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SAFEGUARD your production schedules—make sure of steel deliveries by drawing on the largest and most diversified stocks of steel in the country. More than 10,000 sizes and kinds of steel and allied products are carried by the ten Ryerson Steel-Service plants, strategically located for quick delivery throughout the principal industrial areas. Special handling, cutting and dispatching facilities assure prompt shipment of every order, large or small.

When you need steel, draw on the nearest Ryerson plant.

Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Cleveland, Cincinnati, Detroit, Boston, Buffalo, Philadelphia, Jersey City

RYERSON

As the Editor Views the News

A CONSIDERABLE portion of this issue is devoted to the forthcoming National Metal Congress and Exposition. From 1919, when the first meeting and show of this kind was held in Chicago, the event acquired prestige steadily and in recent years it has won full recognition as the most important annual convention and exposition in the iron, steel and metalworking field. It is the medium for bringing together once each year thousands of individuals interested in the technical aspects of the production, processing and use of ferrous and non-ferrous metals and for affording an opportunity to manufacturers to display their equipment, materials, supplies and services.

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In this preconvention number, STEEL not only presents a preview of the congress and exposition (p. 118) with details of the individual society programs (pp. 164, 170, 173, 176) and of the exhibits (p. 179), but it also introduces a special feature (pp. 121, 122, 134) entitled "Alloys in Action." The emphasis thus placed

Previewing the Metal Show

on ferrous and nonferrous alloys, we believe, is highly consistent with the purpose of the 1936 congress and show. The growth in popularity of alloys has influenced heat treating methods, the technique of welding, the design of equipment and many other activities in the broad field of metalworking. "Alloys in Action" is a timely, fitting theme for the Metal Show Number.

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A strong note of studied optimism prevailed at the annual convention of the Farm Equipment institute at Chicago last week. Agricultural equipment manufacturers (p. 31) find that their business in 1936 was "fairly satisfactory" in spite of the drought, and they confidently expect a broader market in 1937. Republic

Industry Gives Farmers a Hand

Steel's chairman, T. M. Girdler, made a significant statement concerning the relation between the prices of agricultural and industrial products when he as-

serted that the "money from 100 pounds of beef or ten bushels of wheat at current prices will buy from 6 to 20 per cent more now than in 1929 of such steel products as barbed wire, galvanized sheets or nails." Industry, in passing on to customers the advantage of greater manufacturing efficiency in the form of lower prices, serves the farmer more substantially than does uneconomic law, such as that under which AAA is administered.

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In proposing new freight rates to take the place of the existing rates and their accompanying surcharges which expire Dec. 31, the Association of

Railroads Revive Rate Issue

American Railroads (p. 32) re-opens the important issue of transportation costs. The new tariffs favor some shippers and penalize others. In general, rates for long haul shipments are lower and those for short haul freight are higher. Shippers wonder if this means that the railroads are resigned to yielding more business to highway truckmen (p. 47) without a fight. The task of establishing a new rate structure to replace the temporary schedules will require much study and it is doubtful whether the details can be given adequate consideration in the brief period between Nov. 1 and Jan. 1. Thoroughness rather than haste should rule in this job of ratemaking.

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Speaking of the railroads, Herman H. Lind told members of the National Machine Tool Builders' association (p. 30) that it is time to cultivate railroad

Congratulations N.M.T.B.A.!

demand for machine tools. He presented four valid reasons for this conviction. Point is given to his statement by the current surge in freight traffic, which has carried car loadings (p. 48) comfortably above the 800,000 mark weekly. This is the highest volume of railborne freight recorded since November, 1930. . . . Incidentally, the meeting of the machine tool builders marked the thirty-fifth anniversary of the association. The occasion should be one of gratification to its members. Few, if any, trade associations in the metalworking field have equaled the record of N. M. T. B. A. in the length of consistent uniformity and excellence of service to its industry.

E. L. Shaner

Machine Tool Men Observe Thirty-fifth Anniversary

CHEERFULNESS consistent with what one of the speakers referred to as the "late spring of recovery in the cycle of economic seasons" was reflected in the annual convention of the National Machine Tool Builders' association, held Oct. 5-7 at the Homestead, Hot Springs, Va. The meeting marked the thirty-fifth anniversary of the association.

The first two sessions were presided over by Norman D. MacLeod, president and general manager, Abrasive Machine Tool Co., retiring president of the association. In the general manager's report, Herman H. Lind commented on the small number of failures in an industry whose "depression low" was approached by few if any other industries. "Strength and tenacity," he said, "are fundamental qualities of the machine tool industry, and even more outstanding is the vitality which permits the industry to handle a rapidly accelerating volume of orders in recovery." He cited proof of the success of the association's campaign of public enlightenment as to the importance of modern machine tools by exhibiting press clippings covering all parts of the country.

Would Cultivate Railroads

Mr. Lind said he believes it is time to cultivate railroad business. "First, shop men fully realize the condition of their equipment and executives are becoming conscious of the cost of obsolete equipment. Second, railroad executives have seen the results of modernization in cars and new equipment. Third, the revenue of most roads has improved substantially. Fourth, competitive operating conditions make it necessary for railroads to plan economics."

The feeling of the industry toward the complications of the Walsh-Healey, Robinson-Patman and social security acts was expressed by Mr. Lind when he said in closing, "These laws are disheartening to the initiation of new enterprises and to the expansion of old ones—thus standing in the way of increased employment and increased volume of business."

Erwin Schell, department of business administration, Massachusetts Institute of Technology, spoke on "Security Versus Opportunity in Business and Employment." Professor Schell defined machinery as "a national resource of the second degree—in other words, metal which

has been fertilized by brains." He expressed the opinion that continuity, rather than profits, is the basic aim of industry. To insure continu-



Clayton R. Burt

ity machine tool builders should concentrate attention upon their future opportunities. They should invest heavily and constantly in good will, orient themselves for future changes, scan the field constantly for new ideas, and move along several fronts so that diversification can be accomplished promptly if necessary.

Among opportunities for the in-

dustry as a whole, Professor Schell suggested pooling patents, designing machines for "mobility," recognizing in the design of controls, etc., the fact that "a man actually has two hands, not merely a right hand and a clamp," making machines clean to operate thereby getting away from the idea that "grime is the inescapable partner of toil" and thus dignifying the running of machines, and considering the possibility that it may not be long before large mass buyers of production machine tools may demand that design of machines of different makes shall be so co-ordinated that the machines will permit of arrangement into integrated groups. In summing up future possibilities, Professor Schell said, "Change the nature of your manufacturing methods, your materials and your products if necessary, but do not change the skill of your industry."

Reports on foreign conditions were made by F. H. Chapin, president, National Acme Co.; S. T. Massey, vice president, Heald Machine Co.; and J. E. Lovely, chief engineer, Jones & Lamson Machine Co., Mr. Chapin, commenting on Germany, said that closed news sources have prevented general realization of the astounding industrial prosperity in that country due in a considerable degree to the rearmament program. German companies building machines of American design in some cases are sold up as far ahead as the late spring of 1938. There is feverish activity in the building of airports and fast transport planes. Still lacking credit and some essential raw materials, exchange has to be carefully conserved, but trade balance is improving, and strides are being made in direction of artificial rubber and other synthetic substances.

Italy Buys from Germany

Mr. Massey found that the imposition of sanctions had caused the Italian people to swing suddenly from lukewarm support of the African campaign to wholehearted support of the government in this venture and its aftermath of colonial development. Resulting trade already is becoming a factor in Italian affairs but the activity is reflected in the purchase of German machinery rather than that of any other country.

England again represents a major foreign market for American machine tools, according to Mr. Lovely, regardless of the rapid developments in British tools and the high tariff. With the present degree of prosperity in England, it is possible in many cases to obtain tariff rebates on machines imported from the United States provided that equivalent tools are not obtainable from British sources or are not ob-

New Officers

NATIONAL MACHINE TOOL BUILDERS' ASSOCIATION

President

CLAYTON R. BURT

President, Niles-Bement-Pond Co.,
Hartford, Conn.

First Vice President

HOWARD DUNBAR

Manager, Grinding Machine division,
Norton Co., Worcester, Mass.

Second Vice President

N. A. WOODWORTH

President and general manager, Ex-
Cell-O Aircraft & Tool Corp., Detroit

Treasurer

HENRY C. PIERLE

Secretary and sales manager, R. K. Le
Blond Machine Tool Co., Cincinnati

Directors

T. H. DOAN

President, Foote-Burt Co., Cleveland

A. J. GIFFORD

Treasurer, Leland-Gifford Co., Worces-
ter, Mass.

tainable under reasonable delivery conditions. Recovery in England, which dates back farther than it does in America, is due to many influences other than rearmament, and therefore is of a more healthy character. Shipbuilding is an example.

One of the important addresses of the convention was that on "Credit and Public Finance," delivered by James R. Garfield of Cleveland, legal adviser to the association who sounded a warning against changes in basic standards such as that represented by the cutting of the gold equivalent of the American dollar. With the future of the country depending upon credit, and with credit in turn resting upon an honest record in the meeting of obligations, Mr. Garfield is convinced that unless a speedy return be made to time-tried standards of value and of promise-keeping, untold harm will be done.

J. L. Hamilton, chairman, motor and generator section, National Electrical Manufacturers' association, talked on "Motor Standards." He compared the motor and control of a machine tool to the motor and control of an automobile as a vital part of the whole. He brought out the extent of the standardization program by citing the fact that up to date over \$5,000,000 had been spent in the standardization of motor frames alone. In a discussion of this paper, F. O. Hoagland of the Machine Tool Builders' standards committee pointed out the great number of useful standards already available through the American Standards association and urged that more complete advantage be taken of them in the design of machinery.

Would Standardize Depreciation

Mr. Hamilton was followed by Paul T. Norton, Jr., department of industrial engineering, Virginia Polytechnic institute, who spoke on "Depreciation—Its Increasing Importance." A believer in straight line depreciation as a result of 15 years study of the subject, Professor Norton declared that a constant rate of equipment replacement not only is correct in theory but also is proving profitable in plants where it is practiced. In the discussion of this paper a standardized program on depreciation was urged, it being important that from now on all machine tool builders shall "stick to the same story" in making the plant surveys which so frequently are a feature of selling.

There was no formal speaker at the thirty-fifth anniversary banquet held Tuesday evening. The evening was given over to entertainment, with Howard Dunbar as master-of-ceremonies. New officers were elected, as listed elsewhere in this report.

Implement Makers See Still Broader Market for 1937

FARM equipment manufacturers will have had a fairly satisfactory year in 1936 in spite of the drought and other factors. Furthermore, the outlook for 1937 is bright. This was the sentiment expressed at the forty-third annual convention of the Farm Equipment institute, last week in Chicago.

In addition to speaking optimistically regarding the future, Institute President W. C. Mac Farlane, head of Minneapolis-Moline Power Implement Co., Minneapolis, predicted that the trend toward more regulation of business and industry by government will continue.

More Government in Business

"This trend has been going on for years and, in the opinion of most men, it will continue in the future," he said. "The 1936 presidential campaign, no matter what candidate is elected, will not put an end to it. And, perhaps, it should not because, after all, there is nothing inherently wrong with such regulation, provided it is wise and judicious.

"The real problem is to be sure that whatever regulation is undertaken shall be wise and justifiable and not so restrictive as to interfere with normal and healthy development of business and industry."

Discussing business conditions, Harry G. Davis, research director of the institute, pointed out that the complete dependence of the implement industry upon agricultural prosperity has been demonstrated the past few years. Cash farm income last year was 68 per cent of 1929 income, while wholesale farm equipment sales were 66 per cent of 1929 equipment sales.

"While the 1936 drought, at the peak of its intensity, was as bad, if not really worse than was the one in 1934, its evil effects, even in the worst afflicted districts, are far less serious. According to the federal department of agriculture, cash farm income in the West North Central states, the district in which the drought was most severe, was 42 per cent, or \$308,000,000, greater in the first seven months of 1936 than in the corresponding period in 1934.

"The bureau of agricultural economics estimates that total cash farm income, including governmental payments, for 1936 will be \$7,850,000,000, or 11 per cent greater than the cash income of 1935. Such an income, coupled with fairly normal crop and weather

conditions next spring, should result in good business in all lines serving farmers."

If domestic sales of farm equipment this year show an increase in keeping with the 11 per cent gain in farm cash income, the years total will be about \$335,000,000. This would compare with \$301,000,000 in 1935 and would be the largest volume in six years.

The frequent considerations of economic parity for agriculture, he said, do not take account of all of the facts, and prices of agricultural products are not the determining factor. The cost of production must be included as an item in such calculations.

"It is entirely possible for dollar wheat, produced with a minimum of labor and expenses, to be more nearly par when exchanged for other products than is two dollar wheat which is produced by laborious and wasteful methods."

"American farmers can get more steel products today in exchange for farm products than they could in 1929, T. M. Girdler, chairman and president of Republic Steel Corp.," said in an address.

"If we compare the purchasing power of farm products in terms of steel we find the tide definitely in the farmer's favor.

Farm Income Buys More

"For example, the money from 100 pounds of beef or ten bushels of wheat at current prices will buy from six per cent to 20 per cent more now than in 1929 of such steel products as barbed wire, galvanized sheets or nails.

"Apparently very few realize how the steel industry has passed on in the form of lower prices the savings from technological advances made during recent years. Prices have declined an average of \$11 per ton since 1923. This means a saving to American farmers on the amount of steel they will use this year of well over \$25,000,000. The saving for all steel consumers in the country this year will be at least \$300,000,000."

Mr. Girdler pointed out, however, that increasing taxes may have an adverse effect upon the farmer's capacity to purchase industrial products. Discussing taxes, he said: "From 1900 to 1936 the share of the steel dollar going to payrolls increased by 50 per cent. While the tax collector got 800 per cent more, stockholders got much less."

Freight Plan Raises Costs; Steel Producers Protest

A SLIGHT reduction in freight rates on finished steel—in the aggregate—as compared with present rates plus surcharges, and an increase on some raw materials, will be the overall effect of changes proposed last week by the American Association of Railroads, according to iron and steel shippers.

The new schedules are intended to become effective Dec. 31 when the present surcharges expire, and "to partially offset the decrease in revenues which will otherwise occur." The association estimates the surcharges netted \$100,000,000 a year, and that their total revenue will be reduced by \$54,000,000 under the proposed set-up.

First reaction in steel was that it would be impossible for some of the rates to be put in effect by Dec. 31, because of the opposition that will develop.

With heavier carloadings it was expected that the emergency surcharges would soon be taken off. The new schedule proposes to raise the base rate structure, so as to make permanent a large portion of the surcharges, and on some commodities actually increase them.

On short hauls the proposed rates under the iron and steel classification would be generally higher, but when the base rate is over 20 cents, the change would result in a rate lower than at present with surcharge. In instances where the carriers are in sharp competition with trucks it is said that increases probably would not be made.

That there will be strenuous objections to some of the proposals, the effect of which would be to increase the cost of manufacturing pig iron and finished steel, was evident last week from comment in the industry.

One of the controversial points will be in the proposal relating to Lake Superior iron ore. The original iron ore surcharge, collected only by the northern roads, was 10 cents a net ton, or 11.2 cents a gross ton. This was reduced some months ago on protest by shippers to 8 cents a net, or 8.96 a gross.

The northern roads divide their surcharge with the lower-lake carriers on such ore tonnage as is carried to interior furnaces. The effect of the new proposal would be the same as though the surcharge up north was reduced to 5 cents a net ton, and a surcharge of 5 cents were to be levied on ore from

lower lake ports to interior furnaces. In other words, the total charge in the ore regions will be slightly lower than at present, and the rates from lower ports to interior points, higher.

Ore is sold on a delivered lower-lake-port basis, and these freights enter into the price of the ore. Equalizing of the surcharge—in its effects on production costs—has been what some producers have desired; but there is unanimous protest against what amounts to raising a surcharge from 8 cents to 10 cents.

Increases by Classes

Fifth and sixth class rates would be increased 37½ per cent and 30 per cent, respectively, of first class. L.C.L. classification ratings would be equalized between territories, generally by using the lowest rating now published.

Lake cargo coal which is moved from upper lake ports by rail would be increased 15 cents a ton from the present rate not including the surcharges.

Under the general heading of iron and steel the railroads have put the following commodities, pig iron, iron and steel rate 6th class; rails, fastenings, frogs and switches; cast iron pipe and fittings; iron and steel pipe and fittings; iron and steel, nails and wire, not woven; iron and steel rate 5th class; and railway car wheels, axles, and trucks. The railroads' proposal includes the following rates:

IRON AND STEEL, including pig iron, finished and semifinished—Commodity rates, increase of 10 per cent with maximum of 1 cent per 100 pounds; or 20 cents per ton, net or gross, as rated. Column rates, increase of 1 cent per 100 pounds.

SCRAP IRON OR STEEL—Within western territory, and from and to western territory, commodity rates to be increased 20 per cent with maximum of 40 cents per ton, net or gross as rated. In other territories commodity rates to be increased 10 per cent with maximum of 1 cent per 100 pounds, or 20 cents per ton, net or gross as rated. Within, from and to western territory, where column ratings of 15 per cent and 12 per cent at minimum weights of 50,000 and 75,000 pounds, respectively, are applicable, it is proposed to cancel the 12½ per cent column rating at the 75,000 pounds minimum.

COKE, ANTHRACITE AND BITUMINOUS COAL, not including ground, pulverized or dust, in packages:

Scale No. 1

Where present rate per ton (minus emergency charges) is:
0 to 75 cents

76c to \$1.00
Over \$1.00

The increase to be:
3c per net ton—3c gross ton
5c per net ton—6c gross ton
10c per net ton—11c per gross ton

1.—Except as indicated below, rates within and to the West to be increased on the following scale:

Scale No. 2

Where present rate per ton is:

0 to 75 cents
76c to \$1.00
\$1.01 to \$2.00
Over \$2.00

The increase to be:

3c per net ton
5c per net ton
10c per net ton
15c per net ton

Exceptions include the following: (a) Will not apply on coal to Milwaukee, Racine, Kenosha, Wis., Waukegan, North Chicago, Ill., and intermediate points to which scale No. 1 will apply; (b) Where rates from Illinois, Indiana and western Kentucky are not increased by the maximum under the western scale, i.e., 15 cents per net ton, rates from eastern and southern origin groups will be increased 10 cents per net ton; (c) Rates from Utah and Wyoming to the Pacific Northwest are not to be increased.

2.—Rates established to meet truck and/or water competition and so indicated in the tariffs, where emergency charges are not now applied, need not be increased.

3.—Rates on unprepared anthracite moving to breakers for preparation and reshipment by rail will not be increased.

4.—Ex-river rates from Conway, Colona, etc., except those covered by No. 2 above, to be increased in the same amounts in cents per ton as the all-rail rates from the Pittsburgh district to the same destinations are increased.

5.—Rates on coal from Lake Superior and Lake Michigan docks to the interior to be increased as per scale No. 1.

FLUXING STONE AND DOLOMITE, Not roasted—Commodity rates to be increased 5 cents per ton where rates are over 60 cents per ton and including \$1 per ton; 10 cents per ton in rates over \$1 per ton. Rates to and within the Chicago district need not be changed.

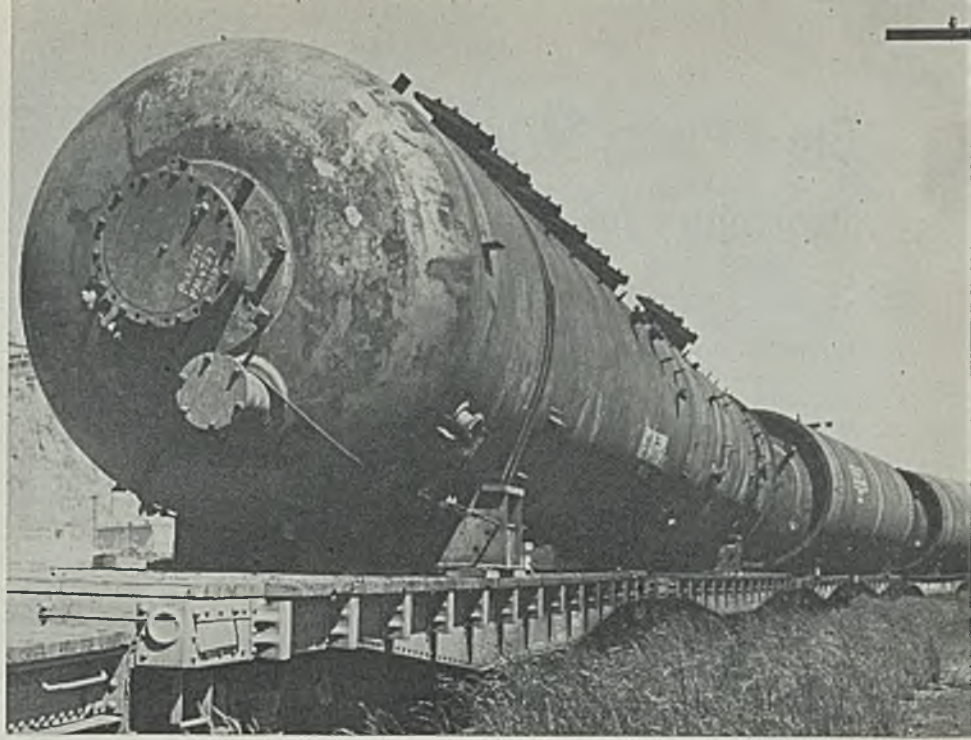
ROASTED DOLOMITE—Rates to be increased 1 cent per 100 pounds or 20 cents per ton, net or gross as rated. Column rates of 60 per cent of sixth in C.F.A. territory to be increased to column 17½; Column rates of 12 per cent where now applicable in certain other territories to be increased to column 13.

MACHINERY AND BOILERS, including electrical appliances and supplies—Class or column rates lower than column 40 to be increased to column 40. This involves increase in official classification from 5th class (35 per cent) to column 40. Commodity rates in all territories on electrical machinery appliances and supplies to be increased 10 per cent with maximum of 5 cents per 100 pounds.

