wisconsin; Worden-Allen Co., Milwaukee, low on general contract.
110 tons, infirmary building, Cranston, R. I.; E. Turgeon, Providence, R. I.,

low on general contract.
100 tons or more, state span, Clark county, Idaho; M. J. Kuney, Spokane, general contractor.
100 tons, Curtis high school addition, Staten Island, New York; general contract to Psaty & Fuhrman Inc., New York.

Metallurgical Coke

Coke Prices, Page 69

Continued cold weather has carried the coke market to its peak for at least three or four years, barring the brief flurry in 1935 when coke users stocked in anticipation of a soft

coal strike. Beehive coke, enjoying both a good domestic and metallurgical demand, is firm. Foundry coke is quoted \$4.25 per ton, f.o.b. ovens, premium \$5.50 to \$5.75, and standard furnace coke, \$3.50 to \$3.65.

Heavier foundry melt at Chicago has increased shipments of by-product coke, February promising to exceed January. In eastern Pennsylvania deliveries are being delayed but actual consumption is increasing. St. Louis cokemakers find the melt has declined somewhat because of severe weather. Shipments of by-product coke from the Birmingham, Ala., district are steady.

Behind the Scenes with STEEL

The Caller Menace

A NEW YORK advertising man has an unusual system for handling callers, one of our undercover men reports. He will talk with anybody over the telephone in the morning, but will not see them personally. He receives visitors afternoons but will not take any incoming calls during the latter half of the day. (What if his wife called up to report their house afire? Oh, boy!).

We have a better system, we believe. We take telephone calls any time, but disguise our voice to sound like Major Bowes, so everybody gives up in disgust. When anybody wants to make a personal call, we slip into our fling cabinet and dress up like Trader Horn. Visitors just can't seem to take that.

Ultimate Consumers

ROSE of the week is pinned with a flourish on the George J. Kirkgasser Co. for their Inland Steel advertisement in last week's issue, p. 10, headed: "Let her select your galvanized sheets." The "her" referred to was a handsome blondish person of the female gender, identified as Miss, or maybe Mrs., Ultimate Consumer. Skipping the obvious opportunity for a little *double entendre* play on the matter of selecting sheets, we would like to get acquainted with this Ultimate



Consumer person, and would be very glad to let her select *all* our galvanized sheets. In fact—well, let it go.

Maybe after we were introduced properly, and we had proceeded to fix her with our gimlet eyes, she would smile and say, "You may call me Uity if you wish."

This matter of appealing to the ultimate consumer in selling steel is further carried out in this week's issue, pp. 46, 47, on which U S Steel shows little Gwendolyn, age 8, waving from the window of a steel pullman car and

saying, "Goodbye, Grandma, and Don't You Worry." The idea is that Grandma is to become steel-conscious and set her nerves at ease about little Gwendolyn's safety. Of course, Grandma herself doesn't buy much steel from day to day, but if she insists on her grand-daughter riding in a steel pullman, then the railroad people have to get busy and make all their cars out of steel, etc. Need we go on?

We'll be interested in seeing just how much steel tonnage can be boosted by making the ultimate consumer steel-conscious; it's an interesting trend which seems to have been accentuated lately in the mags. We have an open mind on the subject and will let the facile pens of Batten, Barton, Durstine & Osborn and the other agencies etch their message upon our impressionable cerebellum.

Probably it won't be long before we dash down to the station and demand of the ticket salesman, "We want a ticket to Chicago and be sure it's in a Yoloy pullman with a Man-Ten underframe."

Still Reading

CL. VAN NESS, originator of a steel house described in STEEL for April 9, 1934, writes that he is still receiving requests for additional information from a wide range of interested parties. One in particular he mentions having received from Johannesburg, South Africa, dated Dec. 17 last. Chief interest in the house, Mr. Van Ness tells us, appears to be in "radiant heated and absorption cooled walls, together with light weight, fireproof, low cost, rapid assembly."

If you are interested in manufacturing prefabricated steel houses, it might pay you to investigate Mr. Van Ness' designs. Address him at East Exchange and Annadale streets, Akron, O. In the meantime follow STEEL for all the latest developments in the steel house field.

Old Friend

PRaise from Caesar is the expression recently conveyed to the STEEL editorial department by a veteran consulting engineer in New York, in these words: "We find STEEL very helpful. It seems far better in every way than when the writer first knew the paper or its predecessor (*Iron Trade Review*) 20 years ago."

—SHRDLU

Pig Iron

Pig Iron Prices, Page 70

Cleveland — Foundries are having difficulty in operation due to freezing weather and consequent slowing down of business, with coke shipments also hampered. Demand for sanitation projects and farm implement production shows sustained volume. With a scarcity of good foundry scrap and an increase in prices some foundries are using more pig iron and less scrap. Republic Steel Corp. blew in its fourth blast furnace and Carnegie-Illinois Steel Corp. lighted stack B of its Central furnaces for merchant iron.

Chicago—Foundry operations continue to improve despite the lag in demand for automotive castings. Operations of motor car foundries are expected to increase shortly, though in some instances, fairly large inventories have been accumulated. Farm implement manufacturers are increasing schedules, now operating at a rate which compares favorably with pre-depression schedules. Shipments are off moderately from the January rate.

St. Louis—Although foundry operations have been curtailed by cold weather, schedules are fairly active, and with present temporary handicaps removed activities are expected to go forward at an accelerated pace, as the volume of actual and potential business is large. A heavy reduction in the melt has been occasioned by continuance of the strike of enamel workers in the Belleville area. Farm implement and tractor interests continue the most active group of consumers.

Pittsburgh—A nonintegrated mill in this district is preparing to extend its contract with a nearby pig iron supplier for its coming basic requirements. These contracts are usually extended on the basis of 60,000-ton requirements. Prices are steady. Truck shipments are more prominent now that the rivers have

been frozen over. Allegheny Foundry Co., Pittsburgh, has been awarded contract for the coming year's requirements of the city of Pittsburgh for street and sewer castings.

New York—Pig iron demand continues light, with sellers declaring they have seen little real improvement so far this year. However, a substantial improvement is expected by March.

Buffalo—Shipments are improving steadily and consumers appear to be making deep inroads into their fourth quarter purchases. Deliveries from local stocks so far this year are about 10 per cent behind those of the like period of 1935. Melt of iron in radiator works is reported heavy. Seven blast furnaces are active, and one is banked.

Philadelphia—While specifications still lag, there is a greater frequency of small rush demands. Adverse weather has made deliveries difficult, and consumers are being caught short in a number of instances. Consumption is expanding and sellers look for improvement early in March. United States Steel Corp., through its agent, is actively soliciting merchant iron business here for the first time in many years.

Birmingham, Ala.—Abatement of the severe weather has brought about renewed activity at shops melting pig iron, and specifications for delivery from blast furnaces are more numerous. Production remains steady, with 12 blast furnaces in full operation.

Cincinnati — Shipments continue upward, but have not surpassed November levels. Foundry operations show gradual improvement.

Toronto, Ont. — Merchant sales continue steady, with weekly awards holding at better than 1000 tons. A few melters have covered for the current quarter, while others take supplies to carry them along for a few weeks. Prices are firm.

Coke By-Products

Coke By-Product Prices, Page 69

New York—Despite let-downs in certain lines, notably the automobile industry, demand for the principal coal tar products has not shown any curtailment. Demands are varied and heavy. The scarcity of naphthalene continues acute. The supply of toluol and xylol also is inadequate. Prices are firm.

Quicksilver

New York—Quicksilver prices are steady in a quiet market. Supplies here continue limited.