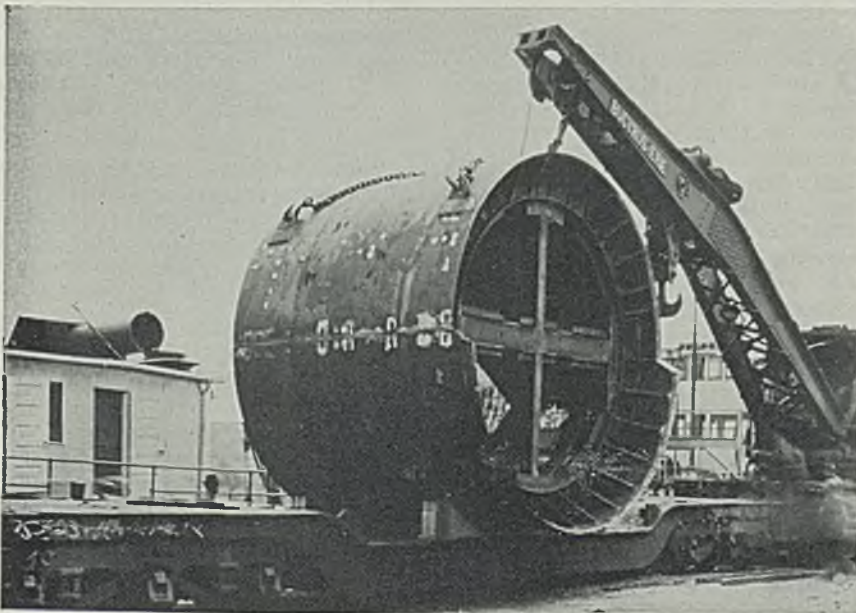
BRICK, all kinds—Commodity rates to be increased 1 cent per 100 pounds where the rate is over 7 cents per 100 pounds. Column rates to be increased 1 cent per 100 pounds.

LIMESTONE, crushed, ground or pulverized, not burnt—Commodity rates over 60 cents per ton to and including \$1 per ton to be increased 5 cents per ton. Commodity rates over \$1 per ton to be increased 10 cents per ton. Where in official territory column 60 per cent of 6th is now applicable, it is proposed to change to column 16½.

◆
 Shipments of
 Heavy Steel
 More Frequent
 ◆

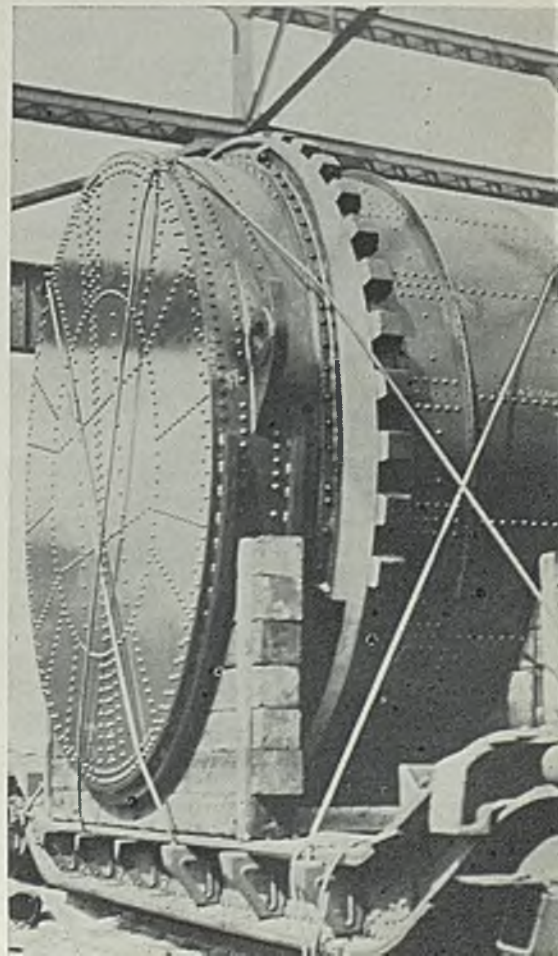


ABOVE is a cargo of oil processing cylinders, nine double cars and four singles, total weight, 2,082,400 pounds, recently shipped from A. O. Smith Corp., Milwaukee, to Weehawken, N. J., for export. It was reported to be the largest train of heavy material ever shipped over the Erie railroad



THIS tunnel shield, made by the American Locomotive Co., Dunkirk, N. Y., was transported by both rail and water, being shipped by boat from Dunkirk to Detroit. It is 18½ feet high and 15 feet wide. The handling of these big shipments requires special cars of the types shown

HERE'S a case of "low bridge," and a cargo that couldn't duck. The illustration (right) shows one of 20 end-drums for the roller gates in Nos. 5 and 7 Mississippi flood control dams, fabricated at Leetsdale, Pa., shops of Bethlehem Steel Co. They were shipped to Winona and Dresbach, Minn., in this type of Pennsylvania railroad depressed car. The over-all diameter of the two types of drums included in the shipments was 16 feet, 8 inches, but as loaded on cars each cargo measured 19 feet in height from top of rails. A special route was worked out, restricted to local train service at a speed not to exceed 30 miles an hour



Steel Plants Win No-Injury Medals

SIXTEEN of 202 steel plants and units entered in the National Safety council's metals section safety contest went through the year ending June 30 with a perfect no-accident record. Bronze plaques were awarded to first place winners in the various divisions and certificates were given for second and third prizes, during sessions of the National Safety congress in Atlantic City, N. J., Oct. 5-9.

During the 12-months 267,792 employees worked 561,788,579 man-hours. The average frequency rate was 8.030—number of disabled injuries per million hours worked. Where two or more contestants tied for first place in any group without a disabled injury, equal rankings and awards were given.

The three winners in each division, or those with perfect records, are:

- | Rank | Steel Mills Division |
|--|--|
| Group A | |
| 1— | Continental Steel Corp., Kokomo division, Kokomo, Ind. |
| 2— | Republic Steel Corp., South Chicago works, Chicago. |
| 3— | Great Lakes Steel Corp., Ecorse, Mich. |
| Groups B and C | |
| 1— | Youngstown Sheet & Tube Co., South Chicago works, Chicago. |
| 2— | Great Lakes Steel Corp., Hanna furnace division, Ecorse, Mich. |
| 3— | Republic Steel Corp., Niles plant, Warren, O. |
| Rolling, Finishing and Fabricating Division | |
| Group A | |
| 1— | Chase Brass & Copper Co., Cleveland. |
| 2— | Berger Mfg. Co., Canton, O. |
| 3— | Pullman Standard Car Mfg. Co., Butler, Pa. |
| Group B | |
| 1— | Revere Copper & Brass Inc., Baltimore division, Baltimore. |
| 1— | Central Tube Co., Ambridge, Pa. |
| 1— | Continental Steel Corp., Chapman Price division, Indianapolis. |
| 1— | Republic Steel Corp., Grand Crossing plant, Chicago. |
| 1— | Union Drawn Steel Co., Beaver Falls, Pa. |
| 1— | Lehigh Structural Steel Co., Allentown, Pa. |
| Foundries Division | |
| 1— | Lycoming Mfg. Co., Plants 2 and 3, Williamsport, Pa. |
| 1— | Haynes Stellite Co., Kokomo, Ind. |
| 1— | American Rolling Mill Co., Sixth street foundry, Ashland, Ky. |
| Heavy Machine Shops Division | |
| Group A | |
| 1— | Lycoming Mfg. Co., Plant 1, Williamsport, Pa. |
| 2— | United Shoe Machinery Corp., Beverly, Mass. |
| 3— | General Electric Co., Philadelphia. |
| Group B | |
| 1— | C. Hager & Sons Hinge Mfg. Co., St. Louis. |
| 1— | D. & B. Pump & Supply Co., Los Angeles. |
| 1— | Noera Mfg. Co., Waterbury, Conn. |
| Light Machine Shops Division | |
| 1— | Western Clock Co., LaSalle, Ill. |
| 1— | Ilg Electric Ventilating Co., Chicago. |
| 1— | Titeflex Metal Hose Co., Newark, N. J. |

District Steel Rates

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended	Change	Same week	1935	1934
	Oct. 10				
Pittsburgh ..	75	+ 2	48	18	
Chicago	75	+ 1	58	26	
Eastern Pa....	48	None	37	17½	
Youngstown...	80	None	56	29½	
Wheeling	92	- 3	81	33	
Cleveland	82	None	59	28	
Buffalo	84	+ 3	52	24	
Birmingham..	64	None	55½	25	
New England	70	-18	68	40	
Detroit	95	None	88	59	
Cincinnati...	90	+ 6	†	†	
Colorado	38	-25	†	†	
Average.....	75	+ ½	52	25	

†Not reported.

Production

STEELMAKING continued its upward trend last week, advancing ½-point to 75 per cent, a new peak since the third week of May, 1930, when the rate also was 75 per cent. Heavy schedules at Pittsburgh, Chicago, Buffalo and Cincinnati contributed.

Youngstown—Held at 80 per cent last week for fourth consecutive week. A drop to about 77 per cent is expected this week, owing to Youngstown Sheet & Tube Co. shutting down its bessemer furnace and one or two open hearths for repairs.

Cleveland—Unchanged at 82 per cent last week. Corrigan, McKinney continues with 12 units active, Otis Steel Co. with all 8, and National Tube at Lorain, with 12. National put on an additional blast furnace Saturday, to operate four.

Pittsburgh—Up to 2 points to 77 per cent, not only placing district operations on new high ground for any time in the last seven years, but also establishing Pittsburgh steelmaking at a margin above the national average. Last week Corporation subsidiaries operated at an average of 75-76 per cent, and independents at close to 80. Forty-one steelworks blast furnaces are active, a gain of one over a week ago.

New England—Dropped 18 points last week to 70 per cent, but it is expected that the rate will rebound to 78 per cent this week.

Central eastern seaboard—Unchanged at 49 per cent, with little early variation expected. For more than a month output has been holding at approximately the current level.

Chicago—Increased 1 point to 75 per cent, a new peak for the year. Production now is about 95 per cent

on the basis of 1929 capacity. Inland Steel Co. has lighted its fourth blast furnace which had been down for relining. Twenty-five of 41 blast furnaces are active. Inland also has started to operate its new blooming mill.

Birmingham—Fourteen open-hearth furnaces are being kept in steady operation, holding steelmaking at 64 per cent. With the rail mill starting around Nov. 1, additional open hearths will be called into service and steel output will be around 71 per cent.

Tennessee Coal, Iron & Railroad Co. will blow in two additional blast furnaces this week, bringing its total to six. Chairman Myron C. Taylor, President W. A. Irvin, and other officials of United States Steel Corp. will inspect the company's properties Thursday.

Wheeling—Off 3 points to 92 per cent, as there was an average of 34 out of 37 open-hearth furnaces operating in the district.

Detroit—Unchanged at 95 per cent based on ingot production in 20 out of 21 basic open-hearth furnaces. One mill is operating all 9 units and the other, 11 of 12.

Buffalo—Operations are near an all time high at 84 per cent. This rate will be maintained or possibly increased two or three points this week. Thirty-one open hearths are active.

Cincinnati—Rose 6 points to 90 per cent last week, highest level this year. Of 24 open hearths, 22 are active.

Colorado—Off 25 points last week to 38 per cent, with six open hearths active, compared with ten in the previous week.

More Alabama Firms Test Job Insurance Law

More suits were filed in Alabama by individuals and firms late last week to restrain collection of the state's unemployment insurance program after attorneys for the Gulf States Steel Co. had won a temporary injunction on the grounds that the state act was unconstitutional.

Last Friday at Montgomery, Ala., Federal Judge C. B. Kennamer heard arguments by the steel company and approximately 80 individuals and firms, engaged in interstate business, to restrain collection of the levies. Similar cases were filed in the circuit state court at Montgomery and Judge Walter Jones set Nov. 9, 10 and 11 for hearing these pleas for permanent injunctions, the suits being filed by strictly intrastate organizations.

Financial

GULF States Steel Co., Birmingham Ala., reports for the seven months ended July 31, net income of \$279,874 after depreciation, interest, amortization and federal income taxes but before provisions for surtax on undistributed profits.

PITTSBURGH STEEL CO.'S SALES UP 66 PER CENT IN YEAR

Pittsburgh Steel Co., Pittsburgh, has just issued its pamphlet report covering results of operations for the fiscal year ended June 30, 1936. The most striking result was an increase in net sales of 66 per cent, compared with the previous fiscal year. The sales totaled \$21,352,326, against \$12,868,879.

Net loss was \$265,360, which compares with net loss of \$1,765,906 in the previous fiscal year. However, the second half of the latest fiscal year showed a profit of \$250,708, following upon a loss of \$516,067 in the first half of the fiscal year.

The company spent \$449,770 for improvements and additions, and \$2,322,773 for maintenance and repairs, according to the report.

* * *

Consumers Steel Products Corp., Detroit, reports net earnings of \$61,505, for 11 months ended Aug. 31, or 37 cents per share on 166,812 shares now outstanding. The company has completed retirement of \$100,000 of outstanding 4¼ per cent cumulative preferred stock in line with the new capital structure, which provides for

350,000 shares of \$1 par value common stock.

* * *

American Machine & Foundry Co., New York, has declared an extra dividend of 25 cents and a regular dividend of the same amount, both payable Nov. 2 to holders of record Oct. 17. The company paid 20 cents quarterly previously.

* * *

Directors of Briggs Mfg. Co., Detroit, have declared an extra and regular dividend of 50 cents each, both payable Oct. 31 to stock of record Oct. 17. A similar extra payment was declared three months ago.

* * *

Duff Norton Mfg. Co., Pittsburgh, has declared the usual quarterly dividend of 25 cents, payable Oct. 15 to Oct. 12 record.

* * *

Waukesha Motor Co., Waukesha, Wis., for fiscal year ended July 31, had net profit of \$731,553 after taxes and charges, against net profit of \$493,335 in the preceding fiscal year.

H. H. McCord Dead

Herbert H. McCord, 56, Belle Haven, Conn., vice president and secretary Post & McCord, New York, structural steel contracting firm died at Princeton, N. J., hospital Oct. 7. Mr. McCord directed the structural steel work on the Empire State and Rockefeller Center buildings, New York.

Meetings

BLAST furnace coke is to be the subject for discussion at the year's largest gathering of coke plant and blast furnace operators, to be held at the Palmer house, Chicago, Oct. 16. The occasion is a joint meeting of the Eastern States Blast Furnace and Coke Oven association and the Blast Furnace and Coke Association of the Chicago District. This is the second annual joint gathering of the groups.

The technical session, to be held Friday afternoon following a 12 o'clock luncheon, lists six topics as follows:

"Use of Sized Coke," by G. T. Williams, blast furnace and coke plant superintendent, Youngstown Sheet & Tube Co.; "Effect of Varying Amounts of Low-Volatile Coal on the Volatile Matter in the Coal Mix," by B. W. Winship, coke plant superintendent, Bethlehem Steel Co., Lackawanna, N. Y.; "Effect of Coal Crushing," by F. T. Moran, coke plant superintendent, Republic Steel Corp., Warren district; "Physical Testing of Coke and Correlation with Furnace Operation," by F. B. Thacher, assistant general manager, Interlake Iron Corp.; "Selection of Coals for Coking," by W. Mathesius, manager of operations, Chicago district, Carnegie-Illinois Steel Corp.; "Effect of Oven Width," by H. R. deHoll, general superintendent, Inland Steel Co.

Blast furnace and coke oven operators of the Chicago district will act as hosts at their respective plants on the morning of Oct. 17 for out-of-town guests. B. A. Standerline, Wisconsin Steel Works, South Chicago, Ill., is secretary-treasurer of the Chicago District association.

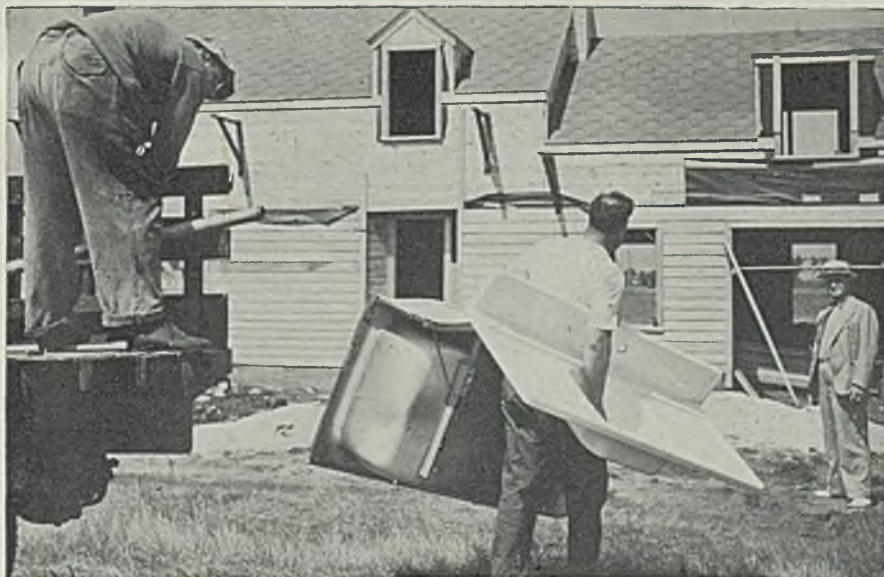
STEEL CONSTRUCTORS TO MEET WITH BANK CREDIT OFFICERS

In a search for a more scientific basis for bank credit to the steel construction industry, the American Institute of Steel Construction has planned this year a novel experiment in connection with its annual convention in White Sulphur Springs, W. Va., Oct. 21-23.

Following the conclusion of those sessions the members will be invited to participate on Saturday, Oct. 24, in a joint conference with the credit officers of banks who will be meeting in Hot Springs, Va. Members of the steel construction industry will motor to the latter place upon the conclusion of their own convention.

It is hoped that out of the discussion will come the formation of a committee to study finance problems and necessities of the industry, to the end that credit relations between structural steel operators and bankers may be conducted on a basis of accurate knowledge.

Not a Hercules—but Light Steel Plumbing Fixtures



THESE pressed steel plumbing fixtures, as developed by Briggs Mfg. Co., Detroit, weigh one-third as much as the conventional type. The workman is carrying a full-size bathtub and kitchen sink; contractors see an important factor in reducing weight load of houses

Steel Imports in August Show Gain

IMPORTS of steel and iron in August showed a gain over July, according to complete figures by the bureau of foreign and domestic commerce, Washington, totaling 60,697 tons, including 12,518 tons of scrap and 48,179 tons of manufactured items. This is an increase over July figures. In that month total imports were 47,940 tons, of which 9,590 tons were scrap and

FOREIGN TRADE OF UNITED STATES IN IRON AND STEEL

	Gross Tons			
	1936		1935	
	Imports	Exports	Imports	Exports
Jan.	50,489	241,564	22,695	262,740
Feb.	43,358	213,802	28,905	228,657
March	56,720	264,337	21,470	323,017
April	49,621	301,937	28,866	205,341
May	59,391	314,950	47,719	286,599
June	59,910	294,951	33,208	286,333
July	47,940	296,738	31,894	296,782
Aug.	60,697	295,341	32,312	247,312
8 mo.	427,782	2,223,670	247,069	2,136,787
Sept.	.....	.....	53,158	244,367
Oct.	.....	.....	59,473	238,350
Nov.	.....	.....	56,637	204,838
Dec.	.....	.....	53,678	239,269
Total	.....	.....	470,015	3,063,605

33,350 tons manufactured goods. For eight months of 1936 total imports were 427,782 tons and in eight months of 1935 they were 247,069 tons.

Total exports for August were 295,341 gross tons, of which 199,649 tons were scrap, leaving 95,692 tons of manufactured materials. In July total exports were 296,738 tons,

ORIGIN OF AUGUST IMPORTS

	Gross Tons			
	Iron ore	Pig iron	Man-ganese ore	Ferro-ganese
Australia	17,153	.....	.....	.....
Canada	15,017	692	.....	.....
Cuba	44,500	.....	.....	.....
Chile	108,900	.....	.....	.....
Norway	15,002	393	.....	1,171
Sweden	32,852	.....	.....	.....
Mexico	206	.....	.....	.....
Brazil	1	.....	4,543	.....
Belgium	.....	444	.....	.....
Germany	.....	60	.....	.....
Netherlands	.....	5,837	.....	248
United Kingd.	.....	60	.....	.....
British India	.....	5,038	10,387	.....
Gold Coast	.....	.....	21,208	.....
France	.....	.....	.....	167
Czechoslovakia	.....	.....	.....	157
Poland	.....	.....	.....	157
Japan	.....	.....	.....	42
Total	233,631	12,524	36,138	1,942
	Sheets, skelp and sawplate	Structural steel	Steel bars	Hoops and bands
Belgium	1,231	5,305	2,591	1,826
France	110	1,868	455	534
Germany	616	45	116	293
Sweden	5	.....	357	2
United Kingd.	96	25	33	28
Czechoslovakia	.....	15	3	.....
Austria	.....	.....	2	.....
Total	2,058	7,258	3,557	2,683

scrap 197,805 tons and manufactured steel and iron 98,933 tons.

For eight months of 1936 total exports were 2,223,670 tons, scrap 1,474,389 tons and manufactured articles 749,281 tons. This compares with eight months of 1935: Total exports 2,136,781 tons, scrap 1,521,190 tons, manufactured classifications 615,591 tons.

From the standpoint of value, exports of various classes of steel products for first half of 1936 showed marked increases from the same period of 1935. Power-driven metal-working machinery exports increased 97.2 per cent, from \$11,114,000 to \$21,917,000; iron and steel plates, sheets, skelp and strip 71.4 per cent, from \$14,025,000 to \$24,015,000; agricultural machinery and implements 47.6 per cent, from \$14,414,000 to \$21,271,000; construction and conveying machinery 44.2 per cent, from \$3,476,000 to \$5,013,000; hand tools 21.2 per cent, from \$4,284,000 to \$5,193,000; automobiles, parts and accessories 7.6 per cent, from \$123,447,000 to \$132,820,000; iron and steel scrap 5.3 per cent, from \$11,258,000 to \$11,857,000. Iron and steel tubular products formed the only important classification showing a

UNITED STATES IMPORTS FOR CONSUMPTION OF IRON AND STEEL PRODUCTS

Articles	Gross Tons		
	Aug. 1936	July 1936	Jan. thru Aug. '36
Pig iron	12,524	12,496	122,527
Sponge iron	.....	252	1,380
Ferromanganese (1)	1,942	1,386	15,345
Spiegeleisen	5,249	4,011	26,634
Ferrosilicon (2)	18	.....	21
Ferrosilicon (3)	21	28	446
Other ferroalloys (4)	.....	275	426
Steel ingots, blooms	8	.....	69
Billets (5)	125	19	533
Concrete rein. bars	1,012	364	3,085
Hollow bar, drill steel	196	141	1,345
Bars, solid, hollow	3,557	2,453	24,652
Iron slabs	.....	.....	.....
Iron bars	98	116	872
Wire rods	1,722	1,280	12,772
Boiler, other plate	150	.....	202
Sheets, skelp, sawpl.	2,062	1,319	13,918
Die blocks, blanks (5)	42	22	155
Tin plate, taggers' tin, terne plate	.....	5	140
Structural shapes	7,264	3,233	35,924
Sheet piling	81	1,024	2,151
Rails, fastenings	542	859	4,947
Cast iron pipe, ftgs.	59	113	298
Mall. iron pipe ftgs.	23	50	93
Welded pipe	546	452	3,755
Other pipe	3,384	1,908	13,981
Cotton ties	601	777	1,466
Hoops, bands	2,683	2,000	15,599
Barbed wire	1,038	949	11,206
Round wire	530	464	3,330
Teleg. and tele. wire	1	1	35
Flat wire, strips	283	172	1,933
Wire rope, strand	171	220	1,620
Other wire	180	124	1,007
Nails, tacks, staples	1,818	1,659	16,280
Bolts, nuts, rivets	94	57	386
Horse, mule shoes	28	20	259
Castings, forgings	127	101	783
Total gross tons	48,179	38,350	339,575
Iron and steel scrap	12,518	9,590	88,207
GRAND TOTAL	60,697	47,940	427,782

(1) Manganese content; (2) chrome content; (3) silicon content; (4) alloy content; (5) new classes. No comparable figures for previous year.

loss for the period, declining 23.2 per cent, from \$5,233,000 to \$4,019,000.