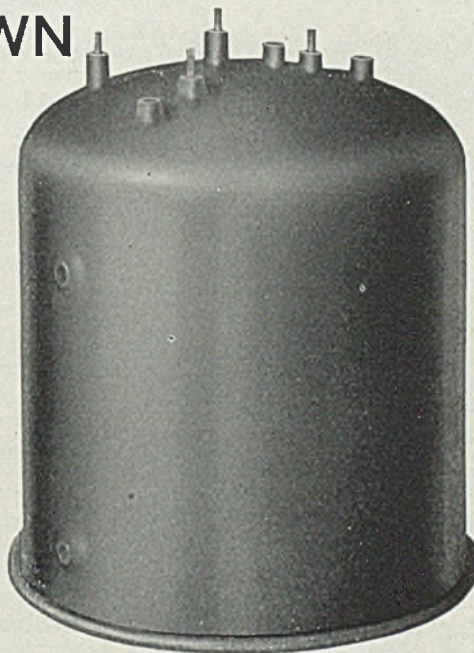
Scrap

Scrap Prices, Page 71

Pittsburgh—Heavy melting steel, No. 1, No. 2 and railroad grades, advanced another 25 cents a ton last week, making the third successive week that the price has increased. One downriver mill last week bought light grades of ordinary heavy melting at \$15 and other consumers bought railroad grades at close to

\$16, delivered. Pennsylvania railroad disposed of its list of No. 1 steel at \$15.50 to \$15.75 for Pittsburgh shipment and its rails at \$15.50 to \$16, and prices on other rail accumulations were comparable when sold recently. Sales at \$15.50 to \$16 on No. 1 steel in the Mahoning Valley and a continuing high market in the east is virtually confining the Pittsburgh district's source of scrap supply to local yards. Jones & Laughlin Steel Corp., Pittsburgh, recently sold some 20 odd Ohio river coal barges for dismantling, which

A DEEP DRAWN SEAMLESS SHAPE WITH INTEGRAL HEAD . . .



This tank is only one of many special shells, shapes, bottles, etc., deep drawn by Hackney to meet the requirements of various companies.

It is constructed from seamless shell with integral head. Specially shaped bottom is welded in place. Bosses are welded to head. This tank is used in connection with a small compressor unit.

The Hackney deep-drawing method of manufacture provides the advantages of uniform strength and smoothness of finish. Hackney offers more than 30 years' experience to assist users of special shapes in obtaining the most efficient construction for their needs.

Send details of your requirements to Hackney for study and possible suggestion of improved methods.

PRESSED STEEL TANK COMPANY

208 S. La Salle St. Bldg., Room 1211, Chicago
6661 Greenfield Ave., Milwaukee, Wis.

1387 Vanderbilt Concourse Bldg., New York
688 Roosevelt Bldg., Los Angeles, Calif.

Hackney

MILWAUKEE

DEEP DRAWN SHELLS AND SHAPES

CASE HISTORIES in the WELLMAN PLANT

The SANFORD Case

IT was with a pattern problem that men from the Sanford Company, New York, came into our office. "We're stumped," said their spokesman.

"What is the trouble?" we asked.

The answer to the question was that the construction of core prints on the pattern was too small to support the core when it was placed in the mould. This caused sagging, which resulted in the walls of the casting being uneven and the thickness of the metal being contrary to the drawing.

That was the problem put to Wellman, but men in the foundry thought it over and recommended increasing the size of the core prints and putting a key on the prints so that location would be exact. This suggestion solved the Sanford case.

Wellman has solved pattern problems or many companies over a period of years, and a call to Wellman before a pattern is made will save many a casting. If you have problems you would like to discuss, write or call ENdicott 2240.

- Castings
- Plated Parts
- Machined Parts
- Plated Tubing

**WELLMAN BRONZE
and ALUMINUM Co.**
6017 SUPERIOR AVENUE
CLEVELAND, OHIO

will realize over 2000 tons of scrap.

Chicago—Scrap prices are strong and heavy melting steel is quoted 25 cents a ton higher on speculative buying. About 40,000 tons of scrap is understood to have been disposed of in this district recently by the A. O. Smith Corp., Milwaukee. Railroad offerings continue to bring substantial premiums over prices paid by mills, though relatively little tonnage has been coming to this district.

Detroit—A tight market continued last week as not only Detroit consumers but Youngstown and Pittsburgh mills are making heavy demands. Since some yards have not operated in the last 20 to 30 days, this source of supply is temporarily cut off. Buying last week forced heavy melting, hydraulic compressed and busheling 50 cents a ton higher.

New York—Further advances have developed in iron and steel scrap. Demand continues brisk. Heavy breakable cast, grate bars and stove plate have advanced 50 cents a ton. New compressed sheets are up 25 cents and No. 1 and 2 melting steels are up 25 to 50 cents.

Philadelphia — Further advances are noted in the eastern Pennsylvania scrap market. Heavy breakable cast is now \$13 to \$13.50, delivered, consuming plant, and No. 1 cupola at \$13.50 to \$14. The market on heavy melting steel continues strong. Some brokers are now paying as high as \$13, delivered, Coatesville, Pa. in covering on orders previously taken at \$12.50, delivered. Railroad malleable is extremely scarce, with prices nominally higher at \$16.50 to \$17, delivered.

Buffalo — Dealers are picking up material in nearby points for shipment to Pittsburgh and Valley consumers. Specialties have sold at the highest prices in several years and more tonnage is wanted by consumers. There is still no buying of heavy melting steel and dealers continue to assert consumers' stocks will force large early purchases.

Cleveland—Scarcity of steel and iron scrap, partly due to weather interference with handling has strengthened the market and higher prices have been made in some nearby districts though not here. Dealers are slow to sell ahead in view of expected price rises.

Cincinnati—Iron and steel scrap is quoted higher in this district, although mills decline to buy further. Advance in Valley prices so far has failed to attract scrap from here. Louisville & Nashville list of 6800 tons, one-half rails, reflects the new policy of avoiding scrap accumulation while awaiting higher bids.

St. Louis—While buying continues virtually at a standstill, iron and

steel scrap is extremely strong, with a number of specific advances in price. The main element of strength is scarcity and efforts of dealers to secure tonnages for contracts. Another factor in higher prices has been active demand for a number of grades from other markets.

Birmingham, Ala. — While no sales of more than ordinary tonnage of scrap are noted, the market continues strong and quotations firm. Available stock is sufficient to meet current requirements.

Seattle — Exporting houses are marking time, hoping that Japan will resume buying soon. Higher freights and scarcity of ship space are additional handicaps to shipments to the Orient. Dealers are selling fairly large tonnages to domestic consumers but prices are not firm.

Toronto, Ont. — Trading in iron and steel scrap shows some improvement with prices sustained and some dealers quoting above list for desirable lots. Shipments of steel scrap to the Hamilton district have increased and local dealers report good movement in heavy melting steel, turnings and other lines. Offerings from rural districts continue light but yard holdings are heavy.

Warehouse

Warehouse Prices, Page 72

New York—Sales continue at a reduced rate compared with last fall. Severe weather is held responsible for much of the present disposition to slow up purchases. Prices are unchanged.

Philadelphia—Business so far this month is holding its own with the January rate, and according to one or two large jobbers, is somewhat better.

Chicago—Sales are holding around the level of a month ago. Truck shipments to outlying sections have been interfered with by snow and ice. Business continues ahead of the rate a year ago.

Cleveland — A fair demand is anticipated. Most sellers are ahead on orders and behind on shipments due to the weather. Prices are steady.

Detroit — Buying continues fair, although shipments are hampered by the weather. Prices are steady.

Cincinnati—Sales so far this year exceed tonnage in the corresponding period last year. A better tone is noted in industrial inquiries. Prices are firm.

St. Louis — Warehouses report business thus far in February slightly ahead of the same period a year ago, but less than during the first two weeks of January. The decrease

is ascribed entirely to adverse weather.

Seattle—Volume is fairly good for this season. Small tonnages are the rule, with sheets probably in best demand. Oregon dealers reduced bars, plates and shapes \$4 a ton, but this has not affected prices in Seattle territory.

Steel in Europe

Foreign Steel Prices, Page 72

London—(By Cable)—Production of steel ingots and castings in Great Britain in January, 912,500 gross tons, is the second highest for any month in history. It is exceeded only by March, 1927, when 949,600 tons was made. The January tonnage represents a gain of 101,000 tons over the 811,500 tons produced in December. The daily rate in December was 33,812 tons, in January 36,500 tons.

Pig iron production in Great Britain in January was 595,500 gross tons, the largest output since May, 1930, when 614,500 tons was produced. The January tonnage was 36,200 tons greater than the 559,300 tons made in December. The daily rate in December was 18,042 tons, in January 19,339 tons. In January 109 stacks were in blast, compared with 102 at the end of December.

Pig iron demand in Great Britain exceeds the supply and several furnaces are out of the market, while additional furnaces are preparing to start. No pig iron is available for export. Prices of hematite have been increased. Most steelworks are operating at capacity and many are behind in deliveries. The full Continental quota of semifinished steel is being absorbed.

The Continent reports conditions more active, especially in semifinished steel and plates. Prices of ship plates for export have been increased 4s.

Nonferrous Metals

Nonferrous Metal Prices, Page 70

New York—A sudden spurt in demand for copper following the announcement that one mine producer and one custom smelter would advance their prices ¼-cent, effective Feb. 15, was the outstanding development in the nonferrous metal markets last week. Statistical strength of most metals was sustained as shipments continued to hold up well.

Copper—A stronger foreign market combined with the underlying statistical strength of the domestic market were contributing factors in

the advance by the two sellers to 9.50c, Connecticut. The outlook for the market is strong although a number of sellers apparently were free sellers at the current level over the week-end. A fairly large tonnage is likely to continue available at 9.25c, Connecticut, until absorbed.

Lead—Demand for lead declined last week but recovery in the buying rate is expected by the closing week of the month. The market tone was strong with all sellers quoting 4.35c, East St. Louis.

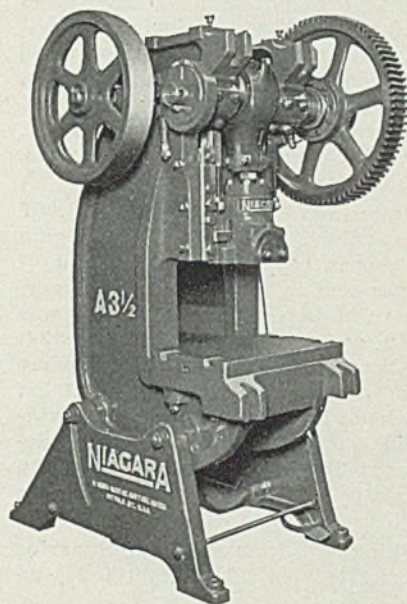
Zinc—Continued active shipments of zinc to consumers featured that

market. New business was light but prices were steady on the basis of 4.85c, East St. Louis, for prime western.

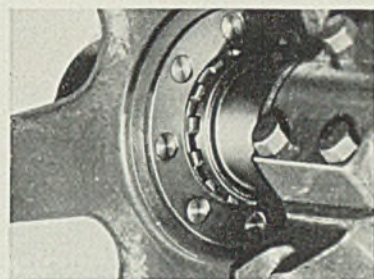
Tin—Consumer buying of tin was light but the undertone of the market was fairly steady. Price fluctuations in the market here reflected short covering in London and changes in sterling exchange rates.

Antimony—Moderate amount of small-lot buying developed in the antimony market but prices held unchanged at 12.87½c, New York, for American spot and 12.87½c, duty paid New York, for Chinese spot.

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with Positive Lock and Single Stroke Mechanism



Just ONE of Many IMPROVEMENTS In NIAGARA INCLINABLE PRESSES

Safety, Instant Engagement, Maximum Strokes per minute and Long Life are performance features of this patented Niagara 14-point engagement Sleeve Clutch.

Other important improvements of Niagara Inclined Presses include — Frames scientifically designed for strength and rigidity.

Triple and double "V" gibs.

Rigid strong slides with Breech Block Die Clamps and equal support for dies from center to front and rear.

Back gear up high and mounted on Timken bearings.

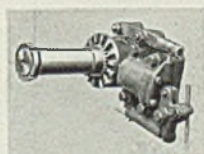
Write for Bulletin 58-E illustrating latest improvements on Niagara Inclined Presses.



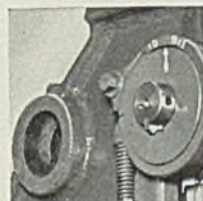
Back Shaft Assembly equipped with Timken Bearings



Splined Clutch Sleeve in constant engagement with Splined Shaft



Sleeve Clutch Throw-out and Single Stroke Mechanism



Integral Back Gear Support and Compensating Brake

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Where December Imports of Iron, Steel Originated

The following tabulation shows the origin of various classes of steel and iron imports in December, by countries, completing the record of foreign trade in these commodities given two weeks ago:

ORIGIN OF DECEMBER IMPORTS				
Gross Tons				
	Pig iron	Manganese ore	Ferromanganese	
Germany.....	1,450	.....	.....	.....
Netherlands.....	7,025	.....	.....	.....
Norway.....	25	.....	1,051	.....
United Kingdom..	675	13	113	.....
Canada.....	694	.....	2,709	.....
Soviet Russia in				
Europe.....	1,716	1,906	.....	.....
British India.....	4,704	524	.....	.....
Brazil.....	.....	6,633	.....	.....
Chile.....	.....	56	.....	.....
Gold Coast.....	.....	3,851	.....	.....
France.....	.....	.....	202	.....
Italy.....	.....	.....	33	.....
Poland.....	.....	.....	78	.....
Total.....	16,289	12,983	4,186	
	Sheets, skelp and sawplate	Structural steel	Steel bars	Hoops and bands
United Kingdom..	4	6	29	49
Belgium.....	874	3,502	1,724	1,561
Germany.....	154	71	372	494
Poland.....	3	.....	.....	.....
Sweden.....	17	.....	177	3
France.....	.....	835	186	33
Canada.....	.....	.....	48	.....
Austria.....	.....	.....	18	.....
Czechoslovakia..	.....	.....	1	.....
Spain.....	.....	.....	31	.....
Total.....	1,052	4,414	2,586	2,140

Report Foreign Construction

An information service designed to keep construction firms and manufacturers and exporters of building

materials, specialties and equipment abreast of construction activity and progress abroad, has been inaugurated by the metals and minerals division of the bureau of foreign and domestic commerce, Washington, of which R. L. Harding is chief. This material is released in a publication entitled *Construction Abroad*, for the present mailed without charge. The publication is compiled by J. Joseph W. Palmer, of the minerals and metals bureau.

Iron Ore Output Up 24% in 1935

IRON ore mined in the United States in 1935, exclusive of that which contained 5 per cent or more manganese in the natural state, amounted to 30,484,000 gross tons, an increase of 24 per cent over 1934, according to the bureau of mines, Washington.

Shipments totaled 333,308,000 tons, valued at \$82,864,000, a gain of 29 per cent in quantity, and of 25 per cent in total value. The average value at the mines in 1935 was \$2.49, compared with \$2.58 in 1934.

About 85 per cent of the ore came from the Lake Superior district. Stocks of iron ore at all mines, mainly in Michigan and Minnesota, decreased 26 per cent from 10,340,690 tons in 1934 to 7,616,000 tons in 1935.

Shipments from the Lake Superior district totaled 27,923,000 tons, up

28 per cent. From the southeastern states, in which the Birmingham district is the largest producing area, 3,256,000 tons was moved, an increase of 38 per cent. Northeastern states, 1,352,000 tons, gained 49 per cent; and western states, 516,000 tons, 73 per cent.

Imports of iron ore reported for the first 11 months in 1935 amounted to 1,354,863 tons, valued at \$3,138,442. Imports for the year 1934 were 1,427,521 tons, valued at \$3,307,504. Exports in the first 11 months of 1935 amounted to 678,034 tons, valued at \$1,911,577, compared with exports for the entire year 1934 of 608,922 tons, valued at \$2,243,066.

Shops Pushing Stainless

Sheet metal shops are rapidly becoming one of the most important outlets for stainless steels, D. C. O'Brien, of the development department of the American Rolling Mill Co., Middletown, O., recently told a group of distributors at Kansas City, Mo. Adaptability of stainless steel to many new uses and the constant introduction of new products made of it are responsible.