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Articles	Gross Tons		
	Aug. 1936	July 1936	Jan. thru Aug. '36
Pig iron	320	125	1,369
Ferromanganese, spiegeleisen	44	48	318
*Other ferroalloys	668	107	1,816
Ingots, blooms	1,303	4,215	12,401
Bars, iron	34	98	788
†Bars, concrete	562	471	2,374
†Bars, other steel	4,169	3,929	32,534
Wire rods	2,533	2,132	25,596
Boiler plate	502	190	2,289
Plate, not fab.	6,740	6,587	41,422
Skelp	5,675	3,419	27,456
Iron sheets, galv.	211	168	1,061
Steel sheets, galv.	4,072	3,781	36,273
Steel sheets, black	7,115	16,088	88,990
Iron sheets, black	738	536	5,169
Strip, cold rolled	1,338	1,304	14,818
Strip, hot rolled	3,568	4,748	25,525
Tin plate, tag'rs' tin	14,641	16,010	162,357
Terne plate	77	301	2,478
Tanks, except lined	1,939	1,283	15,990
Shapes, not fab.	5,226	5,644	36,443
Shapes, fab.	920	640	10,797
Plates, fabricated	300	115	2,334
Metal lath	40	58	640
Frames, sashes	39	52	557
§Sheet piling	146	59	1,745
¶Rails, 60 lb. & over	11,768	5,145	46,645
¶Rails, under 60 lb.	358	62	4,745
Rail fastenings	1,153	445	5,219
Switches, frogs, etc.	260	315	1,147
Railroad spikes	318	154	1,694
R. R. bolts, nuts	122	52	500
Boiler tubes, seamless	765	674	4,152
Do welded	19	46	300
Casing and oil-line pipe, seamless	2,367	1,374	11,804
Do welded	264	422	1,740
Seamless blk. pipe, other than casing	402	298	2,502
Mall. iron screwed pipe fittings	232	286	2,152
Cast iron screwed pipe fittings	186	196	1,356
Cast iron pressure pipe and fittings	2,482	1,964	7,839
Cast iron soil pipe and fittings for	878	495	3,896
Welded steel pipe	942	1,042	7,139
Welded black pipe	192	277	1,482
Welded galv. steel pipe	472	1,377	6,020
Welded galv. wrt. iron pipe	47	255	1,029
Riveted iron, steel pipe and fittings	39	176	711
Iron or steel wire	1,839	1,439	15,933
Galvanized wire	1,425	2,263	13,661
Barbed wire	2,443	3,058	20,280
Woven wire fencing	133	309	1,608
Woven wire screen	65	134	705
Wire rope	151	291	2,126
Other wire and mfrs.	444	460	3,258
Wire nails	431	772	5,205
Horseshoe nails	77	58	450
Tacks	34	31	225
Other nails, staples	212	141	1,514
Bolts, etc.	492	464	4,080
Iron castings	651	455	4,903
Steel castings	241	374	2,064
Car wheels, axles	687	1,294	4,867
Horseshoes, calks	6	3	72
Iron and steel forgings, n. e. s.	175	224	2,718
Total gross tons	95,692	98,933	749,281
Iron & steel scrap	194,600	192,817	1,437,690
Tin plate scrap	1,082	1,195	11,102
Waste-waste tin pl.	3,967	3,793	25,597
Total gross tons	199,649	197,805	1,474,389
GRAND TOTAL	295,341	296,738	2,223,670

*New class. No comparable figures for previous year.
 †New class. Previously included under former classification "steel bars."
 ‡New class. Includes alloy, nonalloy and stainless steel bars (excepting concrete reinforcement bars).
 §New class. Previously included with "frames and sashes."
 ¶Previously shown at "50 pounds."

Enameling, Welding Groups Prepare for New Markets

PREPARATION for increased business in 1937 was the keynote of the sales conference and sixth annual meeting of Porcelain Enamel institute, in Cleveland, Oct. 1 and 2.

An optimistic view was taken by the speakers who pointed to new fields opening for the porcelain enamel industry. Prospects in the architectural market were indicated as particularly promising in this country and abroad.

Advertising men outlined their campaigns for the next year and stressed the need for a co-ordinated effort to capture the new markets. Definite plans for increasing the industry's co-operative advertising for 1937 were proposed. An index of the growing interest in porcelain enamel was revealed when it was shown



R. G. Calton

that the returns from the institute's direct mail advertising had been in excess of 25 per cent.

The importance of technical research was referred to, with special emphasis on the improvement of porcelain enamel to withstand long outdoor life, development of standard tests for acid and abrasion resistance, solution of metallurgical problems, and many others. A proposal was made to appropriate funds to hire a technician to work with the bureau of standards on problems of general interest to the industry.

Budgets were increased for the various branches of the institute in some cases to almost double the 1936 amounts.

George P. MacKnight, secretary, in summarizing the activities for

1937 defined the institute's job as follows: (1) Co-ordination of all the industry's activities; (2) to spread the gospel of porcelain enamel by dissemination of publicity and general educational information, service to members, service to members' customers, consultation with users and prospective users of porcelain enamel; (3) protection of the industry against unfair competition and from the competition of other industries; (4) interpretation of legislation affecting the industry; and (5) giving intelligent service to inquiries received for information on porcelain enamel.

R. G. Calton, Tennessee Enamel Mfg. Co., Nashville, Tenn., was re-elected president of the institute, as was reported in STEEL, Oct. 5, page 23.

Discuss Architectural Field

Bennett Chapple, vice president, American Rolling Mill Co., Middletown, O., presided at the architectural forum, which was the closing event of the annual meeting.

Members of the industry whose companies have been engaged in developing this new market, presented information regarding their construction methods and indicated their willingness to co-operate in making the institute's office a clearing house for all types of information on the use of porcelain enamel for building purposes. The institute office was instructed to gather all available information on architectural porcelain enamels with the view to the preparation of a technical handbook for use in the industry.

Open Electric Welding Development Bureau

REALIZING the need for co-operative development of industrial applications of the electric welding process, the electric welding section of the National Electrical Manufacturers' association has established development headquarters in the Frick building, Pittsburgh.

The section has initiated a program to investigate the electric welding market and determine the possibilities of extending it. In this special attention will be given to application engineering, including: The preparation of reliable information on cost savings through the use of

electric welding; preparation of material for the use of and co-operation with construction engineers, designers and architects; direct promotion of electric welding by missionary work on important new or undeveloped application.

It has been estimated by the section that by securing the widest possible adaptation of applications which have been definitely successful, the use of electric welding in the metal fabricating industries can be increased at least four-fold.

H. S. Card, formerly editor of *The Welding Engineer*, and author of "The Welding Industry," has been



H. S. Card

appointed development director of the section and is now in charge of the Pittsburgh office.

Exhibit Iron Alloys This Week in Pittsburgh

Research projects fostered by the Engineering Foundation will be illustrated in an exhibit to be held at the William Penn hotel, Pittsburgh, Oct. 14-15, in connection with the fall meeting of the American Society of Civil Engineers. The work of the iron alloys and welding research committees of the foundation will be shown. The exhibit will be in charge of Frank T. Sisco, editor of the iron alloys committee, who will also participate in the discussions of the papers presented before the symposium on structural application of steel and light alloys.

Expect Rise in Shipments

A 25 per cent increase in shipments of coal and coke and a 15 per cent increase in iron and steel products during the last quarter are expected in reports to the Southeast Shippers' Advisory board.

Men of Industry

J H. McELHINNEY, formerly general superintendent of Lukens Steel Co., Coatesville, Pa., has been made assistant to vice president of Wheeling Steel Corp., Wheeling, W. Va. Mr. McElhinney was graduated from the University of Pittsburgh in 1909, and in 1911 entered the employ of the United Engineering & Foundry Co., joining Youngstown Sheet & Tube Co. two years later. After service in the World war, he was identified with the Columbia Steel Co. as consulting engineer, went with Lukens in 1926 and had been general superintendent from 1929 to recent date. (See STEEL, Sept. 14, page 28).

Henry D. Scott, for a number of years identified with the operating department of Wheeling Steel Corp. until a few years ago when he left to organize Sharon Tube Co., Sharon, Pa., has returned to the Wheeling Steel Corp. to become executive assistant.

George W. Hewitt has been appointed director of the raw materials division of Wheeling Steel. All three executive changes come with the announcement of the resignation of Parker F. Wilson, who had been assistant to the president.

Lawrence V. Calhoun, recently purchasing agent for the Pettibone Mulliken Co., Chicago, has become associated with Erman-Howell & Co. Inc., Chicago, dealer in iron and steel scrap.

H. B. Pulsifier, metallurgist, American Steel & Wire Co., Cleveland, and prior to that metallurgist with the Ferry Cap & Set Screw



Carl E. Crawford

Who has been appointed general superintendent of the Shenango division of Carnegie-Illinois Steel Corp., succeeding Mr. Pyle, as announced in STEEL, Oct. 5

Co., Cleveland, for eight years, has been appointed director of the district laboratory of American Steel & Wire at Cleveland.

J. C. Nierath, identified with the Kilby Mfg. Co., Cleveland, for 44 years, the last 20 of which he has been its vice president and treasurer, has been elected president, succeeding the late John H. Francis. E. H. Gehlbach, formerly cashier, has been elected secretary and treasurer.

Frank P. McEwen, formerly southern sales manager of Oliver



Frank P. McEwen

Iron & Steel Corp., has been appointed assistant manager of sales, with headquarters in Cleveland, of the Upson division of Republic Steel Corp.

Albert Schnaitman has been named manager at Dayton, O., for Warner & Swasey Co., Cleveland, succeeding Walter L. Loegler who has been appointed manager of the Chicago office of the company. Mr. Schnaitman joined the company in 1928, and recently has been with the Dayton office.

E. J. Ash, formerly engaged in government work at the naval gun factory and Watertown arsenal, Watertown, Mass., has been appointed to the faculty of the University of Michigan, Ann Arbor. Mr. Ash has been active in technical work of the American Foundrymen's association.

Vincent Delpont, European manager of STEEL, and manager of the Penton Publishing Co. Ltd., Caxton House, London, England, and European representative of the Amer-

ican Foundrymen's association, was elected president of the International Committee of Foundry Technical associations, at the recent International Foundry congress at Dusseldorf.

Leon H. A. Weaver, formerly publicity manager of the Superheater Co., New York, has joined the sales and advertising department of the Green Fuel Economizer Co. Inc., Beacon, N. Y.

Horton Penrose has been appointed sales manager of the Struthers Iron & Steel Co., Struthers, O. Mr. Penrose is widely known in the pig iron trade and he formerly represented Shimer & Co., Philadelphia, at Pittsburgh for some years. Later he was a pig iron salesman for Cleveland, Cliffs Iron Co., Cleveland, and more recently he sold pig iron and coke from his own offices in the Rockefeller building, Cleveland.

Robert C. Enos, formerly vice president of the Eaton Axle Co., and president of the Tobenson Axle Co., has been elected president and general manager of the Standard Steel Spring Co., Coraopolis, Pa. Mr. Enos has been holding the title of liquidator for the company since the strike at the Coraopolis division which began Aug. 17.

D. T. Gleason, formerly president of the Standard Steel Spring Co., has been transferred to Gary, Ind., as vice president in charge of the company's plant there.

W. F. Hueston, assistant treasurer, has been elected treasurer.

Samuel Epstein, until recently associated as research metallurgist with Battelle Memorial institute, Columbus, O., and prior to that ac-



David S. Pyle

General superintendent of the Shenango and New Castle plants of Carnegie-Illinois Steel Corp., who retired from active service Oct. 1, as noted in STEEL, Sept. 21

tive with the national bureau of standards and the research staff of Illinois Steel Co., Chicago, is now affiliated with the research and development department of Bethlehem Steel Co., Bethlehem, Pa.

Carl B. Rex, formerly with the Caterpillar Tractor Co., Peoria, Ill., has resigned to join the metallurgical department of Jones & Laughlin Steel Corp., Aliquippa, Pa.

George M. Bucher, president and general manager of the Westinghouse Electric International Co., has been named executive vice president of Westinghouse Electric & Mfg. Co., and will make his headquarters in Pittsburgh. He has been connected with Westinghouse enterprises since 1909 and has been iden-



Douglass G. Buchanan

Appointed general superintendent of the Vandergrift works of Carnegie-Illinois Steel Corp., succeeding W. L. Goodhue, as noted in STEEL, Oct. 5. He was graduated from Sheffield Scientific school, Yale university in 1917

tified chiefly with the company's export department since 1911.

Frank Burgan, representing the small tool division of the Ingersoll Mining Machine Co., Rockford, Ill., is now also covering the northeast section of Ohio, succeeding Henry P. Boggis & Co., Cleveland.

Paul E. Gerdes has left the Ferro Enamel Corp., Cleveland, to join the staff of the Cleveland-Tennessee Enameling Co., Cleveland, Tenn. He will have charge of porcelain enamel control.

C. E. Chatfield has been appointed by Delta-Star Electric Co., Chicago, as sales representative in Indiana, with headquarters at 503 Illinois building, Indianapolis.

D. A. Roberts, formerly with the W. E. Mowry Co., St. Paul, and E. E. Slowter, formerly with the Pitts-



Walter L. Loegler

Formerly in charge of the Dayton, O. territory for the Warner & Swasey Co., Cleveland, who has been appointed manager of the Chicago office of the company, succeeding G. Kochenderfer, resigned. He has been associated with Warner & Swasey since 1912

burgh Plate Glass Co., have joined the staff of the Battelle Memorial institute, Columbus, O. Mr. Roberts will work on various phases of research in metallurgy, and Mr. Slowter will engage in research in the chemical industry.

Died:

WILLARD FULLER, 75, former superintendent of the Upson Nut Co., at Chagrin Falls, O., Oct. 4. He was a brother of H. A. Fuller, of Bourne, Fuller & Co., and when the latter company took over the Upson plant, Willard Fuller returned from Lorain, O., where he had been blowing a blast furnace, and became manager of the Upson works. There he remained until shortly before the plant was absorbed by Republic Steel Corp.

Wilbert H. Everhart, acting superintendent of blast furnaces for Republic Steel Corp., Cleveland, in Cleveland recently. He had been with the Corrigan, McKinney Steel Co. for 30 years, rising from water boy to become superintendent of the furnaces at Scottdale, Pa. He later went to Cleveland and was connected with Republic when the two companies merged.

Charles Spoeneman, 75, president, Enterprise Foundry Co., Belleville, Ill., in that city, Sept. 24.

E. E. Linthicum, 70, founder and president, National Cast Iron Pipe Co., Birmingham, Ala., in Birmingham, Sept. 29. Mr. Linthicum was a leader in church and philanthropic work in the city and was one of the pioneers in the Birmingham iron

and steel industry. He was vice chairman of the board of James B. Clow & Sons Co., Chicago, of which National is a subsidiary.

Parker Sloane, 64, long interested in the manufacture of iron alloys, who built a large electrometallurgical plant at Niagara Falls, N. Y., which was later absorbed by the Vanadium Corp. of America, in New York, Oct. 3. He was a director of the Vanadium Corp. of America, a member of the corporation's executive committee and president and an organizer of the Roosevelt Savings bank, Brooklyn, N. Y.

Charles Fenton Kintzing, 55, president, Essex Wire Cloth Co., Belleville, N. J., in that city, Sept.



Col. A. W. Wyckoff

President and founder of Wyckoff Drawn Steel Co., Ambridge, Pa., who died in Pittsburgh, Sept. 25, as reported in STEEL, Sept. 28, page 31

29. Mr. Kintzing established the Essex company about 15 years ago, having previously been affiliated with the Rogers Wire Works in that city from 1914 until it went out of business.

Otto E. Fricke, 49, auditor for 20 years for the Tennessee Coal, Iron & Railroad Co., Birmingham, Ala. in Birmingham, Sept. 29.

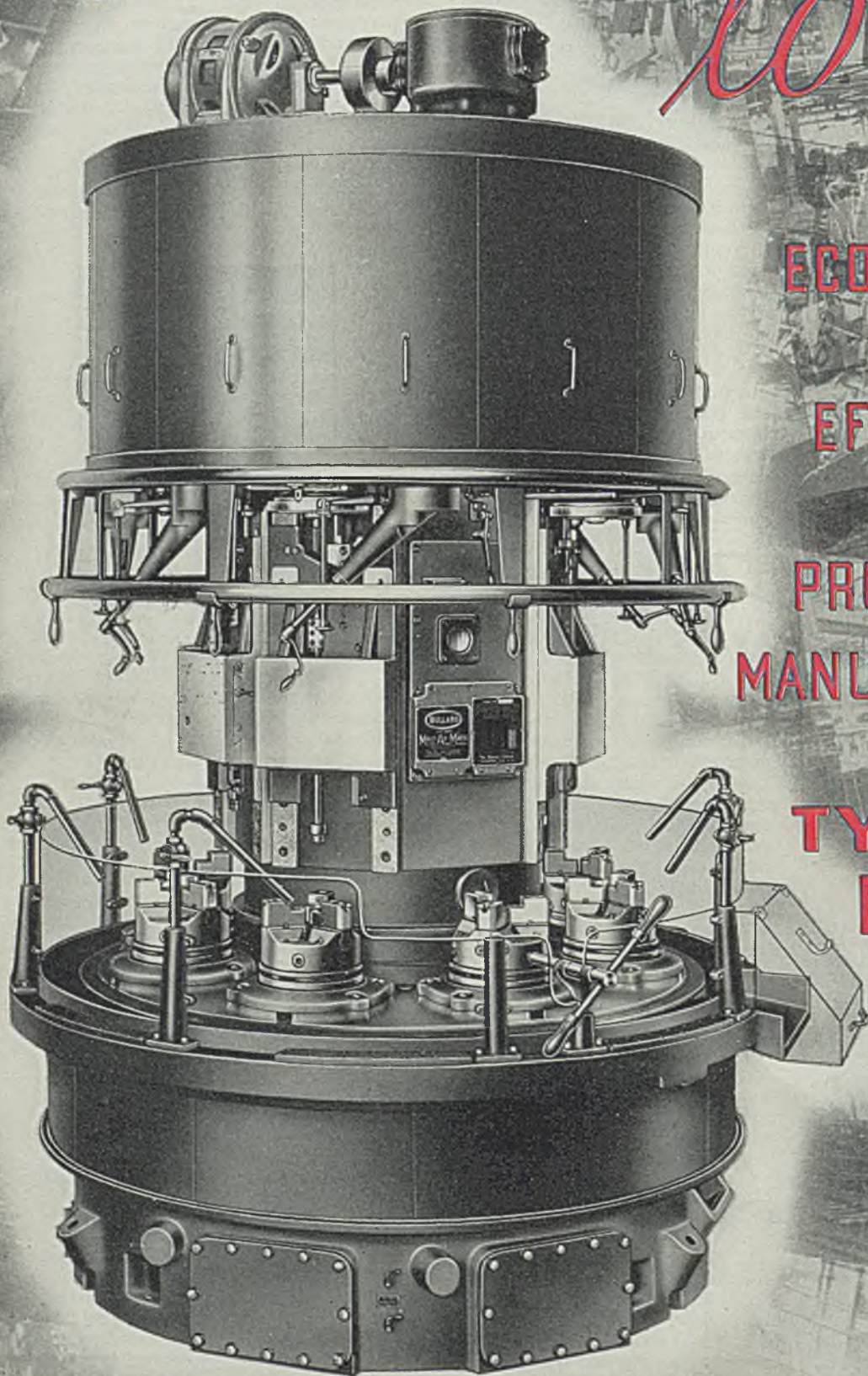
William H. Dreher, 79, former vice president, Acme Fence & Iron Co., Cleveland, in Savannah, O., Sept. 23. He retired in 1931.

Frederick H. Lueders, sales representative, Seybold division, Harris-Seybold-Potter Co., Dayton, O., in Dayton, Sept. 23

Adolph J. Gaehr, 63, president, George Worthington Co., Cleveland, hardware jobber, in Cleveland, Oct. 5. He was successively office boy, cashier, secretary, vice president and in 1930 became president of the company.

Industries Answer

to



MORE
ECONOMICAL
•
EFFICIENT
AND
PROFITABLE
MANUFACTURING

•
TYPE D
MULT-
AU-
MATIC



DETROIT

HOLDING first place has been a sweet plum this year to Chevrolet, but the Chevrolet board of strategy has been concerned lately over how to carry that lead into early 1937 at least.

In this period of transition to new models the sales department has plugged hard on the field men to line up as many advance orders as possible. The plan will be to have these on tap as the new lines come out, and the general sales department wants 100,000 so-called "preferred orders" sure between Oct. 1 and announcement date.

The second step in this plan is to deliver 50,000 models simultaneously on the day the new 1937 Chevrolet is announced. This day, incidentally, will be Nov. 7. Carrying both of these plans through successfully might well mean the jump on Chevrolet's arch rivals, Ford and Plymouth. For one thing, getting 50,000 new 1937 models out on the street in the hands of private owners would be a brilliant maneuver.

In appearance the 1937 Chevrolet is reminiscent of its predecessors, though the 1937 lines are built around a changed front-end. Wheels are larger, now being 17-inch, and wheelbase has been lengthened moderately. The "standard" model as a name has been dropped and now there is the "de-luxe master" and the "conventional master."

Many Features Carry Over

The motor, an overhead valve type, is 5 horsepower greater than in 1936. A fuel selector is adjustable with a threaded nut-type gage. The oil filter is now on the right side instead of the left, making it more accessible, as it is removed from proximity to the carburetor.

No-draft Fisher ventilation is carried over, also hydraulic brakes and knee action. Hypoid rear-axle gears are standard, however, and a novelty for 1937 permits the body to set closer to the road. Bodies are also slightly wider, although standard width running boards are maintained. Steel top is a carry-over. Frames in both lines for 1937 are the box-girder type construction.

Inside the car, a new version of the control panel has been made, the

design being close to the type used in the 1936 Buick. Two vertical chromium bands, each made up of three segregated parts, form a narrow center section of the instrument panel, the luggage compartment being on the right, speedometer and other dials to the left. Steering wheel remains with three spokes.

A heavier felt backing to the front rubber floor mat has been adopted and upholstery finish is better styled. "Toe-room" has been given for the rear seat passengers by a cut-out from the bottom back section of the front seat.

Chevrolet added up all the figures last week and came forth with the statement that to build this 1937 model approximately \$26,000,000 had been spent for retooling, new machinery and plants.

The Flint division spent \$10,000,000, plants in metropolitan Detroit ran through \$6,000,000 and the Saginaw, Mich., division where the foundry operations center, spent \$2,000,000.

Assembly Lines Start

The parts plant at Muncie, Ind., and the commercial car plant at Indianapolis each took \$2,000,000 for improvements. The Bay City, Mich., plants sent home bills for \$500,000, an amount also spent by several other departments, including Janesville, Wis.

The main assembly lines at Flint have started to turn over, although as just related, the new car won't be out until Nov. 7. Before that time, nevertheless, some 10,000 dealers have to be stocked, not to forget retail orders that have come through for the car, "sight unseen."

At Ford, work on the 1937 lines has been progressing favorably since Oct. 5, date of somewhere around the third week of the month is favored for introduction. To summarize, and what may include some prementioned details, the 1937 V-8 has an all-steel roof, an all-steel single-piece floor, a front-end radiator bearing family resemblance to the Lincoln-Zephyr and a considerable reduction in total weight.

Experiments on weight-saving in the motor block apparently may be made if not immediately, sometime

during the 1937 model season. Ford has a habit of making changes during the season. In passing, it may be mentioned that 11 major changes were made in the 1936 lines, as they were perfected, and placed on production jobs at various times through the past year.

Weight-saving in the motor block, estimated to clip off some 30 pounds, will be adverse to pig iron, but will give stainless steel a break. A stainless plate, 400 square inches in area, as a water jacket, is welded on the block. Experiments of this nature have been going on for over two years.

In the bodies, 19 and 20-gage sheets replace 18-gage in as many Ford instances as possible. This is a further increment to weight saving.

As the new V-8 is being held behind the scenes in its last stages, Ford dealers have started an ambitious used-car sale for the month of October. This has a goal of finding new owners for 150,000 used cars and trucks, and it is the first time Ford dealers en masse have conducted such a sale.

The Ford name was made prominent last week through sponsorship of the radio broadcast of the World Series, but at the week's close Ford obtained further attention through announcement of the Lincoln-Zephyr.

Refinements in New Zephyr

Refinements to this "first anniversary" model center around a sharper-nosed radiator grille with defined horizontal chromium strips, a new type luggage compartment, a new instrument panel and grille screening both car heater and radio.

Four body types, including a new three-passenger coupe, are offered. The luggage compartment in each is now reached through the rear-deck hatch. The wheelbase and spring base at 122 and 133 inches, respectively, are unchanged.

The most striking feature of the new Zephyr interior is the instrument panel design, made up of an enclosed grille reaching down to the top of the transmission housing and designed to screen installation of a car heater and radio. Both panel

and grille are finished in the body color.

The four body types include a two and four-door sedan, both carry-overs, a three-passenger coupe and a town limousine. But mechanically, outside of a new steering system, the Zephyr is unchanged. The V-12 motor with 100 horsepower continues with 2 3/4-inch bore and 3 3/4-inch stroke.

Brakes, and this likely is a tip-off on what the Ford V-8 lines for 1937 will have, are the same in the Zephyr, or are still mechanical of the two-shoe energizing type and cable-controlled. Brake drums are cast iron with cooling ribs. The pressed-steel artillery-type wheels, carrying 7.00 x 16-inch tires, are the same as in 1936.

With the slogan, "You can go anywhere in a Bantam for the cost of a phone call," American Bantam Car Co. at Butler, Pa., isn't letting Willys get away with anything when it comes to getting back into the picture with a low-cost, low-upkeep automobile.

Last week Bantam had announced its seven 1937 models and named prices ranging from \$335 to \$445, f.o.b. Butler. In fact, the company claimed that "\$95 down and \$6 a week will both pay for and operate a Bantam."

A close resemblance to the old Austin lies in the Bantam's 108-inch overall length, 46-inch tread and 8-inch ground clearance. The 4-cylinder motor, of a 2.2-inch bore and 3-inch stroke, claims to develop 20 horsepower at 4000 r.p.m.

Claims Orders for 19,107 Cars

The Bantam, claiming 45 to 50 miles per gallon of gasoline and advance dealer orders for 19,107 cars, likely will stress its two quarter-ton truck models. It has five passenger jobs also. One of the trucks is a pick-up, the other a panel model. Each is suitable for small package deliveries.

The Bantam's specification sheet goes on to detail that it has both cast nickel crankshafts and pistons, chrome-nickel H-section connecting rod and one-piece forged valves. The camshaft is also cast nickel steel.

Brakes are cable-drawn mechanical. Transverse springing is leaf type and the channel side-rail frame has four cross members. Pressed steel wheels are standard but a larger diameter is optional. Gas tank capacity is five gallons; oil, one gallon, and water, six quarts.

Production against dealer commitments of 19,107 Bantams is slowly

Automobile Production

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

	1934	1935	1936
Jan.	155,666	289,728	364,004
Feb.	230,256	332,231	287,606
Mar.	338,434	425,913	420,971
Apr.	352,975	452,936	502,775
May	330,455	361,107	460,565
June	306,477	356,340	452,955
July	264,933	332,109	440,999
Aug.	234,811	237,400	271,291
Sept.	170,007	87,540	*119,073
9 mo. ...	2,384,014	2,875,304	3,320,239
Oct.	131,991	272,043	.....
Nov.	83,482	395,959	.....
Dec.	153,624	404,528	.....
Year	2,753,111	3,946,934	.....

Estimated by Cram's Reports

Week ended:

Sept. 12	26,750
Sept. 19	33,615
Sept. 26	15,680
Oct. 3	22,800
Oct. 10	*39,945

*Estimated.

getting under way with the ultimate plan to turn out one complete car every five minutes at Butler.

Proceeding somewhat along the theory that a man may be down but never out, Hupp has made another stab at coming back in 1937. There hasn't been a single Hupp assembled in 1936, but if the needed cash for working capital is raised, manufacturing may start again in time for the 1937 season.

Detroit looks on the Hupp case with something of mixed emotions. Pity, first, for the disintegration of a fine old name in making automobiles, but secondly, exasperation at the moves of the management in the recent past.

Three Plants Sold

Developments last week found Hupp performing like the family that burned up its furniture, stick by stick, to keep warm. Three of the four Cleveland plants belonging to Hupp and once owned by the long-extinct Cleveland and Chandler cars, were sold for the cash they would bring. The sale involved more than 500,000 square feet of factory space.

In the same vein, Hupp has leased out part of the engineering building in Detroit to Goodyear, and storage space at the same division to Packard. Both boarders bring a little cash into the coffers.

Speaking of Packard, a stepup in schedules came through last week. Assemblies at 2650 units were up

sharply from the 2000-per-week level through September. Currently, Packard is working six full days a week with production about 250 sixes per day, plus 150 "120's" and 30 super eights and twelves.

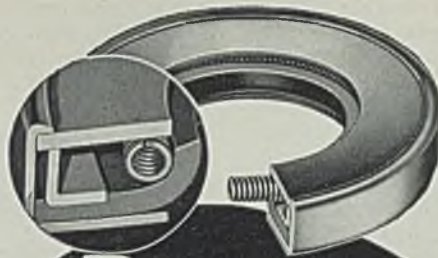
The jack-up to the Packard schedule a week ago was to let in 1500 additional "120's" and 200 more twelves and large eights per month.

New Division Established

Pontiac has established a new territorial division known as the Jacksonville, Fla., zone. . . . Studebaker has already made more than 13,000 of the 1937 jobs. . . . When Lincoln announced its Zephyr last Saturday, it disclosed more than 15,000 sales on the 1936 line since it was brought out in early November, 1935. . . . Charles Hayden, long a director of Mack Trucks Inc., has been elected board chairman. . . . Ford, which had quite a large die program develop in September on small dies, has about completed receipt of the finished business. . . . Packard claims to have an unfilled order backlog for 13,335 cars, even though it shipped 10,161 units in September, a new all-time monthly high. . . . There are now 16 makers turning out cars on the 1937 lines, compared with six two weeks ago. . . . When Chrysler Corp. said it "would drop a car under the Chrysler name into the low-priced field" last week, what it doubtless meant was that its cheapest model, the Airstream six, likely would be shaved in price from the present \$805 list. . . . A bank of \$3,000,000 in unfilled orders was reported by the Toledo Machine & Tool Co., Toledo, O. . . . With buying of materials now a full 60 to 90 days ahead on the part of the automobile industry, it begins to seem that fully 25 per cent of all the 1937 models will be made up in the final quarter of 1936. . . . About 4000 men at Ford's Edgewater, N. J., plant will be back at work around Oct. 15 after two-week's shutdown for inventory.

National Can-McKeesport Tin Plate Merger Proposed

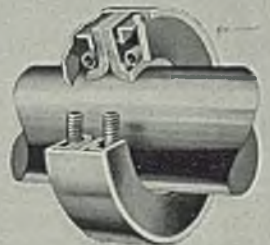
National Can Co. directors last week declared a 33 1/3 per cent stock dividend payable to stock of Oct. 6 record, and also voted, subject to the approval of stockholders, to merge the company with McKeesport Tin Plate Co., which already owns 65 per cent of the National Can Co. stock.



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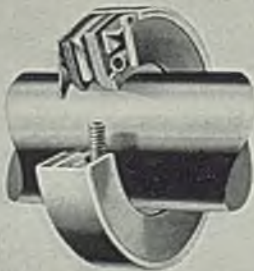


"PERFECT"



DOUBLE FLANGE

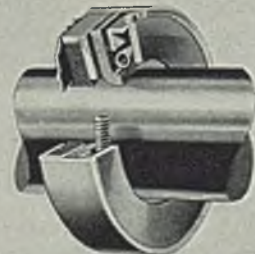
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Activities of Steel Users and Makers

EMPIRE FINISHED STEEL CORP., Newark, N. J., has recently been organized with \$500,000 capital stock, to manufacture a complete line of cold-finished steel bars.

Officers are: Chairman of the board, Ned G. Begle, who is now president of Berst-Forster-Dixfield Co., maker of wooden ware, paper, matches, etc.; president and treasurer, J. J. Komara, organizer, and for the past ten years vice president and general manager of Keystone Drawn Steel Co., and before that was identified with Wyckoff Drawn Steel Co., Columbia Steel & Shafting Co., Carnegie Steel Co. and Republic Steel Corp.; vice president and general manager, Henry J. Bauman, for the past ten years general superintendent of Keystone Drawn Steel Co.; secretary and assistant treasurer, A. J. Bowen, at present with Berst-Forster-Dixfield Co.; general superintendent, S. H. Bauman, for the past 20 years general master mechanic of Columbia Steel & Shafting Co.

Capacity of the company is 1500 tons per month, single turn.

Edwards Homemobile Corp. has been established at South Bend, Ind., for the production of house trailers. The plant is expected to employ 500 men within a few months. W. Howard Edwards is president.

Gould Coupler Corp., Rochester, N. Y., has acquired the entire business of the Gould Coupler Co., subject to outstanding obligations and commitments of the receivers and trustees of that company. No change will be made in policies, management or business operations.

W. G. Nichol Co., Milwaukee, manufacturer of machine tools and supplies, presses, brakes, shears, die sets and accessories, has changed its name to Nichol Machinery Co., effective Nov. 1. The change involves no revision in management or location and is made to identify the company more closely with the products it markets.

Great Lakes Foundries Co-operative has been incorporated in Milwaukee to take over and operate the idle plant of the Great Lakes Malleable Co. at 1839 First street. The co-operative type of organization was adopted in preference to other forms to insure freedom from labor trouble and an equitable dis-

tribution of profits among the employees, according to John W. Sanders, president. A new building is being erected to house a cupola and blower and new processing machinery has been purchased. Other officers of the new firm are Herman Fleishour, vice president and superintendent, and Edward J. Tarkowski, secretary and treasurer.

Leeds & Northrup Co., Philadelphia, has opened an office at 422 Chamber of Commerce building, Boston, staffed for consulting and sales engineering service to companies having problems of instrumentation in manufacturing processes, laboratories, power plants or educational institutions. A complete line of measuring, recording and controlling instruments, as well as electric heat treating furnaces, will be handled through this office.

Universal Steel Co., Bridgeville, Pa., and Cyclops Steel Co., Titusville, Pa., have been merged to form the Universal-Cyclops Steel Corp. The Universal plant at Bridgeville and the Cyclops plant at Titusville will each continue to function as before. The management and policies of the former companies will be continued by the surviving corporation, with general offices at Bridgeville. These companies have been closely associated in all activities for several years and this formal unification will tend to improve the service of both divisions.

1936 Ingots Pass Full 1935 Output

WITH production of 33,605,304 gross tons of steel ingots in nine months, 1936 has made 187,319 tons more than 12 months of 1935, according to the statistics of the American Iron and Steel Institute. All production of fourth quarter will add to this excess over last year. Compared with the 24,051,412 tons produced in the first three quarters of 1935 the increase is 39.6 per cent.

In spite of the partial shutdown for Labor Day September production was only 34,022 tons less than in August, a decline of 0.81 per cent. The daily rate in September was 160,043 tons, compared with 161,351 tons in August. The per cent of operation in September was 72.92, in August 73.52.

All comparisons with the record of 1935 accentuate understanding of the decisive step forward taken by the steel industry in 1936. Average rate of operation for three quarters of 1936 is 65.44 per cent, contrasted with 46.63 for the comparable period of 1935. Daily rate of production in 1936 has averaged 143,612 tons, and in the same period of 1935 it was 103,225 tons.

Official figures of the Institute make the situation even better than the estimate and forecast in STEEL, Oct. 5, page 14, although the latter figures were close to the actual totals.

Steel Ingot Statistics

1936	Monthly Production—Complete for Bessemer; Open Hearth, Calculated from Reports of Companies Making 98.03 per cent						daily production, all	Number of companies (gross working tons)	Number of days
	—Open Hearth—		—Bessemer—		—Total—				
	Gross tons	Per cent of capacity	Gross tons	Per cent of capacity	Gross tons	Per cent of capacity			
Jan.	2,849,557	53.73	196,389	31.54	3,045,946	51.40	112,813	27	
Feb.	2,761,973	56.25	202,445	35.11	3,964,418	54.03	118,577	25	
March	3,157,579	61.83	185,040	30.86	3,342,619	58.58	128,562	26	
April	3,637,479	71.23	304,775	50.83	3,942,254	69.09	151,625	26	
May	3,744,161	73.32	302,092	50.38	4,046,253	70.91	155,625	26	
June	3,649,948	71.47	334,897	55.85	3,984,845	69.83	153,263	26	
July	3,596,125	70.42	326,606	54.47	3,922,731	68.74	150,874	26	
Aug.	3,844,570	75.28	350,560	58.47	4,195,130	73.52	161,351	26	
Sept.	3,858,060	75.55	303,048	50.54	4,161,108	72.92	160,043	26	
9 mos.	31,099,452	67.67	2,505,852	46.44	33,605,304	65.44	143,612	234	
1935									
Jan.	2,630,303	49.70	239,858	34.99	2,870,161	48.02	106,302	27	
Feb.	2,549,935	54.21	224,336	36.82	2,774,271	52.22	115,595	24	
March	2,634,482	51.70	230,810	34.97	2,865,292	49.78	110,204	26	
April	2,408,686	47.27	231,916	35.14	2,640,602	45.88	101,562	26	
May	2,378,865	44.95	254,796	37.17	2,633,661	44.06	97,543	27	
June	2,048,177	41.80	210,487	33.17	2,258,664	40.81	90,347	25	
July	2,043,371	40.10	224,456	34.01	2,267,827	39.40	87,224	26	
Aug.	2,682,569	50.69	223,361	34.05	2,915,930	48.78	107,997	27	
Sept.	2,591,267	52.88	233,737	36.83	2,825,004	51.04	113,000	25	
9 mos.	21,967,655	48.10	2,083,757	35.23	24,051,412	46.63	103,225	233	
Oct.	2,872,040	54.27	270,719	39.50	3,142,759	52.58	116,398	27	
Nov.	2,898,246	56.87	252,163	38.20	3,150,409	54.73	121,170	26	
Dec.	2,845,013	58.06	228,392	35.99	3,073,405	55.53	122,936	25	
Total	30,582,954	50.17	2,835,031	35.91	33,417,985	48.54	107,453	311	

Capacity percentages for 1935 are based on open-hearth capacity of 60,954,717 gross tons and bessemer of 7,895,000 gross tons on Dec. 31, 1934; for 1936 on open-hearth capacity of 61,280,509 gross tons and bessemer of 7,195,000 gross tons, as of Dec. 31, 1935.



WINDOWS OF

WASHINGTON

DISCUSSION of the Walsh-Healey government contract bill and the Robinson-Patman price discrimination bill continues hot and heavy here, particularly among Washington representatives of business and industrial interests. Rarely has any law been passed that has caused as much talk and difference of opinion among these representatives as enactment of these two acts.

The latest theme is of the possible conflict between them. There is plenty of talk of the unconstitutionality of both or either of them. There seems to be rather a consensus that at least parts of the Robinson-Patman act will stand court tests and it is interesting to note how anxious everyone is to get a typical case into the courts for adjudication.

In government contracts now coming through, that is since Sept. 28, when the Walsh-Healey bill became effective, there is a provision or stipulation in regard to the act. It provides for the 40 hour week but wages are not mentioned in any contracts that have yet come to attention.

Dispute Open Market Buying

There is much difference of opinion still as to a definition of open market purchases. Officials of the department of labor and business interests are diametrically opposed on this vital question which has caused much controversy.

Officials of the labor department, who are attempting to make some statements about the Walsh law, hold that if employes work any time during the week on a government contract they must be on a 40-hour week. In other words, a man cannot work ten hours on a government contract and then work another 35 hours on some private contract. If he works at all during the week on a government contract, for

that week his time cannot be more than 40 hours. That is the present construction put on the law unofficially by labor department experts. In ruling in this way they say that the Walsh bill was only a compromise anyhow between that bill and a 30-hour a week bill which was pending in congress up to adjournment.

It is reported by some supposed to be in on the "know" that when the labor department regulations were originally drawn they were much more liberal to industry than as they finally emerged. The story is to the effect that the department of justice had a hand in making the more stringent regulations. Whether this is so no government official will admit.

Ask Delay on Regulations

There is a well founded report that some industrial interests have asked Miss Perkins for a stay of 90 days in the effective date of the new regulations. To the time this is written there has been no decision on this matter.

It is also contended by labor departments officials that if sufficiently clear records are kept by a manufacturer that he will not have to keep special records for each person engaged on a government contract. This has been causing much worry to some manufacturers who foresaw in that regulation considerably difficulty and hardship. Decision on all of these matters to date has been unofficial only.

Literally hundreds of question and answer bulletins have been issued by trade association executives in connection with the Robinson-Patman act. Officials of the federal trade commission, administering this law, say that while in most cases the answers are correct that the associations have taken too narrow a view and therefore the opinions are too narrow.

In connection with the Robinson-

Patman bill it is most interesting to note that the fertilizer industry had some trade practice conference rules before the commission for approval. They were submitted long before passage of the Robinson-Patman act and have had long and careful consideration by the commission. A confidential copy of these rules has just become available to some of the fertilizer principals and they find the commission has taken out some of their language and inserted the identical language of some of the sections of the new law.

Fertilizer manufacturers are much up in the air about the whole affair. They have been co-operating closely with the commission but they had no idea that anything of the kind was to be done. They have not yet quite decided what they will do but a spokesman said last week that they were much disappointed at the turn the rules had taken.

Board to Scan Contracts

Dealing with the Walsh-Healey bill Miss Perkins last week announced the establishment of a public contracts board in her department to hold hearings and to make findings upon questions arising under the new act which went into effect Sept. 28 and requires that manufacturers and dealers who make future contracts in excess of \$10,000 with the government shall comply with certain minimum wage, maximum hour and other labor conditions in the performance of the contract.

Pending the passage of special appropriation act the board will consist of three officers of the department, Frank Healy of the office of the solicitor; Hugh L. Kerwin, director of conciliation, and Telfair Knight, counsel for the textile labor relations board. Mr. Healy has been designated chairman. He was formerly head of the government contracts division of the NRA. Of

course this means that Miss Perkins did not get the money to administer the law which she fully expected the President would give her out of some fund or another, especially in view of the attitude taken on the law by the A. F. of L.

Under the terms of the administrative order naming this temporary board the members were charged with the duty of passing upon requests for exceptions and exemptions, establishment of overtime rates, complaints of violations of the act, establishment of prevailing minimum wages, and appeals from the rulings of other agencies.

Determination of minimum wages will be made by industries or industry groups and will be preceded by hearings at which representatives of labor and management will be invited to appear. The board in making such recommendations will also draw upon the panel of employer and employe consultants for technical advice. The secretary is expected to name this panel within a few days.

Up to this time no minimum wage hearings have been scheduled. It has been announced, however, that the clothing industry would probably be the first to be taken up. The department is now making a statistical survey of wages paid in the various branches of that industry.

COLLUSIVE BIDDING PROBE TAKING IN WIDER SCOPE

The so-called collusive steel bidding investigation being made by the department of justice is proceeding according to John Dickinson, assistant attorney general in charge. Mr. Dickinson admits, however, that the task will take much longer than he had expected when it was undertaken at the request of the President.

Mr. Dickinson refused even to guess when he would be ready to make any kind of a public statement or when the work would be ready for some action. On the other hand he frankly admitted that the investigation has taken on broader ground because, in the first place, it was expected the department would look into the alleged collusive bids of four steel companies as pointed out by Secretary Ickes.