Will Exhibit at Cleveland

Important iron and steel producers and manufacturers of heavy machinery will play an important role in the Great Lakes Exposition to be held in Cleveland June 27 to Oct. 4. Among underwriters of \$10,000 or more are Republic Steel Corp., United States Steel Corp., Standard Tool Co., Cleveland Twist Drill Co., M. A. Hanna Co., Cleveland-Cliffs Iron Co., Youngstown Sheet & Tube Co., Cleveland Graphite Bronze Co., Pickands, Mather & Co., W. S. Tyler Co., Thompson Products Inc., Interlake Iron Corp., and Otis Elevator Co.

Sees Canadian Trade Pact Big Aid to Tool Builders

Increased business accruing to American machine tool manufacturers by reason of the reciprocal trade treaty with Canada will remain largely hidden in our export totals when trade gains of 1936 are reckoned, according to C. S. Stilwell, vice president, Warner & Swasey Co., Cleveland.

"Although the duty on machinery made in the United States has been sharply reduced, British machine tool manufacturers still retain a substantial trade advantage, all things considered," Mr. Stilwell said.

"Now that the treaty is actually operative and we have had an opportunity to consider its consequences, it is apparent that the increases assured in Canadian purchases of American

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40 years experience in building tube mills.

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products will require additions to the manufacturing capacity of plants which are the major users of turret lathes and other metal-working equipment.

"These plants excel in the production of several important groups which gain under the Canadian treaty. They range from electric refrigerators, washing machines and radios to dynamos, generators, motors and parts. Perhaps the most important of all are the reductions of 50 per cent in the duties on most classes of farm equipment, which in 1929-30 accounted for \$14,000,000 in our exports.

"Motor vehicles and parts, many of which are manufactured by Canadian subsidiaries under American supervision, also gain under the treaty, and will undoubtedly be imported in larger numbers.

"In the light of these facts we will have to give the Canadian trade treaty credit in part for increases in domestic machine tool orders in 1936."

Convention Calendar

Feb. 17-21—American Institute of Mining and Metallurgical Engineers. 145th annual meeting at Engineering Societies building, New York. A. B. Parsons, 29 West Thirty-ninth street, New York, is executive secretary.

Feb. 25-27—American Concrete Institute. Annual convention and exhibit at Palmer House, Chicago. Harvey Whipple, 642 New Center building, Detroit, is secretary.

March 2-6—American Society for Testing Materials. Spring group meeting of committees at William Penn hotel, Pittsburgh. C. L. Warwick, 260 Broad street, Philadelphia, is secretary.

March 3-6—American Management Association. Sixth packaging conference and exposition at Hotel Pennsylvania, New York. Alvin E. Dodd, 20 Vesey street, New York, is executive vice president.

March 4—American Society for Testing Materials. Regional meeting at William Penn hotel, Pittsburgh. C. L. Warwick, 260 Broad street, Philadelphia, is secretary.

March 10-18—National Association of Waste Material Dealers Inc. Annual convention at Hotel Astor, New York. Charles M. Haskins, 1109 Times building, New York, is secretary.

March 20-April 4—American Ceramic Society. Annual convention and exhibit at Columbus, O. Ross C. Purdy, 2525 North High street, Columbus, O., is secretary.

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

April 14-18—Oil Burner Institute Inc. Twelfth national convention at Statler hotel, and show at Convention Hall, Detroit. G. Harvey Porter, 39 Rockefeller Plaza, New York, is managing director.

April 16—National Council of American Shipbuilders. Annual conven-

tion at Whitehall club, New York. C. C. Knerr, 11 Broadway, New York, is secretary.

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

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

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

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

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

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

April 27-30—Chamber of Commerce of the United States. Annual meeting in Washington. D. A. Skinner, 1615 H street, N. W., is secretary.

Mirrors of Motordom

(Continued from Page 23)

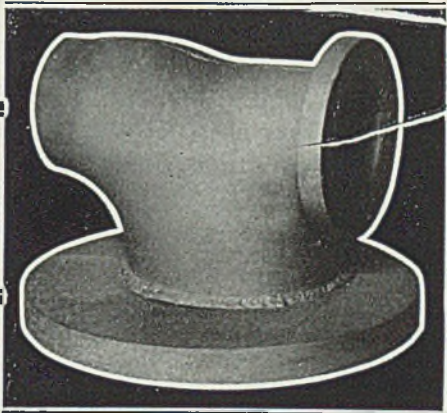
at Toledo going into the spark plug and speedometer business will be to please Chrysler. The Toledo concern has long been a Chrysler stronghold on ignition and other parts' supply. But Chrysler has had to depend pretty much on A. C. Spark Plug, a General Motors subsidiary, for its plugs.

Ford's big source on plugs is Ford Champion, also at Toledo, and of course General Motors subsidiaries draw almost entirely on their sister company, A. C. Spark Plug. If Electric Auto-Lite goes into the business in a big way, as it promises to do, it will place a third important maker in the field, from which Chrysler certainly will draw, from which Ford may come to buy, and which will obviously detract from General Motors' subsidiary.

Electric Auto-Lite has been experimenting with a porcelain baker and will have more equipment for manufacturing both the plug and the core in shortly. It is aiming at something like quantity production by March.

When the motor car publicity department suddenly decides not to issue the usual writeup on how production is going, you can ask for no

50%
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COST



50%
LESS
WEIGHT

THIS is the striking result of composite design as affected by Parish engineering service on a pressure fitting of cast steel that constantly failed under high pressures in service.

Produced of a stamped-and-welded design, this fitting not only split the cost and weight of its former style but successfully tested at 100 lbs. air pressure . . . Similar savings and betterments are likewise possible on *your* manufactured parts. Your blue-prints and specifications will permit this study.

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Specialists in difficult stamping design

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better sign that assemblies aren't so good.

The automobile industry has a peculiar disposition of telling the good news and not saying anything when things slide off. That isn't pre-variation, but it's fancy dispensing of fact.

Last week Chevrolet, for one, clamped down on voluminous releases of previous date on production. Obviously, February production is falling behind January. Parts-makers say that a 40 per cent cut has been authorized, which makes Chevrolet assemblies this month 60,-

000, compared with 100,000 in January, December and November.

The Chevrolet high command last October said: "We will make 100,000 cars a month indefinitely through the balance of 1935 and into early 1936." but, like the rest, the cut had to come and, generally speaking for all motordom, it seems to be a shave of 35 to 40 per cent from January.

For instance, Ford has stopped working on Fridays and shuts down each Thursday night until Monday morning of the last two weeks. Ford will make 65,000 jobs in February.

Plymouth is down to 2 days weekly, and oddly enough, will resume with a strange schedule when things start to break. As soon as Plymouth can get onto a five-day week again it will drop Monday, not Saturday.

Hudson last week was down to 3 1/2 days, but in attempting to give all hands some work kept two lines running and turned forth on a chilly world some 2400 models.

Packard has ambitiously set a production of 5000 models for March. Chrysler and DeSoto, as well as Hupp, have been closed tight. Pontiac has been in step with Chevrolet as far as proportionately cutting schedules goes.

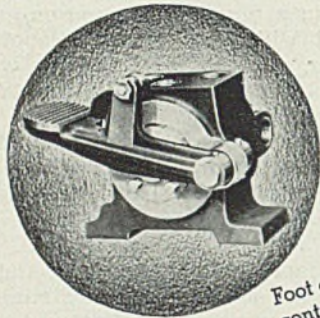
Bright spots are Olds and Buick, where buying from the "middle classes" seems to be weathering the storm. Last week Buick and Olds each made over 3000 cars, pretty good for the times. That's as good as Plymouth made, and each was fully a fifth as good as Ford or Chevrolet, which is indeed something.

Equipment

Chicago—Prospects in most equipment markets continue favorable. A slight lull has developed in machine tool sales but inquiries continue active and a pickup in buying is seen for the near future. Except for the Santa Fe which has about a dozen machine tools pending, railroads are buying equipment sparingly. Increased activity at repair shops, however, is seen as likely to result in better machinery demand later this year. Small tool sales are well maintained, pointing to sustained activity at metalworking shops.

Pittsburgh—Carnegie-Illinois Steel Corp. last week approved appropriation for the construction of a new car dumper to replace the one at the Edgar Thomson steelworks, which has been in service for 30 years. The new dumper will be located on a new site which will fit into the future developments at this plant and will take care of the large and new-type cars now being used. In addition to modern safety devices which will be a part of the car dumper, a new, up-to-date, interlocking signal system will be installed which will add to the safety of its operation and protection of employes from injury.

Seattle—Small boat construction is creating a good demand for diesel engines and specialty plants have important contracts in hand. Other equipment used in marine property and for replacements is in good demand. There is active inquiry for road building machinery while logging equipment is showing improvement. Puget Sound Navy yard will receive bids Feb. 18 and 21 for a list of machine tools and other items.



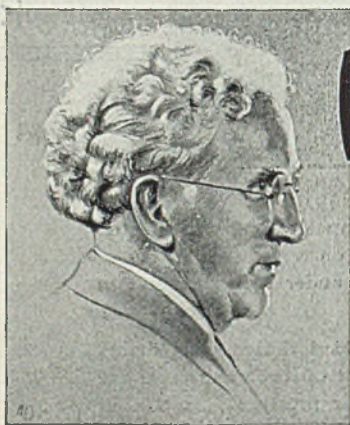
STEP ON IT . . . !

Foot operated valves speed up production and simplify control. The operator's hands are free for other work. Use Hannifin "Packless" Air Control Valves with their simple, dependable disc type construction and get full value out of air power. There is no packing—and no leakage or maintenance trouble.

Made in 3-way and 4-way types, treadle operated, spring return and heavy duty rotary models, for various standard control cycles. Also hand control valves, manifold types, electric valves, and special types, for control of all kinds of air and hydraulic equipment. Write for Valve Bulletin No. 34-S.

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Outstanding 1936 achievements of the Welding Industry—Flexible kilowatt ampere pounds and hours.

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Construction and Enterprise

Ohio

CANTON, O. — Offices of the Canton Foundry & Machine Co. have been moved from the Dime Bank building here to the factory at 6400 Breakwater avenue, Cleveland, according to J. R. Bucher, president. The company is now a division of the Hill Clutch Machine & Foundry Co., Cleveland.

CINCINNATI — Century Machine Co., 4434 Marburg avenue, is having plans made through Tielig & Lee, 344 West Sixth street, for a factory addition, to cost \$37,000 with equipment.

CINCINNATI — City, Charles E. Lex purchasing agent, room 143, city hall, will ask bids Feb. 18, for furnishing valve and street castings to the department of public works and department of water.

CLEVELAND — Feick Mfg. Co., a new corporation, which will specialize in sheet metal work for advertising display and cabinet work, has leased for five years about 10,000 square feet of manufacturing space at 10225 Meech avenue southeast, from the Anton Zverina Realty Co. The company, headed by Harry W. Feick, will go into full operation as soon as operating facilities are installed.

CLEVELAND — Reliable Steel Plate Co. has been incorporated by Emmanuel Margulis, M. H. Mendelsohn, and Jack B. Dworken, 1323 Schofield building, correspondent.

CLEVELAND — Contract Welders Inc., 4829 Lexington avenue northeast, and Industrial Welding & Cutting Co., 4400 Perkins avenue northeast, have merged and will be consolidated in larger quarters at 2545 East Seventy-ninth street, about April 1. C. C. Peck will head the consolidation.

CLEVELAND — Tool Salvage & Mfg. Co. has been incorporated for the manufacture and repair of tools by Thomas J. Coleman, William E. Burns, and George J. McMonagle. Frey, Burns & McMonagle, Engineers building, is correspondent.

CLEVELAND — Republic Steel Corp., Republic building, has announced that work will begin at once on a \$500,000 remodeling and enlarging project in the cold strip and tin plate departments of its plant at Warren, O. Program includes the addition of more cold rolling stands, annealing furnaces, leveling and cut off machinery, and remodeling of existing strip mills through the installation of new drives to speed up production. In the tin plate division of the plant, additional annealing furnaces, tinning units, and transfer equipment will be added, and provision made for more sorting space.

DAYTON, O. — Dayton Power & Light Co., F. M. Tait president, is having plans prepared and will take bids about March 1 for construction of the Miller's Ford power plant building, 100 x 104 feet. Equipment to be installed will include a 42,000-horsepower turbo-generator. Estimated cost of the project is \$3,000,000 and Columbia Engineering Co., Cincinnati, is engineer.

DAYTON, O. — Air corps, materiel division, Wright field, asks bids March 2 for a bench lathe; March 3 for buffers, polishers, portable electric saws, and grinders; March 4 for counter-bores testing machine; and March 6 for sheet metal brakes, burring, turning, wiring, beading, crumpling, elbow

edging, and slitting machines, bar and scroll shear, rotary slitting and squaring shear, and a nibbler.

DAYTON, O. — United States army, air corps, materiel division, Wright field, asks bids Feb. 24 for furnishing two motor driven radial drill presses and one motor driven drill press; Feb. 27 for six bodies and equipment for truck and field servicing; Feb. 25 for two 2-speed hydraulic jacks, high lift type; Feb. 28 for 15 light duty tractors, 25 tractor mowers, and five light duty tractors with rotary brush scraper; and Feb. 27 for a pull type

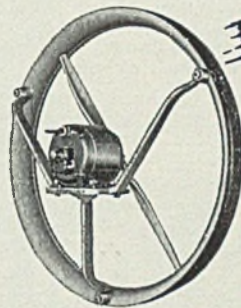
grinder with tractor hitch, complete with independent block type scarifier.

DAYTON, O. — Air corps, materiel division, Wright field, asks bids Feb. 28 for light duty tractors; Feb. 27, for a pull type grader; and March 2, for tail wheel assemblies.

EAST CANTON, O. — Village, S. H. Browning mayor, and Roscoe Rice, First National Bank building, consulting engineer, has completed plans and will ask for bids about Feb. 20, for the construction of a waterworks, to include a 100,000-gallon elevated storage tank, pumping equipment, and distribution system, including 3½ miles of mains, etc. Project will cost \$57,000.

ELYRIA, O. — A special committee has been appointed by the city council to investigate the advisability of in-

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1. MODERATE COST. Based on best materials, expert craftsmanship plus a modest profit.
2. LOW DEPRECIATION. Because of rugged construction, long-lived motors.
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SCORES OF MILLS RECOMMEND PROPELLAIRS

for Cooling Men, Cooling Sheets, Exhausting from pickling rooms, general ventilation.

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Refer your ventilating and exhausting problems to Propellair's engineers. Our long experience in steel mill problems is your assurance of skilled counsel. Write for 40-page PROPELLAIR CATALOG. No obligation.

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BROOKMIRE FORECAST for 1936

The year 1936 is faced with confusing economic and political developments. The Brookmire 1936 Forecast discusses the outlook for Business — Commodity prices — Money — Bonds and Stocks.

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BROOKMIRE

Corporation
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Investment Counselors and
Administrative Economists

551 Fifth Avenue, New York, B. 57

stalling a diesel power plant, at an approximate cost of \$17,000.

FOSTORIA, O. — Reopening of the Electric Auto-Lite Co. plant here before spring was forecast recently.

IRONTON, O. — J. Benson Davis has purchased the Champion Bottling Works here, operated formerly by Joseph Selb, and will plan improvements to the plant.

LANCASTER, O. — City, W. E. Rowles service director, contemplates advertising for bids for furnishing 10,000 feet of tubing for use in the natural gas department, to cost \$2000, and a swabbing or bailing machine to cost \$1200. Ordinance has received authorization.

LIMA, O.—Davidson Enameling Products Co. purchased the Lima Metal Products Inc. plant here recently, for the fabrication of metals in preparation for enameling.