The secretary of the interior last week sent additional alleged identical bids to the department of justice for such action as it sees fit. These included steel tubing involving both jobbers and manufacturers and copper cable and wire, including both manufacturers and jobbers.

"These are cases of close collaboration, to use no stronger term," said Mr. Ickes in announcing his action. "The circumstances are a little different, however, than in some

instances of apparent collusive bidding in the past. In each of these new cases, while most of the bids were identical, at least one bidder submitted different and lower figures and both contracts are being awarded." It is expected these last cases will simply be added to what the justice department already has for investigation.

LEWIS SAYS STEEL CAMPAIGN IS FOLLOWING PLAN CLOSELY

John L. Lewis at a press conference here last week stated that the steel organization campaign is proceeding "according to chart, graph and blueprint."

A complete organization is already functioning in all important steel centers, he added. He revealed that the CIO has 175 paid organizers in the field.

Lewis refused to make public the union membership in the steel industry. However he said that in the rubber industry there are 28,000 union members and in the automobile industry 60,000.

There is a "likelihood," he said, that in the near future the movement in the steel industry will crystallize to the point where specific demands will be made upon employers.

Lewis denied reports that there is a movement on foot to bring harmony into the ranks of labor. He made this statement in connection with reported statements of David Dubinsky, head of the women garment workers, that his union might consider a compromise with the A. F. of L. if the latter would go ahead with organization of workers in mass industries.

EXPECT FRENCH TRADE BARS TO BE MUCH MODIFIED

Following action on devaluation of the French franc, that government has now reduced import duties by 20 per cent, in accordance with predictions made in these columns recently. Information received by the state department today indicates no change has been made in existing quotas on iron and steel products, of which we export mostly automobile sheets and plain wire to France. There is a reduction in quota restrictions on some classes of machinery but it is not believed this will have much effect on our trade. The lowered tariff rates were effective as of Oct. 10.

According to information available now tariff reduction on raw materials is 20 per cent, on partly manufactured products 17 per cent and on certain kinds of manufactured products 15 per cent.

It is specifically stated that the cut in tariff rate will apply to many American imports, including those on which there has been a special

unit tax in addition to the regular import duty.

Officials of the state department, who refused to be quoted, have expressed much interest and hope at this move on the part of the French government. They feel, it is reported, that this is just the first step in opening up trade barriers which France has maintained so long.

This tariff cut has been predicted by officials of both the state department and the department of commerce ever since the announcement of the devaluation of the franc although the action was not anticipated so soon after the monetary action.

The interpretation being put on this action by France by financial and trade experts of our government is that it is a first step toward the abandonment of the French longtime foreign trade restrictive policies. It appears to these experts also that this action really allies the French nation with the United States and Great Britain on the principle that an increase in the flow of foreign commerce really depends on the removal of barriers which have been erected by some nations in the form of high tariffs, quotas and exchange restrictions.

AUSTRALIA COMING BACK AFTER DEPRESSION YEARS

Justice Percival Halse-Rogers of the Supreme Court of New South Wales was in Washington last week on his way back to his home and stated that Australia is rapidly coming out of the depression.

"Most of our export trade is in raw materials," he said in speaking of the import restrictions in his country which have particularly hurt the United States. "Since America has become self sufficient and stopped buying things from us, we can no longer buy from her. The last large import was motor cars. Our government put a high tax on American cars during the depression because it felt they were a luxury and the people shouldn't indulge in luxuries at a time of distress."

CROWELL AGAIN HEADS ARMY ORDNANCE GROUP

Brig. Gen. Benedict Crowell of Cleveland, assistant secretary of war and munitions during the world war, has been re-elected president of the Army Ordnance association.

This association is a nation-wide society of civilian executives and engineers pledged to industrial preparedness as one of our country's strongest guarantees of peace. It aims to foster a knowledge of the design and production of ordnance for the army.

Will Roads Lose Short Haul Business Without Fight?

REPRESENTATIVES of the Association of American Railroads have announced proposals for freight rates to take the place of the present surcharges which expire Dec. 31. The new rates will be filed with the interstate commerce commission on Nov. 1. In view of the time required for thorough consideration of the many details involved, it is somewhat doubtful whether the new schedules can be put into effect by the time the present surcharges expire.

Next to labor, transportation is the most important item of expense in the operation of many industrial enterprises. Since freight tariffs are subject to the approval of a government regulatory body, transportation costs are not as flexible as the costs of many other services. Freight rates cannot be altered as readily as wages or salaries, for instance, to meet changes in economic conditions.

For this reason, it would seem desirable that in substituting rate schedules for the existing surcharges, every effort should be made to introduce rates which not only are equitable to shippers but also are in line with policies which are compatible with the future trend of railroad development. In other words, time will be required to draft a scientific rate structure. If the interval between Nov. 1 and Jan. 1 is too short to permit a thorough-going job of ratemaking, it would be far better to postpone the change than to put through hastily drawn tariffs which would cause unnecessary dissatisfaction and confusion.

New Rates—Some Higher, Some Lower—Provide for Differentials Sharply Penalizing Short Haul Traffic

Examination of the proposed rates for materials and products shipped by companies in the iron, steel and metalworking industries shows that in some cases the rates will be higher than those paid at present. On some commodities the new freight charges will be lower. Shippers will be obliged to study the details of the proposals carefully in order to determine their net effect upon their annual freight bills.

In one respect the railroad experts who drafted the proposed rates seem to have followed a uniform policy. In the case of pig iron and of certain items in semifinished and finished steel, the new tariffs represent a decrease from present charges on the long haul but impose an increased transportation cost on short haul shipments. If the railroads have given due consideration to this differential between short

and long haul rates and if their decision to increase the charge for short distance shipments is final, then one may ask in all sincerity whether the roads are voluntarily and knowingly yielding more of their short haul business to the highway trucking companies.

Those who have been in the railroad service long enough to have acquired a real fascination for the work and an ingrained loyalty to efficient railroading cringe every time they see an interurban motor truck and trailer train carrying several small cubes of steel. This feeling is not aroused by any sense of animosity against the trucking interests. Instead it comes from a hope—almost tantamount to conviction—that if the railroads really would put their wits to work effectively, they could devise ways of meeting much of this competition.

Better Service, Lower Rates, Are Rewinning Passenger Traffic; They Will Do Same for Freight

The railroads are enjoying a sharp increase in passenger traffic, due to three factors: People have more money to spend. Fares have been reduced. Service and equipment have been improved. Roads which have been really progressive in the last named respect are enjoying a greater increase in travel than those which have been content to rely upon the first and second factors. In short, the rule "more goods (or services) for less money" has worked for the railroads, even though some of them resisted the idea stubbornly.

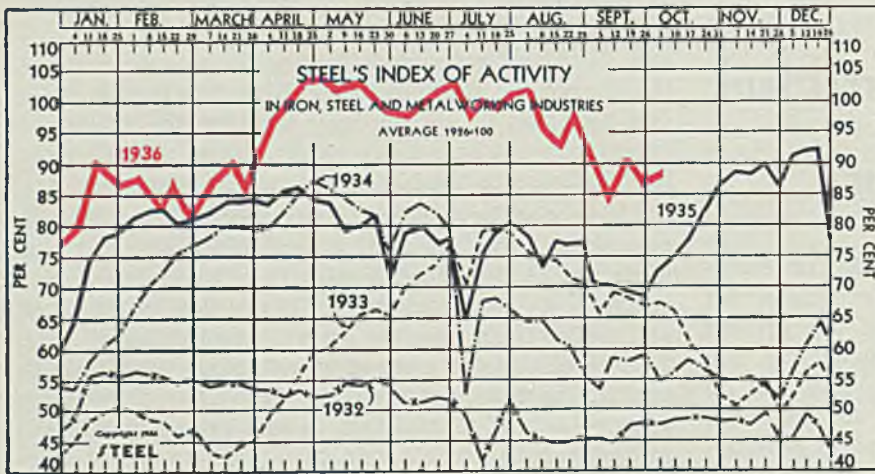
The rule should work equally well if applied to freight traffic. Somehow the roads should be able to give express service for short haul, heavy freight and at rates attractive to shippers. Somewhere, some smart railroader will find a solution for this problem.

That is, he will if given a chance. But if the rates for short haul railroad freight are raised too much, more traffic will be lost to highway trucks and the opportunity for even the most efficient railroads to provide traffic-holding and traffic-winning service will be lost irretrievably.

It is never safe to be dogmatic about the problems of the railroads. The business of rail transportation is complicated by numerous restrictions, unfair competition and many other factors, many of which are beyond the control of railroad management.

Yet in spite of these severe handicaps, a number of the more enterprising roads have improved their positions tremendously under discouraging conditions. By devoting the same intensive effort to the freight problem that has proved effective in reviving passenger business, some of the roads undoubtedly can win back their rightful portion of trucked freight. It is unthinkable that they should relinquish more of the business without a fight.

THE BUSINESS TREND



STEEL'S index of activity in the iron, steel and metalworking industries gained 2.8 points to 89.0 in the week ending October 3:

Week ending	1936	1935	1934	1933
July 11	100.9	76.5	67.8	79.1
July 18	99.9	79.8	68.1	79.4
July 25	102.1	80.8	66.4	78.8
Aug. 1	102.5	78.4	64.8	75.9
Aug. 8	98.7	73.4	64.6	74.7
Aug. 15	92.6	77.5	61.4	74.2
Aug. 22	97.7	77.0	60.3	71.6
Aug. 29	94.0	77.3	55.1	70.3
Sept. 5	87.5	70.9	53.5	65.5
Sept. 12	83.1	70.1	58.7	69.1
Sept. 19	90.1	69.4	58.1	68.2
Sept. 26	86.2†	68.5	59.3	66.9
Oct. 3	89.0*	73.3	54.7	67.4

†Revised. *Preliminary.

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

Index of Industrial Activity Is Poised for Upturn

EXCEPT for automobile production, which is beginning to mount after the low point in the transition from old to new schedules, industrial activity is at the highest level attained in 1936 or in the entire recovery period.

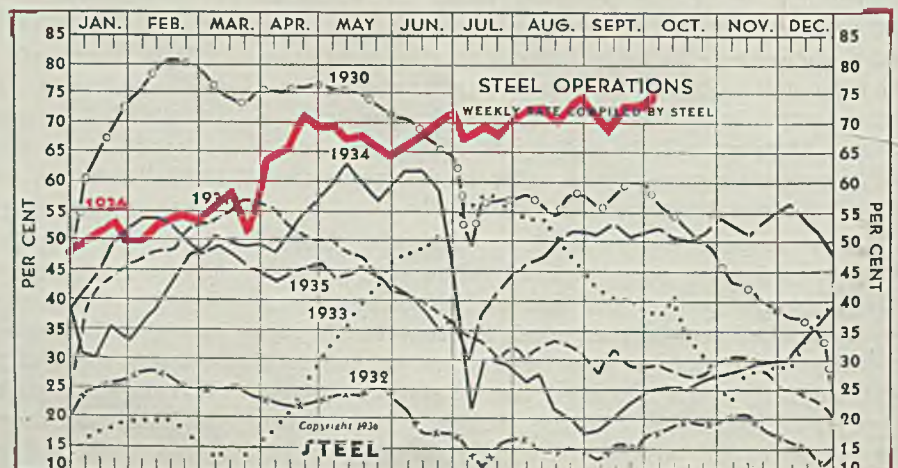
In the week ending Oct. 3, gains over the previous week were recorded for freight car loadings, steelworks operations and electric power output. These upward movements, combined with a minor step-up in motor car assemblies, lifted STEEL'S index from 86.2 to 89.0. With expanding automobile production, and steady freight traffic, steel activity and power output, the index seems destined to climb sharply

throughout October. Indications point to a curve closely paralleling that of October, 1935, but at levels about 15 to 20 points higher.

Revenue car loadings in the week ending Oct. 3 are indicative of a remarkable movement of freight. According to estimates, loadings will be just short of 825,000 cars. This is the heaviest freight traffic carried by the railroads since the week ending Nov. 15, 1930. However, the volume of freight carried by trucks and trailers in the 1936 week probably was several times that hauled on rubber tires in the 1930 week. If we had accurate statistics on the movement of freight by highway, and could add them to the figures of railroad-borne freight, the total for the current week possibly would equal or exceed that for one of the very good weeks of 1928 or 1929.

Electric power output, at 2,169,442,000 kilowatt-hours, is only a shade below the highest weekly production on record. Steelworks operations, at 74.5 per cent of capacity, established a new high for 1936.

	1936	1935	1934
Oct. 3	74.5	53.5	25.0
Sept. 26	73.0	51.0	25.0
Sept. 19	72.5	52.0	22.5
Sept. 12	69.5	54.0	20.5
Sept. 5	71.5	52.0	18.0
Aug. 29	73.0	52.5	18.5
Aug. 22	72.0	52.5	20.5
Aug. 15	70.5	51.0	21.5
Aug. 8	71.5	48.0	27.5
Aug. 1	71.5	47.0	26.5
July 25	70.5	45.0	29.5
July 18	68.5	43.0	30.0
July 11	69.5	38.0	30.0
July 4	66.0	31.0	22.0
June 27	71.5	37.0	46.0
June 20	70.5	35.5	59.0
June 13	68.0	39.0	62.0



September Pig Iron Output Shows Moderate Gain

	Daily Average, Tons		Blast Furnace Rate, Per Cent	
	1936	1935	1936	1935
Jan.	65,461	47,692	48.2	34.2
Feb.	63,411	57,675	46.6	41.4
Mar.	66,004	57,120	48.5	41.0
Apr.	80,316	55,719	59.1	40.0
May	85,795	55,986	63.1	40.2
June	86,551	51,949	63.6	37.2
July	83,735	49,043	61.5	35.2
Aug.	87,475	56,767	64.3	40.7
Sept.	90,942	59,009	66.9	42.5
Oct.	63,818	.....	45.8	.....
Nov.	68,876	.....	49.5	.....
Dec.	68,242	.....	49.0	.....

Merchandise Exports Unchanged In August; Imports Up Slightly

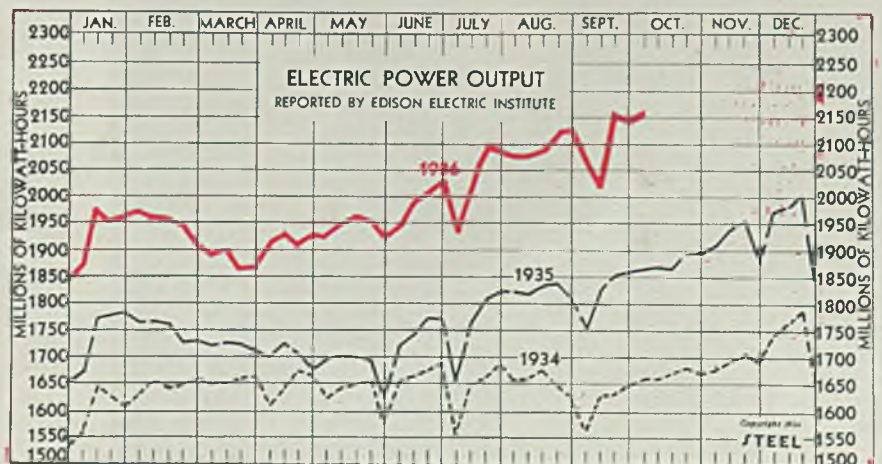
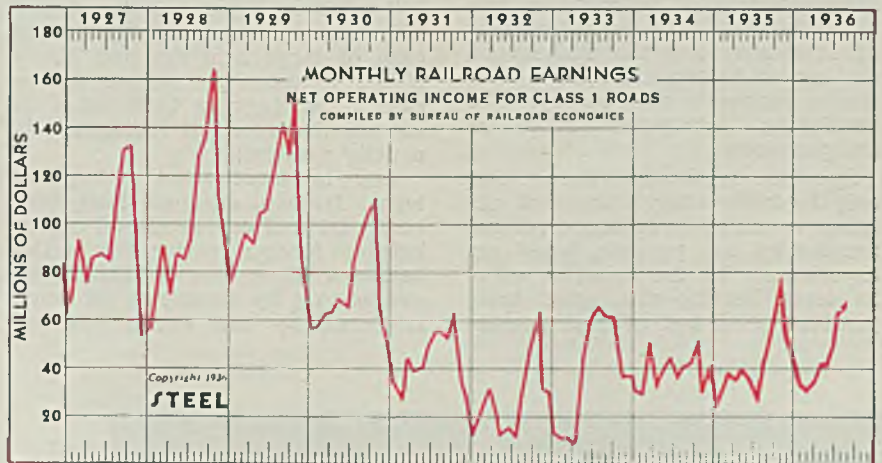
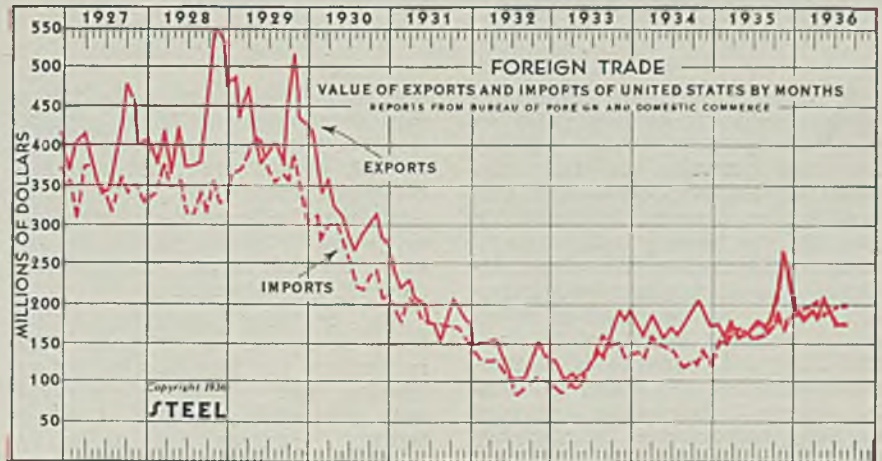
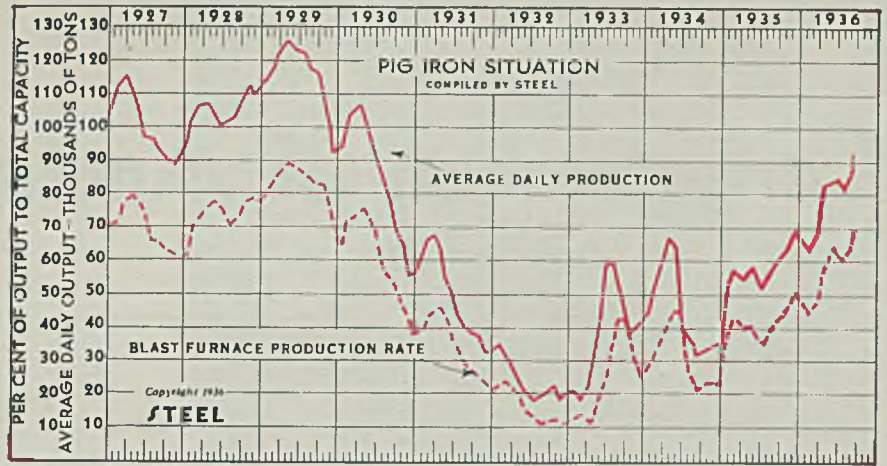
	Dollars (000 omitted)		Dollars (000 omitted)	
	1936		1935	
	Exports	Imports	Exports	Imports
Jan.	198,654	187,482	176,223	166,993
Feb.	182,030	192,771	162,999	152,491
Mar.	194,790	198,686	185,603	177,279
Apr.	193,490	202,437	164,350	170,567
May	201,042	191,110	165,457	170,207
June	185,188	192,233	170,193	156,756
July	178,324	193,409	173,371	177,698
Aug.	178,249	195,016	172,128	169,030
Sept. ....	.....	.....	198,189	161,653
Oct. ....	.....	.....	221,215	189,240
Nov. ....	.....	.....	269,400	168,955
Dec. ....	.....	.....	223,737	186,648

Class 1 Railroads Earn 2.30 Per Cent in Eight Months

	1936		1935		1934	
	Exports	Imports	Exports	Imports	Exports	Imports
Jan.	\$35,764,748	\$21,348,557	\$31,058,275	.....	.....	.....
Feb.	33,594,718	25,719,919	29,420,772	.....	.....	.....
March	35,205,513	37,850,965	52,217,083	.....	.....	.....
April	41,547,644	45,625,786	32,433,939	.....	.....	.....
May	41,842,147	39,505,069	39,699,194	.....	.....	.....
June	50,312,580	34,102,703	42,037,757	.....	.....	.....
July	61,773,765	26,919,343	35,441,265	.....	.....	.....
Aug.	64,680,717	42,156,706	40,564,071	.....	.....	.....
Sept. ....	.....	57,359,339	41,713,425	.....	.....	.....
Oct. ....	.....	75,425,092	49,336,307	.....	.....	.....
Nov. ....	.....	54,234,305	32,540,502	.....	.....	.....
Dec. ....	.....	46,040,165	38,738,295	.....	.....	.....

Electric Power Production Again Near Record

	Millions Kw.-Hrs.			
	1936	1935	1934	1933
Oct. 3	2169	1863	1659	1646
Sept. 26	2157	1857	1648	1652
Sept. 19	2170	1851	1630	1638
Sept. 12	2028	1827	1633	1663
Sept. 5	2098	1752	1564	1582
Aug. 29	2135	1809	1626	1637
Aug. 22	2125	1839	1648	1630
Aug. 15	2094	1832	1674	1650
Aug. 8	2079	1819	1659	1627
Aug. 1	2079	1821	1657	1650
July 25	2008	1823	1683	1661
July 18	2099	1807	1663	1654
July 11	2029	1766	1647	1648
July 4	1940	1655	1555	1538



Consideration of Antifriction Bearing

BY O. L. MAAG

Lubrication Engineer, Timken
Roller Bearing Co., Canton, O.

ALL types of antifriction bearings must be lubricated to dissipate heat and prevent rust and corrosion. At the same time, the lubricant functions in preventing the entrance of water or grit into the bearing and serves to reduce still further the slight internal friction which would normally occur. No one kind of lubricant is suitable for all applications, and the plant manager or maintenance engineer can effect substantial savings in lubrication costs and bearing maintenance by studying the bearing problems in his plant. Many sources of information are available, including manufacturers of lubricants and the makers of antifriction bearings. Both are willing to co-operate with operators in developing lubrication schedules and practices.

Specific recommendations can only be made after a study of existing conditions, yet broad recommendations are possible, based on experience. In the selection of a lubricant, bearing size, speed, temperature, load and general operat-

ing conditions all must be taken into consideration. Some applications definitely require the use of an oil, others are most satisfactorily lubricated with grease, while some may be handled by either oil or grease. Certain conditions require the use of an extreme pressure (E. P.) lubricant.

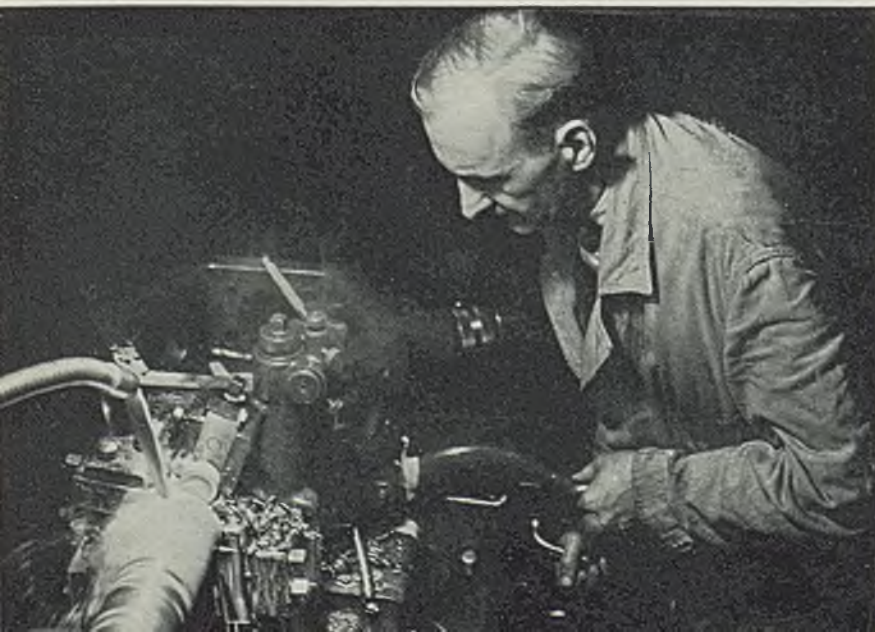
For ordinary operating conditions at speeds lower than 1000 revolutions per minute, antifriction bearings are commonly lubricated with grease. In the case of larger bearings, greases are ordinarily used where speeds are lower than 500 revolutions per minute. Above 500 revolutions per minute in the case of large bearings and above 1000 revolutions per minute in the case of bearings up to 6 inches in outside diameter, oil lubrication is usually preferable.

Any lubricant must reduce internal friction, dissipate heat, prevent rust and corrosion and aid in keeping foreign matter out of the bearings. Heat may be caused by overloading, by the use of too much lubricant, by the wrong kind of

lubricant, or in some cases by external conditions. Overloading cannot be corrected by changing the lubricant, although certain materials which will be discussed later may be used to reduce the harmful effects until the situation can be corrected.

Practically all good lubricants serve to prevent rust and corrosion so long as they are fresh and free from contamination. However, if machinery is to be shut down for any considerable length of time, it is advisable to clean out all antifriction bearings and replace the lubricant with fresh stock. This will avoid the possibility of injuring the bearing surfaces by moisture, oxidation products, or foreign matter which has become mixed with the lubricant in service. Likewise, before starting equipment which has been out of service a long time it is always advisable to clean out the lubricant used to preserve the bearing surfaces and replace it with fresh lubricant of the proper type and consistency.

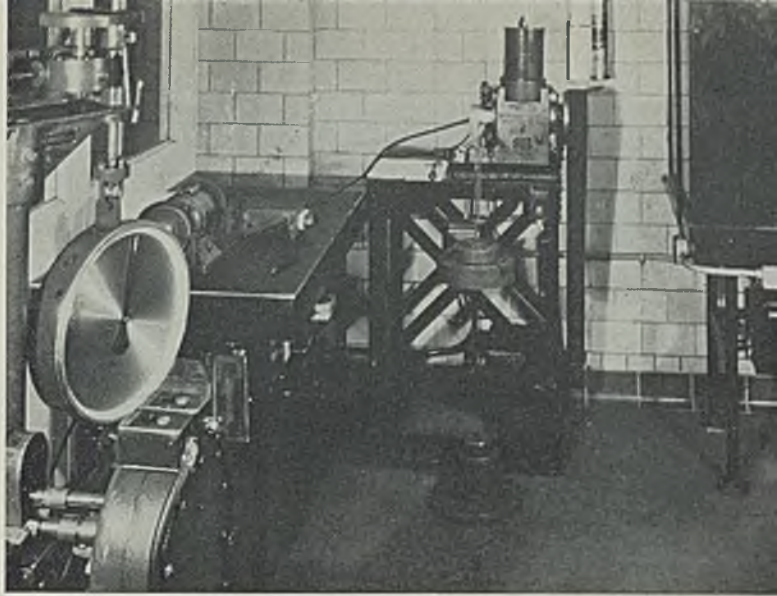
Closures are depended upon to



CLOSELY held machine tool spindles and high-speed shafts are frequently run in with extreme-pressure oils for an initial period. The Warner & Swasey turret lathe at the left is typical of this type of machine and is shown operating at twice standard speed, making a $\frac{1}{2}$ -inch cut on a $3\frac{1}{2}$ -inch bar of S.A.E. 1035 steel. Cemented tungsten carbide cutter is used

Lubrication

CORNER of lubrication laboratory showing, at center, machine developed by Timken engineers to test breakdown point of E.P. lubricants



retain the lubricant and prevent the entrance of foreign matter. However, the lubricant plays an important part in the way the closures function. If the right type and consistency of lubricant is used, nominal wiping contacts are usually satisfactory. If, however, the lubricant thins out too much in service the tendency on the part of most maintenance men is to tighten up on the closure. This aggravates the condition and as the closure is made tighter its friction on the shaft not only wears out the

closure but is responsible for an appreciable power loss as well. A lubricant that does not thin out in service, such as a cold milled grease, will usually help in conditions such as this. The possibility of such conditions arising should be studied in advance by whoever is in charge of lubrication or maintenance in the plant and provision made for using the proper lubricant in the correct amount as required.

Lubricants for industrial anti-friction bearing applications include the following types: Lime, soda, aluminum and lead soaps as well as mixed base greases, together with oils of various degrees of refinement and body. For cer-

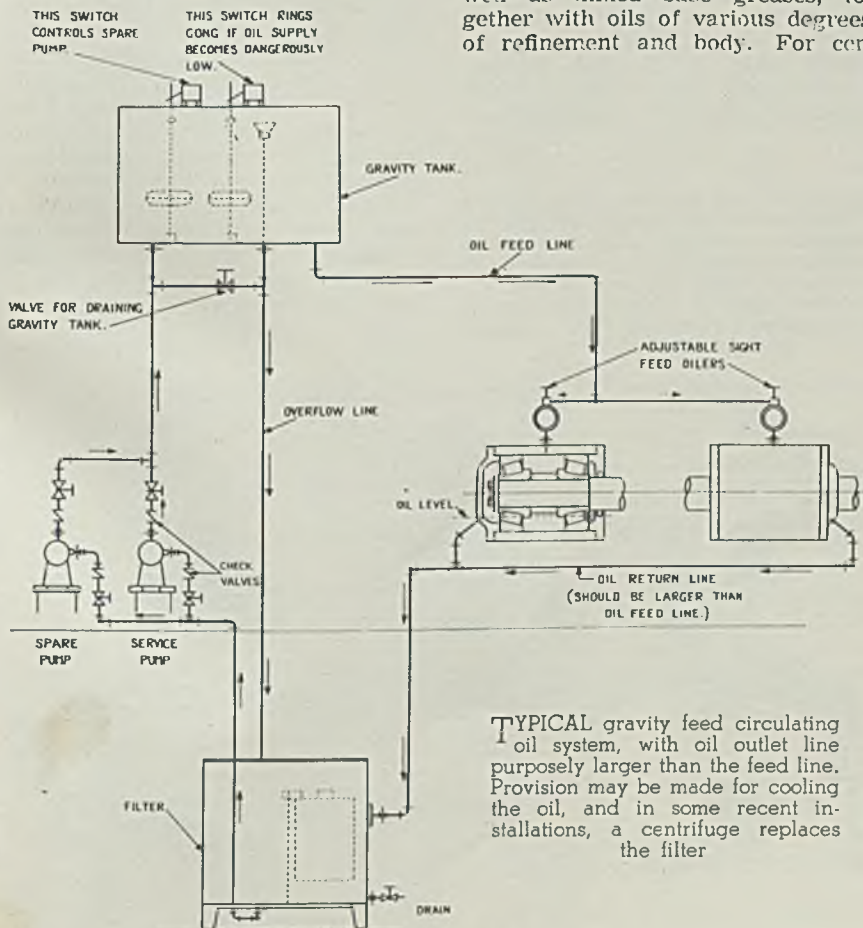
tain applications the newer E. P. oils and greases are particularly suitable. E. P. oils of various types have proved of value in the run-in period of newly assembled machinery as well as for routine use.

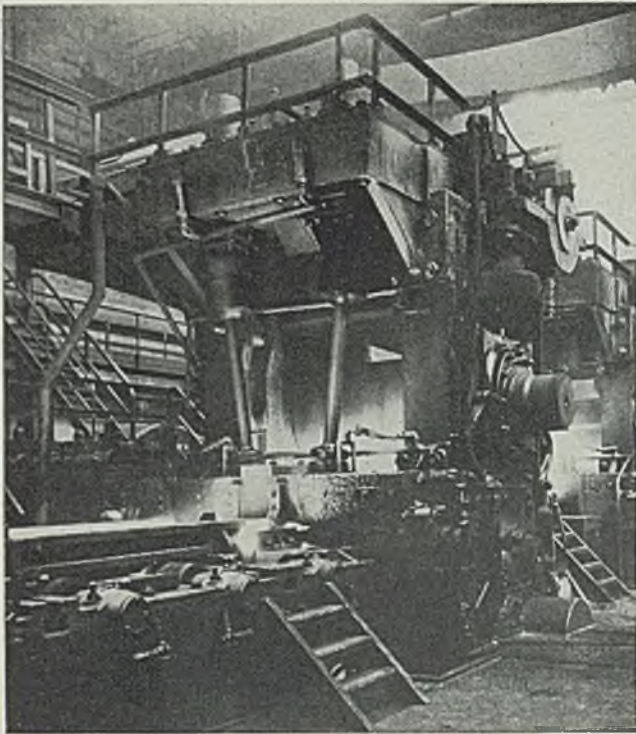
Lime soap greases, which are usually the least expensive to compound, have perhaps the widest use in the industrial field. Their use is usually confined to those applications where temperatures are low, or where moisture may be present. Aluminum stearate greases likewise are used where moisture conditions are encountered. Applications involving higher temperatures and higher speeds usually use a lubricant of the soda type. The grease selected should be studied with regard to separation, for there is a tendency in certain greases to thin out in service to such a degree that the oil is thrown out, leaving a deposit of nonlubricating soap in the bearings.

High Speeds Require New Greases

Short fiber, smooth texture soda soap greases have proved successful in lubricating Timken bearings at high speeds. These greases do not have the same tendency to channel that is frequently noticed in the stringy, fibrous product and their lubricating action is similar to that of lime soap greases. Cold working is usually required to produce greases of this type.

Higher speeds and greater loads have brought about the development of extreme pressure lubricants. These are essential in many cases and may be used successfully in many others even where they are not fundamentally necessary, thus simplifying the lubrication engineer's problem in the plant by reducing the number of different lubricants required. They are excellent for running in new equipment and have a wide range of use in connection with rolling mill equipment. The Timken company has had success with E. P. lu-





—Wheeling Steel Corp.

EXTREME - PRES-SURE greases have answered the requirements of higher speeds and heavier loads on anti-friction bearings, being almost universally used on rolling mills of this type

bricants having a lead-soap sulphur base or a chlorinated sulphur base as with the straight chlorinated base products, and is co-operating with lubricant manufacturers in developing E. P. type lubricants.

High-speed applications are ordinarily lubricated with oil. Sight feed, constant level and wick feed oilers are all in use in the industrial field. While the latter two systems are usually more economical, considerable progress has been made in reducing lubrication costs for sight feed oiling systems by compounding the oils with from $\frac{1}{4}$ to $\frac{1}{2}$ -per cent of a soap. These compounded oils feed more slowly and adhere well to the bearing surface, thus reducing the amount of lubricant required and assuring that full value is obtained from that which is used. If these oils are not compounded properly, or operating conditions are adverse to their use, trouble may be experienced from clogged oil lines.

Drains Should Be Provided

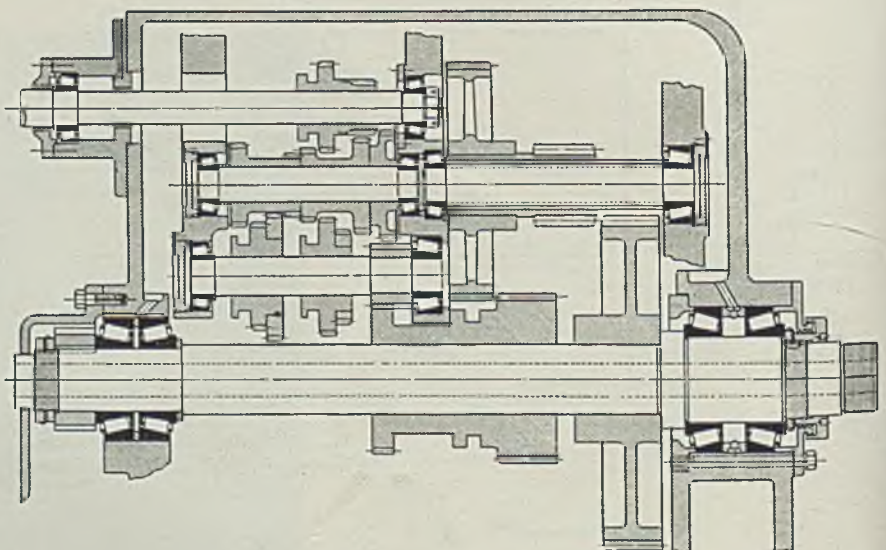
In any oil lubricated bearing application provision should be made to drain away any excess of lubricant. An excess of oil or grease will cause churning, which develops heat and causes a certain power loss as well. Drains should be located so that only the bottom of the bearing rollers dip into the oil.

Heavy cylinder oils are commonly used for lubricating units such as ball mills, clay mills, and similar equipment where the speeds are low but the service is heavy. Frequently, however, it has been found advisable to use a lighter bodied oil of the E. P. type

for this type of service as it reduces operating temperatures and shows a substantial saving in power.

Many advantages are possible with circulating oil systems. These may be applied to both gears and bearings or to either separately. With such systems ample but controlled and positive lubrication is assured. No churning can occur, which aids in keeping bearing temperatures under control. The constant supply of fresh lubricant

MACHINE tool gearbox and spindle on anti-friction bearings. The bearings supporting the gear shafts are splash lubricated; spindle bearings are provided with a collecting well and guided circulation. Highly refined oil or a short fiber smooth texture soda soap grease is ideal for this application



also washes out any foreign matter from the bearings and thus avoids scoring or abrasion. It is possible to cool the lubricant, and filtering equipment can be incorporated in the circulating system with excellent results. E. P. oils have been used with excellent results in circulating oil systems, particularly in connection with gear reduction units.

When studying lubrication problems in any plant, it is always advisable to consult with the manufacturers of the equipment and the bearings as well as with those who will furnish the lubricants. All parties will profit by such co-operation and the maintenance man will be able to work out the most efficient and most economical lubrication schedule.

Schwartz Addresses Metal Group on Ferrous Castings

Harry A. Schwartz, manager of research, National Malleable & Steel Casting Co., Cleveland, addressed the Buffalo chapter of the American Society of Metals recently on "Ferrous Castings."

The speaker traced the metallographic relations of cast iron, malleable iron and steel, and showed in general that they all are to be considered as representative of alloys of iron and carbon. They may differ in the amount of total carbon, the presence of or absence of graphite and the metallographic characteristics of the matrix. The graphite may be flaky, primary graphite, or nodular secondary graphite, according as it is formed during freezing or subsequent heat treatment.

The relation of heat treatment and chemical composition to these variables was discussed and some reference was made to the newer graphitizable steels.

What To Observe in Approving Designs for Machine Tools and Fixtures



BY CHARLES J. MARTIN
Tool and Machine Designing Department,
Ex-Cell-O Aircraft & Tool Corp., Detroit

WHAT is the most important part of a machine tool? In at least 75 per cent of cases, the fixture is the most important part, because the part that is to be manufactured can be machined just as accurately as the fixture is built.

Here are 18 points which should be followed closely in approving a fixture design:

1. Location of part.
2. Plenty of clearance to load and unload the parts to be machined.
3. Clamping of parts, so as not to distort and destroy the accuracy of part, after it has been machined and removed from fixture.
4. Clamping arrangement so designed that it will not distort the fixture when clamping the part.
5. Design to facilitate the changing of tools.
6. Design to get rid of chips as rapidly as possible, in such a way that it will not interfere with the cutting tools, being sure that the chips will not fall on the fixture, moving parts or hydraulic pipes.
7. When a coolant is used, it should flow freely on the tools and at the same time be directed so that it will not spray over the machine and operator.
8. Rigidity of design, to withstand abuse without affecting the accuracy of fixture. It should also be designed to radiate the maximum amount of heat caused by the cutting tools and revolving parts.
9. All parts subject to wear should be made of a good grade of alloy steel, heat treated and ground.
10. All rest plates should be made to clean the surface of chips and grit which may adhere to the parts

as they are moved into position. This is done by machining diagonal grooves across the rest plates and leaving the edges sharp so that when a part is moved over these plates it will scrape the surface clean.

11. Fixtures should be designed to use standard commercial tools, such as drills, reamers, spotfacers, milling cutters, taps, bushings, adjustable drill holders, or tap holders.

12. Whether a manually operated or hydraulically operated fixture should be used depends on the production and size of part to be machined. In cases where the part is small and on low production, manual operation is preferred. Where the part is large and heavy and the operator would have to handle an excessive amount of

weight each day, then the fixture should be completely hydraulic.

13. When designing a hydraulic fixture, oil passages should be completely manifolded. The manifold should be designed so that no hot chips will collect on it, causing excessive heat in the oil which may in some cases affect the accuracy of the fixture.

14. Clamping arrangement for a hydraulic fixture should be designed so that the releasing of the clamps is accomplished with a higher pressure than that required for clamping. This is accomplished by using the piston rod end of the cylinder for clamping. The hydraulic cylinder, in many cases, should operate a mechanical self-locking arrangement, especially where there is heavy-duty machining; this also keeps the size of the cylinder smaller.

15. Indexing types of fixtures, where multiple operations are performed, are of three types: The trunnion, the rotary table, and conveyor. These fixtures cause more trouble than the single-purpose fixture. Chief sources of trouble are: Spacings between stations, the setting of tools so that each station shall produce an interchangeable part, and chips.

16. Fixture proper should be a complete independent assembly, which can be located on the trunnion, rotary table or conveyor as a separate unit for each station. This will make it possible to remove any one of these fixtures for repairs without affecting the operation of the machine.

17. Indexing mechanism, whether hydraulic or mechanical, will always have a tendency to lay or over-run its position. The locating pin

GENERAL principles involved in the design of efficient machine tools and fixtures are summarized in the accompanying article by Charles J. Martin who at one time was assistant chief draftsman in the tool and machine designing department of the Ford Motor Co. The discussion is abstracted from a paper presented Sept. 10 in Detroit before the American Society of Tool Engineers. No detailed technical analysis of design problems is given, but rather a review of certain fundamental factors in good present-day machine tool practice

should be straight with a bullet nose so that it will pull the fixture into its correct position and at the same time will clean itself of any dirt or chips which may adhere to the pin. Never use a taper pin for locating, as it will not clean itself and any adhering dirt or chips will throw the location off.

18. Clamping arrangement, when clamping a rough casting or forging, should be designed so that the clamps can be re-tightened between each station while the fixture is indexing. When clamping on a finished surface this is not necessary.

These points in approving fixture design hold true for any type of fixture, whether the fixture is for a single or multiple indexing or continuous-operating machine.

Design of Tools and Fixtures

The hydraulically-operated fixture is being used more every day on all types of high production machinery where there are multiple operations to the cycle of the fixture. About 90 per cent of all fixtures designed and built by Ex-Cell-O for standard lines of equipment and special equipment are hydraulically operated. These have proved satisfactory for their simplicity in design, speed and uniformity of operation. Every part is located and clamped into position always with the same pressure which is easily regulated. This is essential where the part is frail and accuracy is required for the part machined.

A question may arise: Why all the precaution in approaching the fixture design when purchasing a machine and fixture from a machine tool company? Many machine tool builders will admit they do not know much about designing a fixture or that there is not enough profit in so doing and they prefer the customer to design and build his own fixture.

Consider now some of the factors involved in designing or approving semispecial or special machines. This class of machine tools has been increasing every year. Here are 15 points which the writer recommends:

1. Make the tool layout.
2. Select the type of tools to be used — commercial or standard adopted by customer.
3. Figure the cutting speeds per minute and feed in thousandths per revolution and make an experimental tryout.
4. Design the fixture around the part and the tool layout.
5. Determine the amount of travel necessary for machining the part, also enough to remove tools and worn parts of fixture in the minimum amount of time.
6. The machine should be designed in unit assemblies wherever possible, especially where excessive wear requires frequent replace-

ment. By doing this there can be a spare assembly carried in stock. This is economical where there is more than one machine of the same kind in use—such as grinding and precision boring spindles, where there are complete units which can be easily replaced.

7. Selection of materials for the different parts of the machine should be checked carefully as there is a tendency for the engineer to form the habit of using one type of steel for all parts. Castings and steels should be selected and treated according to the wear and abuse to which they are subjected.

8. Factor of safety should be at least four or five for machines in the automobile industries, where accuracy is of major importance and no vibration can be tolerated; the machine should be designed for maximum rigidity and heavier than what is required for strength alone.

9. Oiling system should be checked thoroughly as the engineering is in progress. In many cases this is left until the design is complete with the result trouble follows in incorporating an efficient oiling system in the design of the finished machine. A good oiling system is far more economical than a repair bill.

Care Needed in Spindle Design

10. Ways used when there are sliding heads or tables to produce precision work should comprise one V-type and one flat type; they should be more than 2½ times as long as the distance from the V to the center of the flat way. The slide should be heavy enough to absorb any vibration caused from the rotating parts or the machining operation performed.