SANDUSKY, O.—E. E. Hartung, city engineer, and R. L. Magee, district No. 8, WPA director, contemplates ordering bids to be taken for furnishing all cast iron pipe and fittings necessary for WPA projects during 1936.

Michigan

BARODA, MICH. — Baroda Grey Iron Foundry has been incorporated by directors Kurt Weber, this city, Amalie Weber, Alex Kamber, Enrich Weber, St. Joseph, Mich., and Attorney Arthur E. Lackner, Benton Harbor, Mich.

BATTLE CREEK, MICH.—Duplex Machinery Co., this city, has been incorporated to manufacture farm machinery, by Irving K. Stone, 108 South McCamly street.

BATTLE CREEK, MICH.—Battle Creek Food Co. is having plans prepared for the construction of a factory addition. A. B. Chanel, this city, is architect.

BRADLEY, MICH.—Bradley Elevator Co. has been incorporated in this city, by Leslie Enzian.

DEARBORN, MICH.—Utility Metal Sash Corp. has been incorporated to

deal in sashes and screens, by Charles R. Emery, 23533 Michigan avenue.

DETROIT—Central Plating Co. has been incorporated to fabricate and deal in iron and steel, by Charles Erdman, 1699 Atkinson avenue.

DETROIT—Babcock Iron & Metal Co., 1550 Harper avenue, has been incorporated to do a general buying and selling of steel and iron, by Ben. Babcock, 5168 Second boulevard.

DETROIT—Varkle Iron & Metal Co. Inc., 6565 Mack avenue, has been organized by Morris Varkle, 4045 Cortland avenue, to do a general scrap iron business.

DETROIT—Sewell Cushion Wheel Co., 4091 Beaufait street, recently suffered \$100,000 loss to one of its large warehouse buildings here.

DETROIT—Phelps & Bernardi, 504 Detroit Savings Bank building, architect, is preparing preliminary plans for the union bus terminal to be erected at Washington boulevard and Grand River avenue.

DETROIT—Alloy Metals Welding Corp., has been incorporated to do a general welding business, by Andrew Irons, 1339 Trumbull avenue.

DETROIT—Graham Warehouses Inc. has been organized to operate warehouses, by R. C. Hicks, 8505 West Warren avenue.

DETROIT—Paner-Davies Corp. has been incorporated to do a general stamping, plating, and polishing business, by Elmer F. Paner, 3729 Crane avenue.

DETROIT—Wayne Screw Products Co., Albert C. Germer treasurer, announces that its new 60 x 140-foot unit will be completed about March 15. New equipment will be placed in this unit, which will double the present capacity of the plant.

DETROIT—General Tool Bit Corp. has been organized for the manufacture of tools, by Robert E. Werner, 2545 Pennsylvania avenue.

GRAND RAPIDS, MICH. — Waltz-

Holst Blow Pipe Co. has been incorporated to deal in structural iron and angle iron work, by Frederick Waltz, 1320 Front avenue northwest.

GRAND RAPIDS, MICH.—Eckenberg-Ferrell Co., 412 Transportation building, this city, has been incorporated to deal in business machines, by William H. Durant, 108 LaGrave avenue southeast.

KALAMAZOO, MICH. — Wilson-Brinker Co., 412 Pythian building, has been incorporated for the engineering of mechanical equipment, by R. W. Wilson.

LANSING, MICH.—Multi-Lead Tool & Engineering Co. has been incorporated at 812 East Kalamazoo street, to deal in tools and dies, by Edward E. Judge, 304 Riley street.

LANSING, MICH. — State prison board is having working drawings prepared by Bowd & Munson, architect, for the erection of a \$100,000 storage and warehouse building here.

PONTIAC, MICH. — L. J. Heenan, architect, is taking figures on three factory buildings to be erected on East South boulevard, this city, for the Baldwin Rubber Co.

New York

ALBION, N. Y.—C. J. Gray is making plans for the purchase of a gasoline power shovel, to cost approximately \$1000.

ASTORIA, N. Y.—General Motors Corp., Detroit, is starting work on the construction of a 50,000 square foot supply depot, on the East river waterfront here. Building will occupy the block bounded by Vernon boulevard, Thirtieth drive, Twelfth street, and Thirty-first avenue.

ELMIRA, N. Y.—Delaware, Lackawanna, & Western railroad, G. A. Philips, Hoboken, N. J., engineer, is making plans for the installation of an elevated steel tank, to cost \$1000.

JAMESTOWN, N. Y.—Swanhall Oil Co., J. Swanson manager, Buffalo and East Second streets, plans purchasing 500-gallon steel tanks, electric pumps, etc., for installation at service stations in various localities in Chautauqua county.

NEW YORK—B. Dulchin Inc., 154 Seventh avenue, distributor of hardware, electrical, plumbing, and building maintenance supplies, has leased from the Barmil Realty Co. Inc., a building at Twentieth street and Seventh avenue. Extensive alterations have been started, and cost of modernization will be \$10,000, according to Abraham Grossman, architect.

NEW YORK — Cauldwell-Wingate Co. has booked the general contract for construction of the ventilation building of the midtown Hudson tunnel. The steel, 710 tons, has not been placed.

NEW YORK—Robert Gair Co. Inc., 155 East Forty-fourth street, manufacturer of folding boxes and shipping cases, has purchased the plant and business of the Peerless Paper Box Co., Berea road northwest, Cleveland, former plant of the Winton Motor Carriage Co. Operation is to be increased to a considerable extent under the new ownership, especially in the long inactive setup box department, where new equipment will be added. Property and plant will be in the name of Gair-Cleveland Cartons Inc., and Fred Hashagen will be vice president

(Please turn to Page 92)