11. Spindle and spindle mountings should be designed carefully. In production machinery where a machine runs continually 16 hours or more per day the spindles should be designed for long life. There are three types of spindle mountings: Tapered roller bearings, ball bearings, and the plain bearing, either straight or tapered. The tapered roller bearing should be used for heavy-duty spindles, the ball bearing for drill spindles or lighter operation and also for precision work. The plain bearing is probably the most accurate of the three, but it does not have the life and generates more heat than the anti-friction bearings.

12. With regard to material used for bases and housings of various machines, where any high degree of accuracy is required high-grade castings should be used. Many machines today are of welded steel construction. This is economical when only one machine is being built and probably will not be duplicated, or where close accuracy is not required.

13. Reduction gears on all machines should be mounted on anti-friction bearings. They should be designed to the accepted rule for the required horsepower, but in practice the width of the face of the

gear should be at least twice as wide as the theoretical required gear to provide a longer life. Where the speed of the gear is not high the oiling system can be of the submerged type. On high-speed gears a circulating system should be provided so that the gears will not churn the oil and create excess heat which will cause ultimate failure.

Electrical Equipment Standard

14. All motors should be mounted in an accessible place for ease of maintenance. The electrical control equipment should be standard as manufactured by the various electrical companies. This equipment not only provides economies on new installations but saves time and money on maintenance. Electrical control equipment should be mounted outside the machine or in a separate control housing box, to avoid being subjected to dirt, chips, heat and oil leakage.

15. On a hydraulically-operated machine, the pump and necessary operating equipment should be mounted in a self-contained unit including the motor mountings and oil reservoir. This is a recent development and is designed so that air can circulate completely around the unit with the result little heat is transmitted to the machine proper. Oil passages should be manifolded wherever possible. Hydraulic operating valves should be mounted on the machine where they are easily accessible for repairs.

When should semispecial, special or improved equipment be purchased? In the writer's opinion, a manufacturer cannot afford to delay purchasing this equipment if it will pay for itself within a year. In figuring the saving he should take into consideration the man-power saved, the amount it would cost to keep present machines in repair and the saving in tools over the old method.

New Solvents and Resin From Light Oil Refining

Study of the refining of light oils at by-product coke plants is being carried on at the Mellon Institute of Industrial Research, Pittsburgh, by P. J. Wilson Jr. and J. H. Wells. Several new products have been recovered from the residues, including a series of high boiling oils and a dark stable resin which can be produced in large quantities at a low cost.

The high boiling oils are largely aromatic hydrocarbons with small portions of paraffins and compounds soluble in 80 per cent sulphuric acid. These oils possess excellent solvent properties, and are miscible with most of the commercial organic solvents, and are not affected by water, brine, alkalis or dilute mineral acids.

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*is Strong, Tough, Non-Rusting
and Corrosion Resistant*

- Everdur is a high strength alloy composed of copper, silicon and other controlled elements. In corrosion resistance it is equal or superior to copper, yet it possesses many qualities usually not found in metals of this character . . . Everdur has excellent machining and working characteristics, and can be fabricated, hot or cold, into a wide variety of forms and shapes . . . This moderately priced, workable and weldable alloy has established itself in many fields of engineering and manufacture, for an exceptionally wide range of applications . . . Everdur is available in all commercial shapes, and in four standard compositions suitable for hot or cold working, casting, or screw machine work.
- Because of its unusual resistance to corrosive gases and saline fogs, Everdur Metal has been widely accepted as the ideal non-ferrous material for bolts and similar products . . . Averages of tests, covering a variety of types and sizes of cold headed Everdur bolts, indicate tensile strengths of from 90,000 to 105,000 lb. per sq. in., with an approximate elongation of 10% in 2 inches. The following pages are indicative of the adaptability of this exclusive Anaconda Alloy.

THE AMERICAN BRASS COMPANY

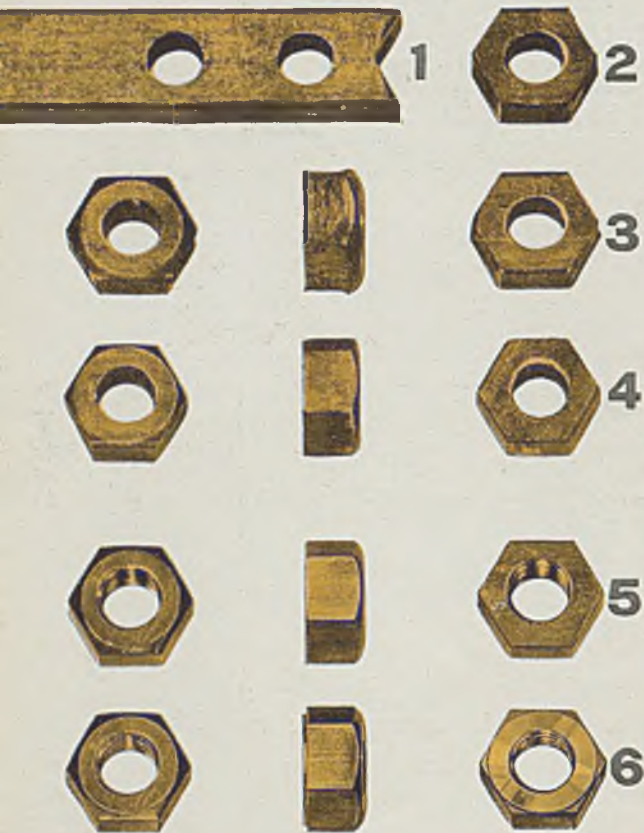


General Offices: Waterbury, Connecticut

Offices and Agencies in Principal Cities

Copper with the Strength of Steel

"EVERDUR GIVES LONGER TOOL LIFE

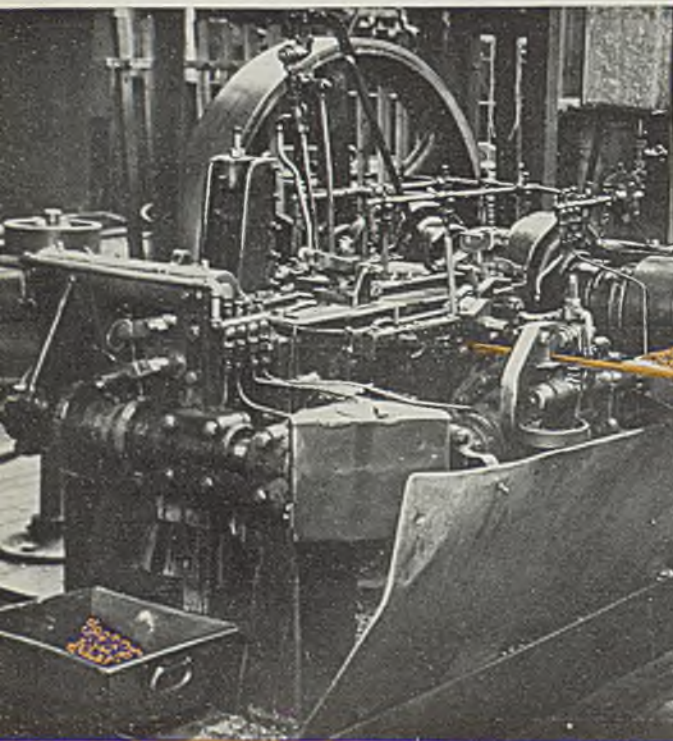


• A wide range of Everdur bolt and nut products is fabricated in the Port Chester, N. Y., plant of Russell, Burdsall & Ward Bolt & Nut Co. The workability of this metal is emphasized by the accompanying illustrations, showing progressive operations in the manufacture of $\frac{3}{8}$ " American Standard Regular Semi-Finished Everdur 1010 nuts:

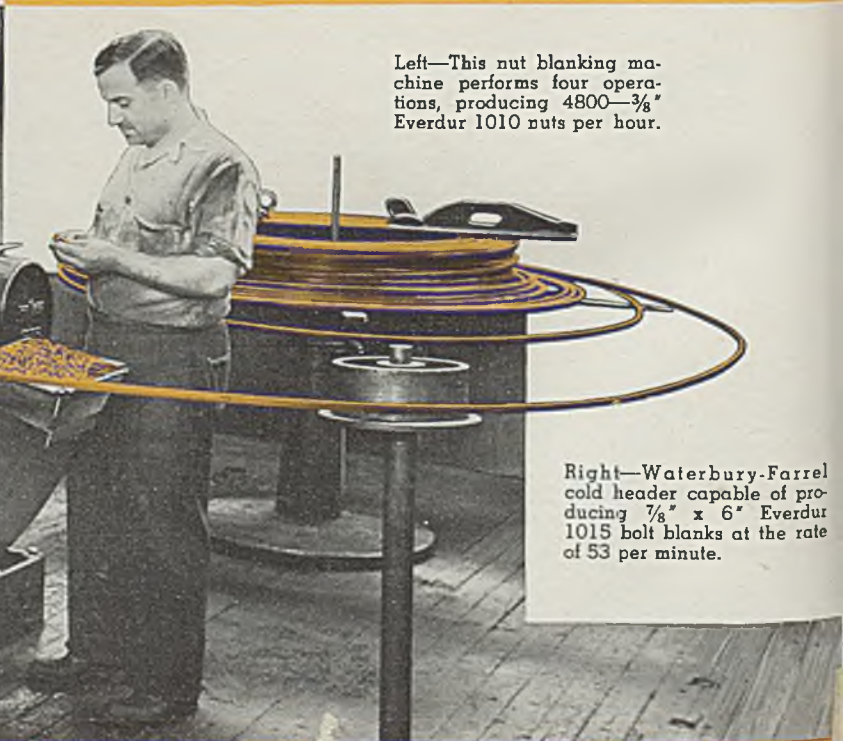
• Operations 1 to 4, pictured at the left, are performed simultaneously on nut blanking machines. .310" holes are first punched (1) in .612" x .325" rectangular Everdur 1010 rod in coils. Rough nut blanks are then cut off (2), and a cupping operation (3) forms the chamfer. This is followed by reshearing or trimming of the blanks, which at the same time are sized and burnished (4) on all sides of the hexagon. Production on this machine is at the rate of 4800 per hour. Cut-off punches and dies are ground after each eight hour run. This tool life is approximately equal to that obtained on steel.

• After tumbling, the nuts are tapped (5) on automatic nut tappers at the rate of 3,000 per hour. The nuts are then washer-faced (6) on special equipment, and cleaned. Constant checking and gauging are, of course, carried on through all operations. In the Coraopolis, Pa., plant, Everdur 1010 nuts up to $1\frac{1}{2}$ " diameter bolt size are produced by this manufacturer in essentially the same manner.

• Comparing Everdur with other high-strength bronzes and copper-silicon alloys, production executives of this manufacturer report these significant facts: Everdur machines faster and threads cleaner with a better finish, resulting in a more uniform product of better appearance. When fabricat-



Left—This nut blanking machine performs four operations, producing 4800— $\frac{3}{8}$ " Everdur 1010 nuts per hour.



Right—Waterbury-Farrel cold header capable of producing $\frac{7}{8}$ " x 6" Everdur 1015 bolt blanks at the rate of 53 per minute.

Everdur Metal is strong, dependable, workable

MACHINES FASTER . . . "

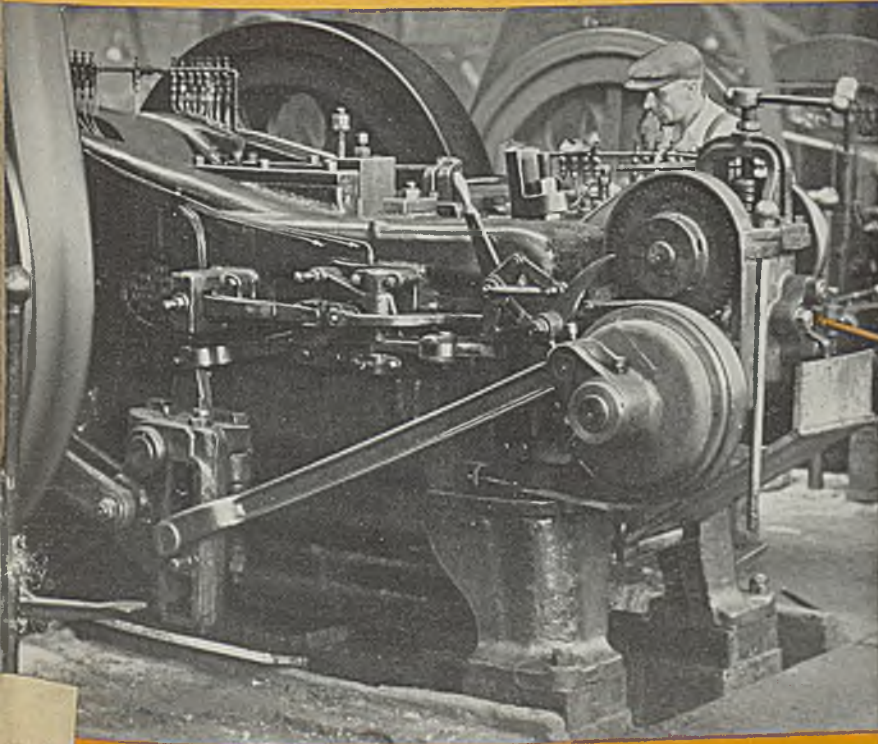
ing Everdur, there is no distortion of the finished product. The metal does not sweat on punches, dies or taps. Tool life on taps, employing the regular soluble cutting compound used with steel, is from two to three times longer than that obtained on similar high-strength, non-ferrous metals.

- At the rate of 53 per minute, the Waterbury-Farrel cold heading machine pictured below is turning out $\frac{7}{8}$ " x 6" Everdur 1015 bolt blanks from .843" Everdur rod stock.

- The upsetting operation is completed in two strokes; the first forming a bulb, the second finishing the cold heading operation as illustrated on the right. Micrographs of cross sectional areas of these bolt heads show excellent flow lines. The shanks of these bolt blanks are then swaged for the length of the rolled thread, and the heads trimmed.

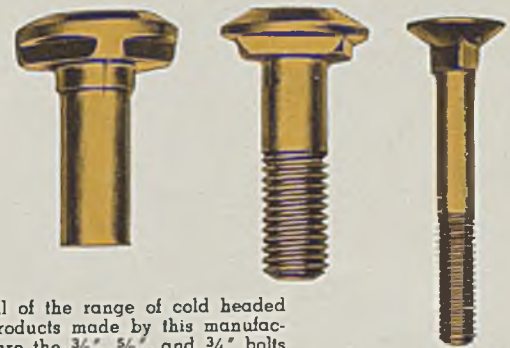
- Here, too, the excellent working characteristics of Everdur 1015 are revealed in long tool life of forming, swaging, roll threading and trimming dies, and in a finished product of consistently uniform and accurate dimensions.

- Everdur 1015 rod stock, .843" diameter for cold heading, has a minimum tensile strength of 70,000 lb. per sq. in.; a minimum yield point of 55,000 lb. per sq. in.; and a minimum elongation of 12% in 2 inches. The cumulative effect of the various cold working operations increases the physical values of the finished bolts to an appreciable extent. Averages of tests on many types and sizes of Everdur 1015 cold headed, rolled thread bolts indicate tensile strengths of from 90,000 to 105,000 lb. per sq. in., with an approximate elongation of 10% in 2 inches.

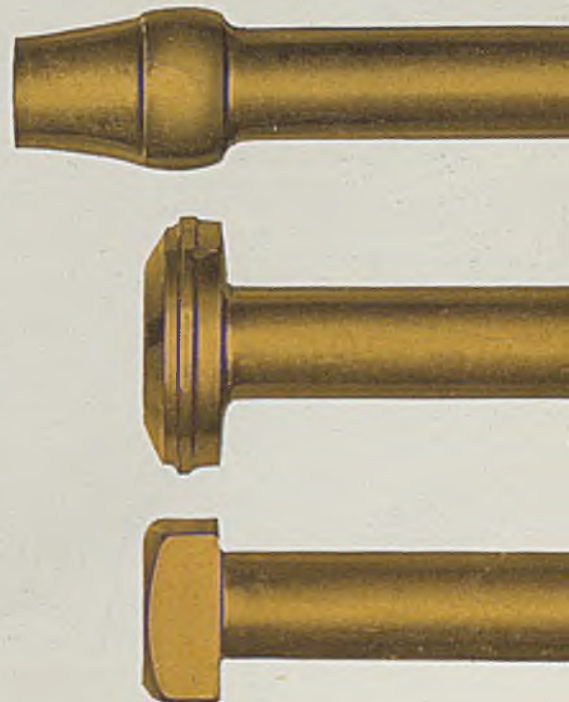


.. and moderately priced

Tapping $\frac{3}{8}$ " American Standard Regular Semi-Finished Everdur 1010 nuts at the rate of 3,000 per hour. The bucket contains approximately 100,000 Everdur nuts.



Typical of the range of cold headed bolt products made by this manufacturer are the $\frac{3}{8}$ ", $\frac{5}{8}$ ", and $\frac{3}{4}$ " bolts illustrated above.



Above: Sequence of cold heading operations on $\frac{7}{8}$ " x 6" Everdur bolt blanks, indicating the adaptability of Everdur 1015 to severe cold working.

Millions of Everdur Bolts

**ATTEST THE DURABILITY OF THIS
MODERATELY PRICED METAL**

This new booklet contains detailed information on physical properties, characteristics and applications of Everdur Bolts. Write for Anaconda Publication E-6, addressing The American Brass Company, General Offices, Waterbury, Connecticut.



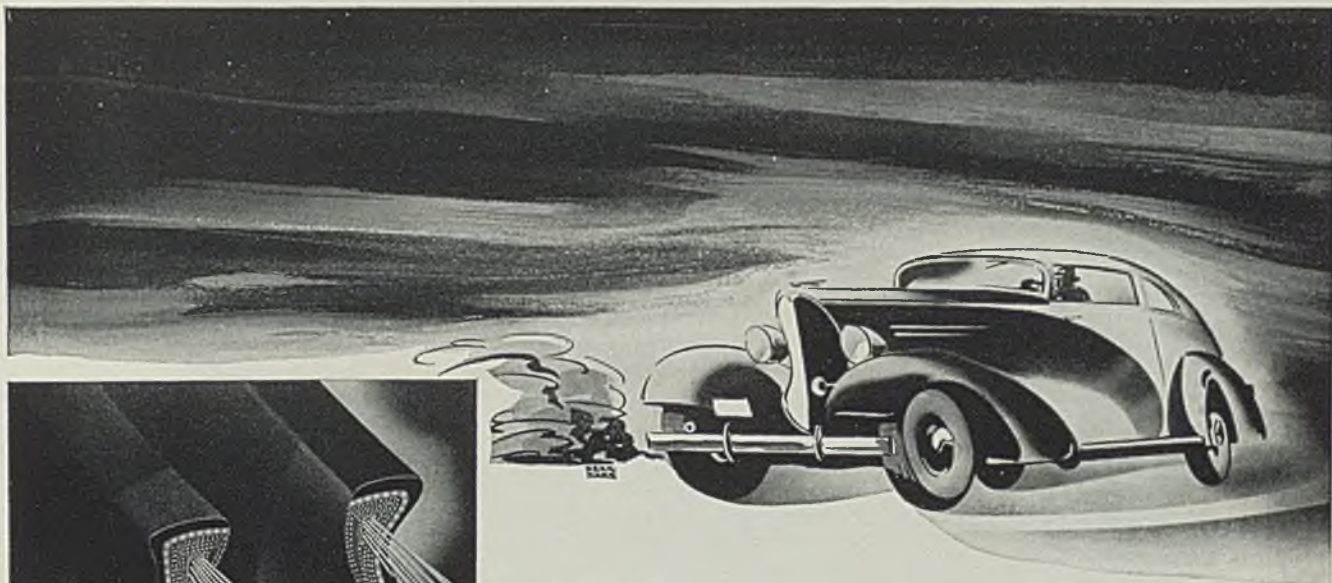
- Everdur bolts, screws, and engineering equipment in many and varied forms have been in use for years in highly unfavorable locations, resisting exposure to all types of water; to saline fogs, corrosive gases and vapors; a wide variety of corrosive liquids; and stresses caused by unusual service conditions, daily and seasonal temperature changes, wind pressure and storm conditions.
- In the electrical field particularly, millions of Everdur bolts, and other items of outdoor connectors, pole line hardware, sub-station and railroad signal equipment have appreciably reduced service interruptions, replacements, and failure of structural members.
- Everdur products, regularly furnished by leading manufacturers, include: Bolts, flat and lock washers, nuts, cotter pins, machine screws, rivets, studs, wood and lag screws, U bolts, J bolts, eye bolts, turnbuckles, thimbles, clips, guy clamps, wire rope sockets and similar accessories. A list of these manufacturers will be furnished on request.

"Everdur" is a registered trade-mark identifying products of The American Brass Company made from alloys of copper, silicon and other elements.



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GENERAL OFFICES: WATERBURY, CONNECTICUT
OFFICES AND AGENCIES IN PRINCIPAL CITIES

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Wickwire Spencer manufactures High and Low Carbon Wires— in various tempers, grades and finishes—for your specific purpose. Hard-Drawn, soft or annealed Basic or Bessemer Wires— Hard-Drawn annealed, or oil-tempered Spring Wire, Chrome Vanadium Spring Wire— Valve Spring— Music— Clip— Pin— Hairpin— Hook and Eye— Broom— Stapling— Bookbinding— Machinery Spring Wire— Reed Wire— Clock— Pinion— Needle— Bar— Screw Stock— Armature Binding— Brush— Card— Florist— Mattress— Shaped— Rope— Welding. Flat Wire and Strip Steel, High or Low Carbon— Hard, annealed or tempered— Clock Spring Steel— Corrosion and Heat Resisting Wires. Consult the Wissco technical man on your wire problems, however large or small.

WISSCO WIRE
by Wickwire Spencer

Commemorate Two Decades of Atmospheric Corrosion Tests on Steel Sheets

TWENTY years ago this October, the American Society for Testing Materials exposed a series of black iron and steel sheets to the atmosphere at Annapolis, Md., for the purpose of studying the effects of corrosion. Since the specimens were put on the test racks, they have been inspected faithfully twice a year by a special subcommittee of committee A-5 on corrosion of iron and steel, and from time to time the society has made available in its numerous publications complete data and information on the various test programs.

Original Members Still Active

Year after year the committee has centered all its effort in its work and has never taken time out specifically to visualize its own position. Therefore, believing that the twentieth anniversary of the test is a fitting occasion for celebration, the society is arranging a meeting and banquet at Carvel hall, Annapolis, Oct. 16, at which will be present some of the men who constituted the original committee in charge of this long-time test program and others who are now active in the work. Preceding the banquet, the sheets at the naval experiment station will be inspected.