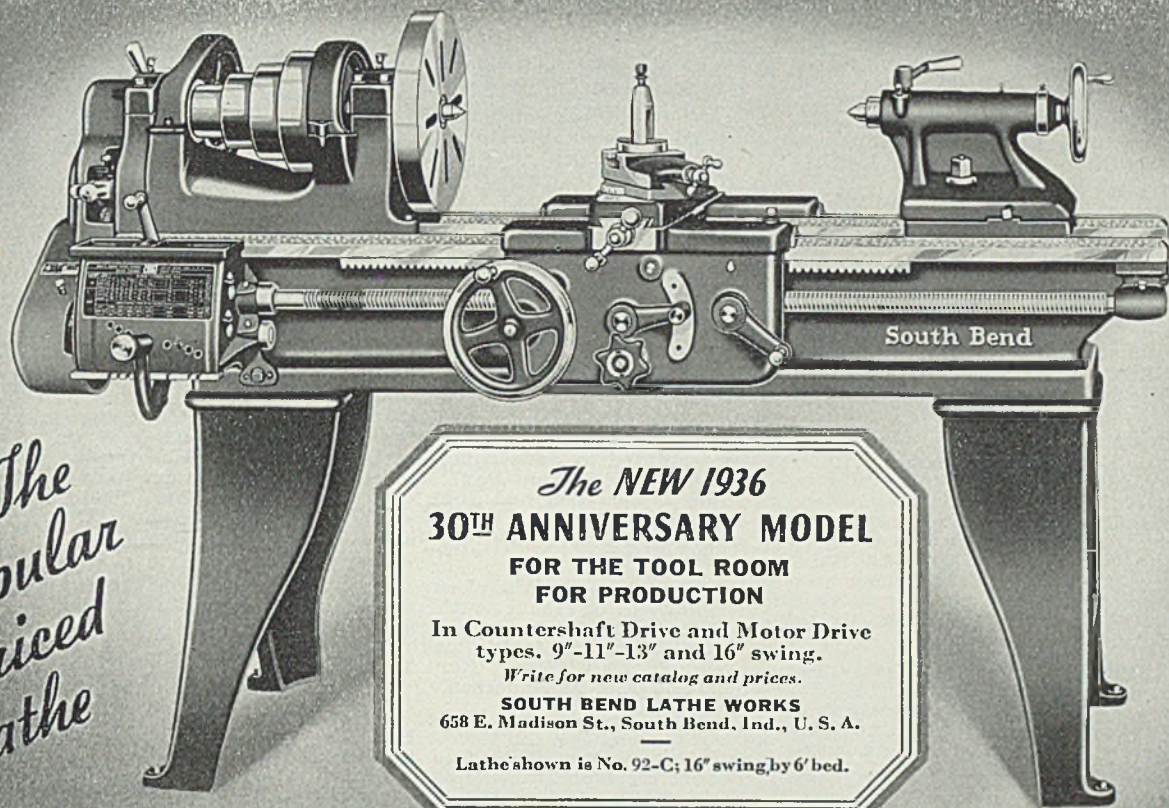


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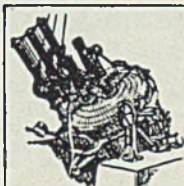
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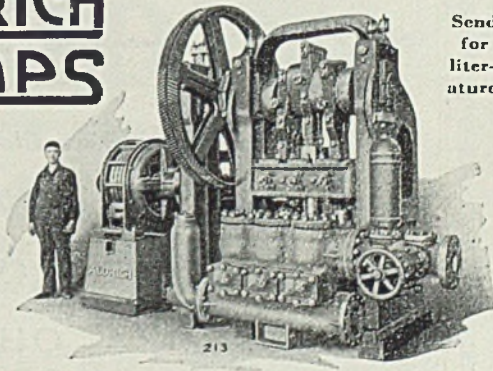
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(Continued from Page 90)

and resident manager. E. Victor Donaldson is president.

NEW YORK — United States engineer, first district, 39 Whitehall street, asks bids Feb. 18, invoice No. 1097-36-291, for cast steel propellers.

NIAGARA FALLS, N. Y.—Carborundum Co., manufacturer of abrasive products, is constructing an addition to its plant here.

SYRACUSE, N. Y.—Syracuse university will purchase paper mill machinery for complete paper plant in state forestry school, to exceed \$50,000. Bids are now being taken on materials for foundations and platforms on which machinery will be erected.

SYRACUSE, N. Y.—Continental Can Co. Inc., 100 East Forty-second street, New York, will enlarge its warehouse facilities here by erecting a 2-story brick and steel warehouse approximately 100 x 230 feet, adjacent to the company's present building on Railroad avenue. An additional floor will be added to another building at that location. Work will start shortly to be completed by June 1.

WESTFIELD, N. Y.—Ross Associates, J. Hernandez, Halesite, N. Y., plans purchasing two or more miles of 2-inch iron pipe, and 1800 to 1900 feet of 6 to 6½-inch steel pipe, costing \$5000. S. R. Ross, Box 62, Little Neck, N. Y., is engineer.

Pennsylvania

LANCASTER, PA.—Lancaster Iron Works Inc. plans the installation of electrical power equipment, in connection with the rebuilding of a portion of its steel plate and machinery plant, recently damaged by fire, causing a loss of \$80,000.

OIL CITY, PA.—Mullins Mfg. Co., Salem, O., has sold its boat building division to a group of business men in this city. The division will be moved here where operations will start about March 15, in the plant formerly occupied by the Kramer Wagon Co.

PHILADELPHIA — Frankford ar-

senal, this city, will ask bids March 9 for an automatic turret machine, under invoice No. 36-329.

YOUNGSVILLE, PA.—Youngsville Milling Co. is in the market for transmission, conveyor, and power plant equipment and machinery for flour and feed mill, including grinders, etc.

Illinois

CHICAGO—Fibre Abrasive Corp., 325 West Ohio street, has been incorporated to do a general paper business, by J. G. N. Bates, A. E. Holmes, and Thomas M. Richmond. Correspondent is Brown, Fox & Blumberg, 231 South La Salle street.

CHICAGO—Fisher Furnace Co., 1822 North Lamon avenue, has been incorporated to do a general furnace business, by William Paul Martin Jr., John L. Stroman, and John C. Trussell. Correspondent is Burry, Johnstone, Peters & Dixon, 105 South La Salle street.

CHICAGO—National Instrument & Regulator Co., 1810 South Michigan avenue, has been incorporated to manufacture and deal in machinery of all kinds, by E. Spear, Emil T. Johnson, and Joel A. Anderson.

CHICAGO—Steigerwaldt Cement Construction Co., 5308 Northwest Highway, has been incorporated to do a general cement construction business, by Henry Steigerwaldt, Elmer R. Weber, and Jacob Levy, 109 North Dearborn street, correspondent.

JOLIET, ILL.—American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York, plans the installation of motors and controls, conveyors, electric hoists, and other equipment in its new sulphuric acid plant near here. Cost will be over \$250,000.

PEORIA, ILL.—Hill-Kastien Automotive Parts & Machine Co., 116 North Washington street, has been incorporated as a general machine shop, by Leland D. Hill, and Walter and Emil P. Kastien, Hunter, Cavanaugh & McLaughlin, 718 Commercial National Bank building, this city, is correspondent.

Indiana

ANDERSON, IND.—Guide Lamp Corp. is planning a plant addition for the manufacture of motor lamps, cowls, fenders, and other parts for automobiles. Cost will exceed \$40,000 and maturity is indefinite.

INDIANAPOLIS—Fairbanks, Morse & Co., 900 South Wabash avenue, Chicago, is making plans for improvements to its plant here, Twenty-first and Northwestern avenue, to cost \$60,000.

INDIANAPOLIS—Chapman Price Steel Co., Shelby street, plans the installation of heavy duty motors and controls, electric hoists, conveyors and other equipment, in connection with extensions and improvements at its mill. Cost will be close to \$500,000, and the company is affiliated with the Continental Steel Corp., Kokomo, Ind.

MUNCIE, IND.—Ball Bros. Glass Co. plans the construction of a brick and steel warehouse on East Twelfth street and Macedonia avenue. Cost will exceed \$50,000.

District of Columbia

WASHINGTON — Department of agriculture, division of purchase, sales and traffic, asks bids Feb. 18 for spike and spring tooth harrows, field tiller or cultivator, rotary feed water pump, trailer type lime spreader, four wheel farm tractor, row crop farm tractor, and rotary scrapers.

WASHINGTON—Navy department, bureau of supplies and accounts, will ask bids Feb. 18, for the following: Miscellaneous pipe and tubing, schedule No. 7153, brass and copper, delivery to Mare Island, Calif.; one metal cutting, motor driven hack saw, schedule No. 7172, delivery to Mare Island; one motor-driven fire engine, schedule No. 7138, delivery to Puget Sound, Wash.

WASHINGTON—Navy department, bureau of supplies and accounts, asks bids Feb. 18, for the following: One motor-driven cut off saw, schedule No. 7146, with delivery to Puget Sound, Wash.; one metal melting furnace, schedule No. 7150; one motor-driven milling machine, schedule No. 7151, delivery to Puget Sound; and one sensitive drilling machine, schedule No. 7152, floor pedestal type, motor-driven, delivery to Puget Sound.

WASHINGTON — Department of agriculture, division of purchase, sales and traffic, asks bids Feb. 18 for barbed wire and staples, and automatic tractor double disc harrows.

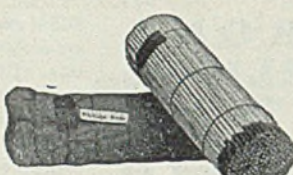
WASHINGTON — National Paint & Varnish Co. Inc. has leased a building at 3210 Grace street northwest, for the manufacture of paints.

Wisconsin

MADISON, WIS.—L. A. Smith, superintendent of water department, will be ready for bids about March 2 for furnishing superheaters, soot blowing units, suspended arches, and feed water regulators for two 500-horse-power Sterling boilers.

MAYVILLE, WIS.—Mayville Die & Tool Co. has been incorporated to do a general machine shop business, by A. L. Dorst, A. A. Mayer, and Henry Thatcher.

MILWAUKEE—City, J. W. Nicholson purchasing agent, will ask bids Feb. 20 for 59 tons of special castings, 21 tons of offset pipes, two tons tapping sleeves, valve bores and parts. (Please turn to Page 94)



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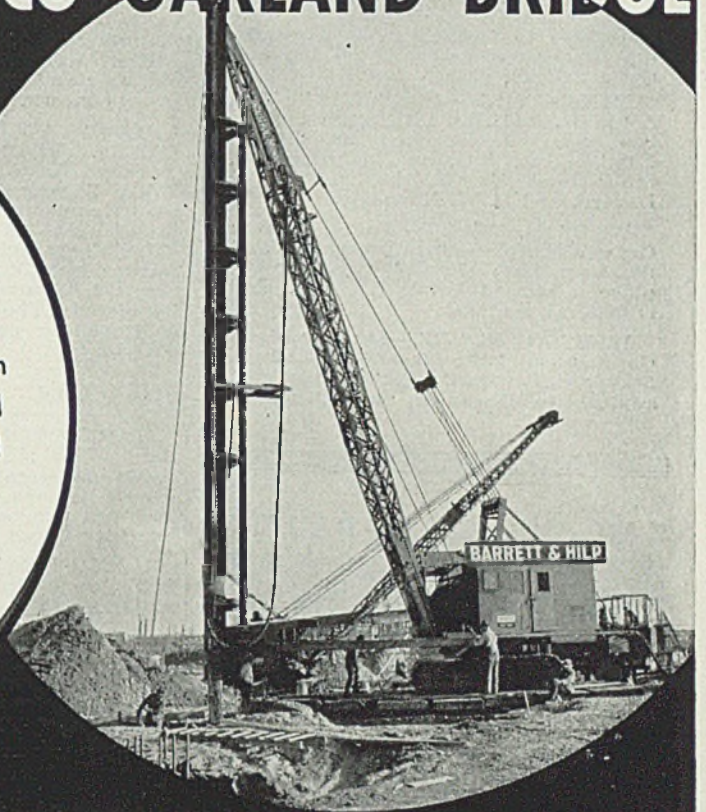
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(Concluded from Page 92)

290 three to 16-inch gate valves, 25 tapping valves, and one 20-inch and three 24-inch gate valves.

MILWAUKEE—Joseph Miotke Tool & Die Co., 107 East Pittsburgh avenue, has been incorporated as Joseph Miotke Inc. Other incorporators, other than Mr. Miotke, are M. L. Davern, and B. W. Reynolds.

WAUSAU, WIS. — Lake Wausau Granite Co. plans new processing and finishing plant, 50 x 350 feet, to replace a burned building. A. F. Kell is general manager.

WEST ALLIS, WIS.—Murphy Diesel Co. has leased the former plant of the Standard Separator Co. in this city, adjacent to Milwaukee, and will manu-

facture a new type of diesel engine for industrial and marine use, for the manufacture of fuel injection systems and accessories. M. J. Murphy is chief engineer and general manager of the diesel concern.

WEST ALLIS, WIS. — Thomas Kattnig, Milwaukee, operating the Kattnig Machine & Supply Co. and Arkco Engineering Co., has organized the Kemp Smith Machine Co. and leased space in the Kemp Smith machine shops, this city, for the manufacture of milling machines built by the old Kemp Smith Mfg. Co., now liquidated. The principal lines will be continued in production by the new company.

Minnesota

MAHNOMEN, MINN. — Wilcox Lumber Co. plans the construction of yards and storage facilities, estimated to cost \$37,000 with equipment. The architect has not been appointed and maturity is indefinite.

MOOREHEAD, MINN.—City, R. G. Price clerk, has voted to construct power plant improvements, including a new boiler building, larger smokestacks, new boiler, and coal and ash handling equipment, to cost \$120,000. A PWA project, R. D. Thomas, 1200 Second avenue south, Minneapolis, is consulting engineer.

ST. PAUL—Minnesota Mining & Mfg. Co. has purchased property here for production of a new rubber cement, used to make automotive upholstery adhesive.

Wyoming

RELIANCE, WYO.—Union Pacific Coal Co., E. McAuliffe, Omaha, Nebr., president, is making plans for the construction of a steel tippie, to cost \$232,000.

Nevada

VIRGINIA CITY, NEV. — Castle Peak Quicksilver Co. is planning improvements to its mill and mining property, to cost \$37,000 with equipment.

California

BAYWOOD PARK, CALIF. — Ankerite Products Co., Mr. Anker president, is making plans for the construction of a paint factory, to cost \$50,000.

LOS ANGELES—Federated Metals Corp., 2425 Hunter street, is planning the construction of two factory buildings, one 80 x 140 feet and the other 80 x 240 feet, East Twenty-sixth street and Indiana avenue. Cost will exceed \$37,500. Private plans.

MARYSVILLE, CALIF.—City plans additional equipment and improvements at municipal airport, including the construction of a steel frame and corrugated iron hangar, to cost \$34,000. Plans are being made by Phil J. Divver, city engineer.

Oregon

FREEWATER, OREG.—Plans are being prepared for the proposed \$80,000 cannery for the Utah Cannery Co. here, the city having agreed to drill new wells for the supply of water.

PORTLAND, OREG.—Voters have approved a proposed \$300,000 bond issue to construct an airport, for which WPA has granted \$1,300,000.

PORTLAND, OREG.—At a special election, Portland Traction Co. was

granted a 20-year franchise and will acquire additional equipment for the system.

Washington

HOQUIAM, WASH.—Grays Harbor Pulp & Paper Co., W. S. Lucey manager, plans constructing a breakdown and clipping plant.

SEATTLE—Hiorluck Brewing Co., 602 Westlake avenue north, announces plans for the construction of an additional storage building, 55 x 65 feet.

SEATTLE—Fire caused damage to the warehouse of the Barde Steel Co., 2709 Utah street, recently.

SPOKANE—Corby Mining Co. has been incorporated at 618 West Gordon street, by E. C. Tousley and associates.

TACOMA, WASH.—Atlas Foundry Co. has been granted a permit to construct a craneway trestle at 3012 South Wilkeson street.

TACOMA, WASH.—Nelson Boiler & Tank Co. has been formed by C. A. Nelson and associates. Address P. O. box 1261.

WALLA WALLA, WASH.—Eugene Geary, Pacific coast superintendent of Libby, McNeill & Libby, announces plans for doubling the capacity of its vegetable cannery at a cost of \$125,000. Two new structures and new equipment are involved.

Canada

HAMILTON, ONT. — United Carr Fastener Co., H. S. Beddoe manager, Gage avenue north, is making plans for a 1-story brick and steel addition to its plant. Program calls for additional special equipment for manufacturing patented fasteners.

PORT COLBORNE, ONT.—Port Colborne Iron Works is constructing an addition to its iron works plant in this city.

Foreign

PORT MELBOURNE, AUSTRALIA—Private interests have acquired a 50-acre tract at Fishermen's Bend near here, and will erect a large automobile body manufacturing and assembly plant composed of five buildings. A housing plan for the workers to be employed will also be worked out. Ralph H. Hunt, Melbourne, is American vice consul.

ARGENTINA, SOUTH AMERICA—Plans are being made for a chain of grain elevators, as part of the control program for national trade in grain, approval of the bill being anticipated May 1, providing for 50,000,000 pesos for the project. Program calls for the erection of 12 elevators, varying in capacity from 10,000 to 205,000 tons. Specification plans have been approved and are available at National Elevator Commission, Calle 25 de Mayo, Buenos Aires, Argentina. DuWayne G. Clark is assistant trade commissioner.

PARANAGUA, BRAZIL—Ministry of Transportation, this port, state of Parana, has had an appropriation approved by the President amounting to 10,848 contos (one conto equals approximately \$55) to be used for the construction of docks, warehouses, and complementary works here.

GOTHENBURG, SWEDEN — SKF Ballbearing Co., this city, plans to extend its plant facilities by the addition of a building, to cost 1,000,000 kroners. Axel Carlander is chairman. The American plant is SKF Industries Inc., Hartford, Conn.

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