The original series of tests started in 1916 included identical sets of test specimens exposed to the industrial atmosphere of Pittsburgh, the rural and light industrial atmosphere at Fort Sheridan, Ill., and sea-coast type of atmosphere at Annapolis. About 485 specimens of 22 and 16-gage sheets were exposed at each location.

Pittsburgh tests extended over a period of 6 years and 3 months, during which a large number of failures

developed in the specimens. The Fort Sheridan tests covered a period of 11 years in which 127 of the 219 specimens of 22-gage failed and 4 of the 216 16-gage specimens. At Annapolis there have been no failures reported on the 16-gage specimens, but about 60 of the 22-gage have failed.

The chief feature of the selection of specimens was that some of the samples contained added copper and a comparable number were noncopper-bearing or had low copper content. Experiments demonstrated conclusively that steel sheets containing up to about 0.2 per cent copper offer a distinct increase to resistance to atmospheric corrosion, as compared with sheets with little or no copper when they are both exposed freely to the atmosphere.

As a result of information developed in these tests, various American industries have benefited greatly from the use of the so-called copper-bearing steel. For instance, in the railroad field the life of the plate parts of hopper cars in normal service has been increased 4 to 5 years by the use of copper-bearing steel instead of ordinary steel.

These atmospheric experiments have shown the value of phosphorus as an alloying element, although this observation has not been so widely circulated as was the information on copper. Phosphorus and copper together in steel produce more resistance to atmospheric corrosion than does copper alone. Phosphorus in steel was always regarded as harmful, and something to be avoided with great care.

Not only did these experiments shed light on the efficacy of small additions of copper to steels, but they undoubtedly stimulated research into

the use of higher percentages of copper as an alloying element. Within the past two years, a number of so-called high-strength steels have been introduced in the market containing appreciable amounts of both copper and phosphorus.

Four of the original members of the subcommittee in charge of these tests have continued actively in the work throughout 20 years of their duration. These members are: W. R. Fleming, metallurgical engineer, Andrews Steel Co., Newport, Ky.; M. E. McDonnell, chief chemist, Pennsylvania railroad, Altoona, Pa.; H. E. Smith, materials engineer, White Plains, N. Y.; and F. N. Speller, director, department of metallurgy and research, National Tube Co., Pittsburgh.

Great Interest Shown

It is significant that after so long a period four of the original nine members of the committee in charge should still be active in the work. Their interest and support not only is evidence of the importance of the work, but is also a tribute to the inspiration given by the late J. H. Gibboney, chief chemist, Norfolk & Western railway, who was vice chairman of committee A-5 when the tests were initiated, and who served from 1922 to 1933 as chairman. F. F. Farnsworth, Bell Telephone Laboratories Inc., New York, is present chairman of committee A-5 and T. R. Galloway, New York Edison Co.,

In addition to the previously mentioned four men, the present subcommittee includes: E. S. Tayler-son, Carnegie-Illinois Steel Corp., Pittsburgh, chairman; F. H. Frankland, chief engineer, American Institute of Steel Construction, New York; J. R. Page, chief material in-

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- and forget it, except for periodic change of lubricant.
5. **Power** . . . *Philadelphia MotoReduceRs* average 95% output efficiency.
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spector, Norfolk & Western railway, Roanoke, Va.; R. F. Passano, research engineer, American Rolling Mill Co., Middletown, O.; and representative of United States navy, bureau of engineering and naval engineering, experiment station, Annapolis, Md.

When the atmospheric corrosion tests on black iron and steel sheets were inaugurated, they were the sole responsibility of committee A-5, but several extensive research projects were subsequently initiated and a number of extremely important investigations are now under way. One series of tests involved the resistance to corrosion of black iron and steel sheets in running water in which 900 samples were exposed to filtered drinking water, brackish water and acid mine water.

In another program 550 specimens of zinc-coated iron and steel

sheets were exposed at each of five committee test sites, to various types of atmosphere and in an extremely extensive test investigation begun in January, 1929, 700 hardware specimens carrying commercial metal protective coatings of zinc applied by various processes—cadmium, aluminum, lead, etc.—have been exposed at each of the five test locations.

Extensive Program Initiated

The latest test program, and one which is among the most extensive of those sponsored by the society, includes atmospheric corrosion tests on wire and wire products. In these tests, involving plain unfabricated wire, barbed wire, strand, farm fence and chain-link fence, over 30,000 test specimens are being exposed at 11 test sites in widely separated parts of the United States. The specimens

for these tests are now being assembled on the test racks.

This twentieth anniversary of the outdoor exposure tests on sheets at Annapolis serves to emphasize that probably in no other way except through a program such as that sponsored by the American Society for Testing Materials does industry have access to facilities for conducting outdoor tests over this long period of years with the same competent and unbiased supervision.

Through inspections and publication of corrosion data in convenient form it is felt that the society has made a distinct contribution to the field of useful engineering information relating to the performance of various metals and in so doing it is carrying out one of its primary purposes, namely, the promotion of knowledge of the materials of engineering.

Plan Foundry Conference At University of Iowa

The engineering college of the University of Iowa, the Quad City chapter of the American Foundrymen's association and the Northern Iowa Foundrymen's association are jointly sponsoring a foundry conference at Iowa City, Iowa, Oct. 30-31. Three technical sessions will be held in the engineering building of the university. A dinner will be served on the evening of Oct. 30.

This conference, held for the purpose of bringing foundrymen of the district together for discussion of fundamental, practical problems, will have as speakers outstanding leaders of the industry. The program has been arranged in the form of symposiums or roundtables with several speakers discussing most topics.

The tentative program has been announced as follows:

Friday, Oct. 30

MORNING

"Sand Control," by Horace Deane, Deere & Co., Moline, Ill., and H. W. Dietert, Harry W. Dietert Co., Detroit.

"Demonstration of Sand Control Methods," by H. W. Dietert, Harry W. Dietert Co., Detroit.

AFTERNOON

"Fundamentals of Testing Cast Metals," by Prof. H. L. Daasch, Iowa State college, Ames, Iowa.

"Demonstration of Testing Cast Metals," by staff of University of Iowa.

"Cupola Practice," by Fred J. Walls, International Nickel Co. Inc., New York; E. K. Smith, Electro Metallurgical Co., Detroit; and V. A. Crosby, Climax Molybdenum Co., Detroit.

EVENING

Dinner.

Saturday, Oct. 31

MORNING

"Alloy Cast Iron," by R. G. McElwee, Vanadium Corp. of America, Detroit; F. J. Walls, International Nickel Co. Inc., New York; E. K. Smith, Electro Metallurgical Co., Detroit; and V. A.

Crosby, Climax Molybdenum Co., Detroit.

"Nonferrous Foundry Practice," by D. M. Curry, International Nickel Co. Inc., New York.

"Electric Furnace and Rotary Furnace Melting of Cast Iron," by W. R. Jennings, John Deere Tractor Co., Waterloo, Iowa; R. G. McElwee, Vanadium Corp. of America, Detroit; and D. J. Reese, Whiting Corp., Harvey, Ill.

New Plastic Refractories For Furnaces Announced

Two new plastic refractory materials, known as Champion furnace patch and Champion ramming mix are announced by the Champion Spark Plug Co. and the Detroit Electric Furnace Co., both of Detroit. The materials have been developed especially for high-temperature melting furnaces and are the results of developments in a plasticizing process for andalusite base mullite. The materials are similar chemically but differ in screen size, the ramming mix being of coarser texture, adapted for ramming deep patches or monolithic linings. Both products have been field tested in a number of different operations.

Report English Process For Surface Alloying

Through the metals and minerals division of the bureau of foreign and domestic commerce, Washington, word comes of a new surface alloying process reported by Consul James R. Wilkinson, Birmingham, England, to have been developed by two Midland engineers who plan to establish a plant at Birmingham where the new process will be employed.

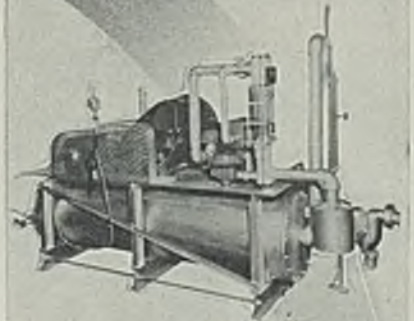
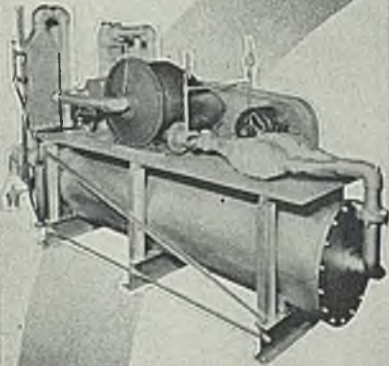
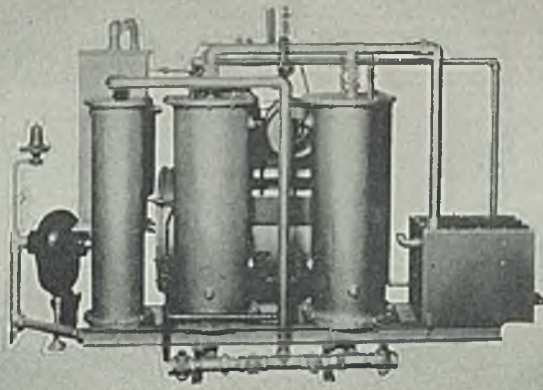
The process is described as being

comparatively simple, operating on an electrochemical principle. Apparently a medium has been evolved which, under the action of an electric current, breaks down into the component elements, and a metal immersed therein becomes impregnated with these free, active agents. For example, it is stated, if the object to be treated is a sheet of steel and the free metal in the medium is copper, the latter will actually enter into the surface of the sheet to form a surface layer of iron-copper alloy, and will not merely deposit on the surface as in plating.

Naturally many claims are being made as to the merits of the process for rustproofing metal surfaces and immunizing them to all forms of corrosion, but until further information is available on exact details of the method and the mechanics of metal penetration, as well as cost and extent of equipment, it is difficult to give any accurate appraisal of possibilities.

Publish Data on Application Of Bearings to Aircraft

New section of the *Timken Engineering Journal* showing the application of roller bearings to landing wheels, tail wheels, swivels and rocker arm assemblies, has just been published by the Timken Roller Bearing Co., Canton, O. Bearing sizes for landing and tail wheels have been standardized by the company in accordance with military and naval regulations and the various wheel and tire manufacturers. The new section is a 16-page unit and all data given are coordinated with ratings given in the *Timken Journal*. Copies of the section are available on request.



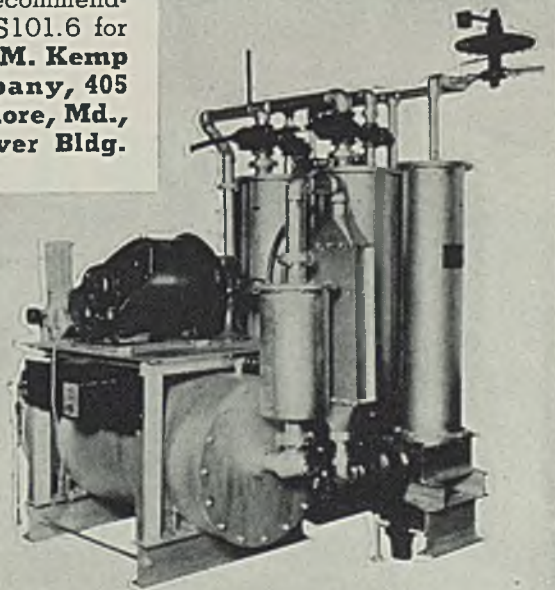
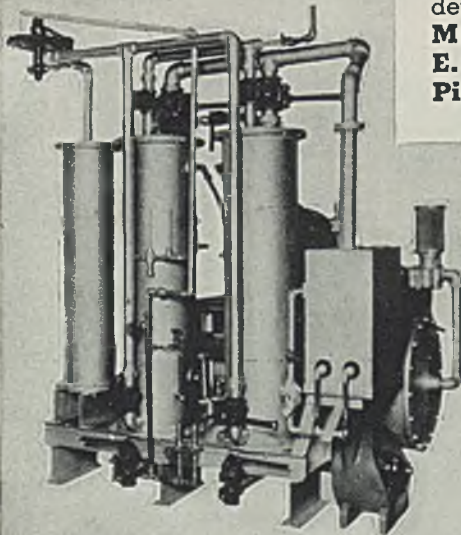
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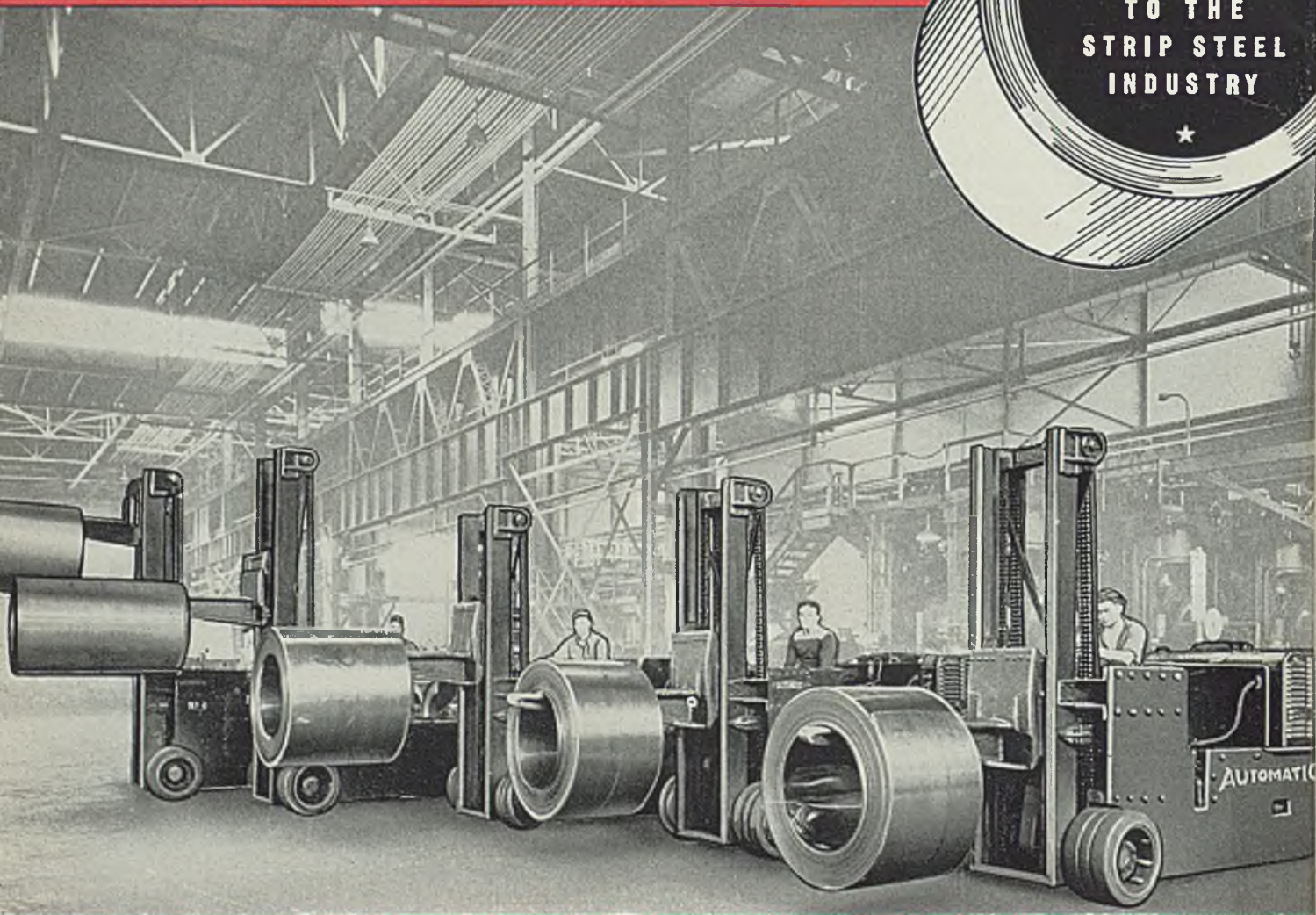


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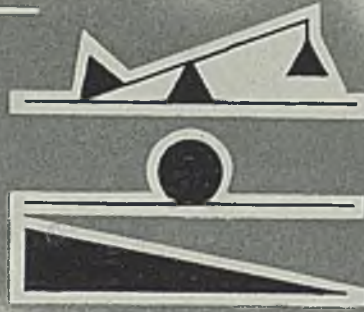
★ A vital part of the new continuous strip steel process are the facilities for coil movement throughout the mill. From continuous pickler to rotary shears, storage or cold roll, these "AUTOMATIC" HEAVY DUTY, FRONT WHEEL DRIVE, CENTER CONTROL RAM TYPE TRACTORS illustrated are keeping step with production schedules in the most modern strip steel coil mills in the country. Whether your coils weigh 7,000 pounds or 30,000 pounds—36" to 93" wide, "AUTOMATIC" RAM TYPE TRACTORS transport and stack these heavy coils of strip steel quickly, safely, efficiently and at low cost.

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Refrigerator Cabinets Sorted Enroute From Factory to Warehouse

RECENTLY completed warehouse of the General Electric Co. at its refrigerator manufacturing division in Erie, Pa., is the latest model of an integrated materials handling system, which reaches back into the packing department, provides a smooth-flowing warehousing and delivery system, and completes its task only after shipment has been deposited in the freight car.

Shipping departments and warehouses are often "stepchildren" of a factory family, left out in the cold without a merited share in the plant materials handling system. In manufacturing departments, modern

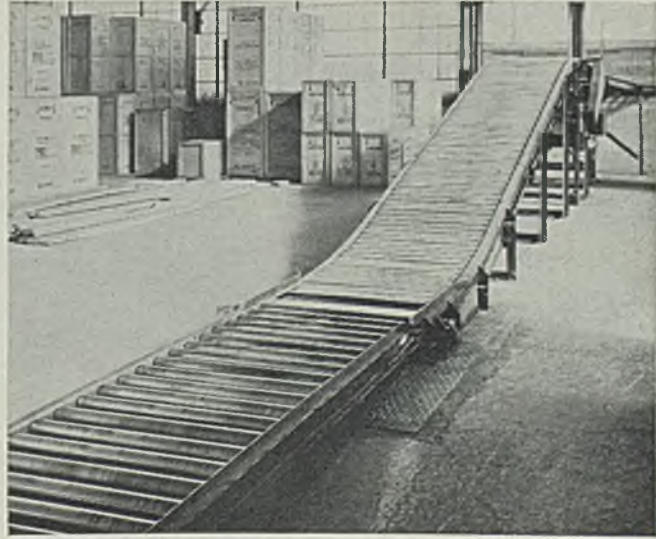
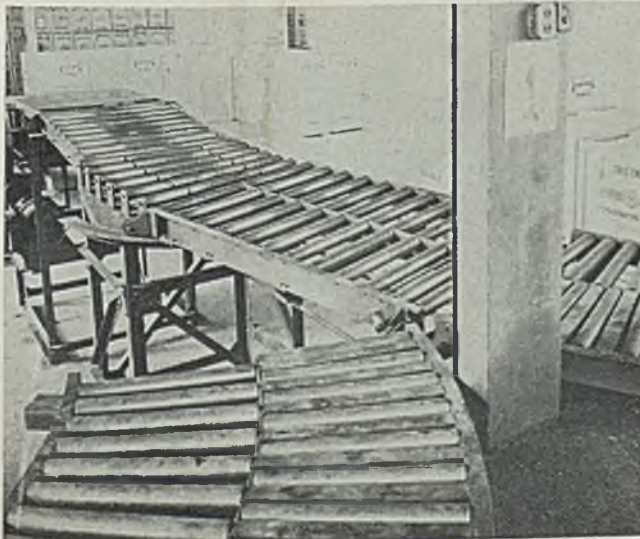
methods of transporting materials and parts from operation to operation may be common, but, the job of making a product completed, the modern handling touch often ends, and the task of the shipping department begins under a handicap.

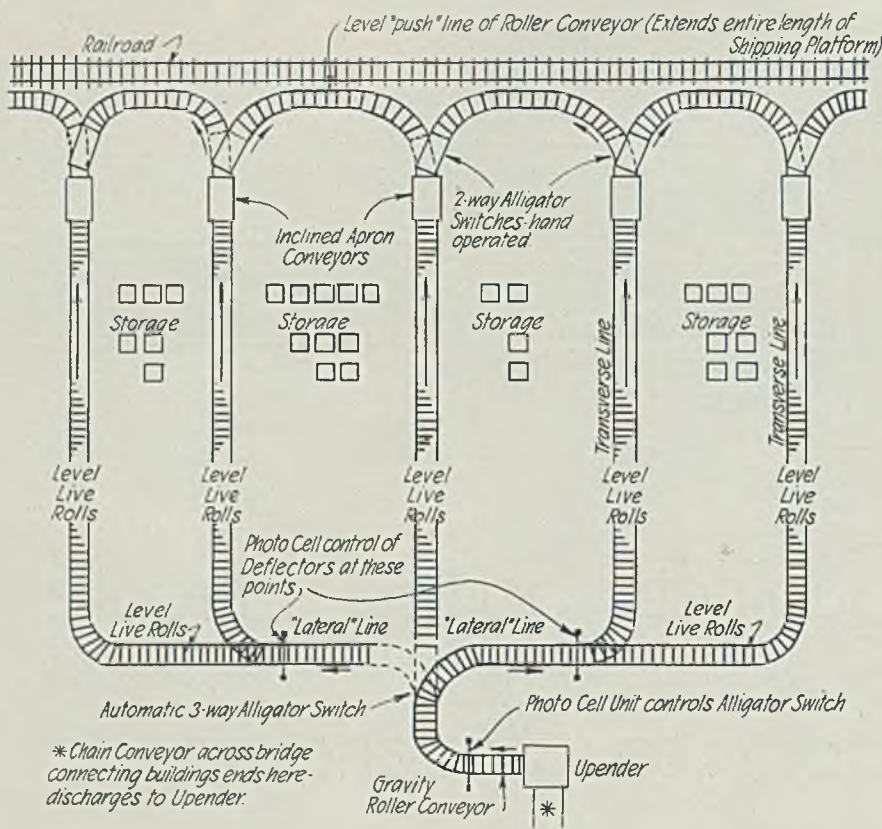
In recent years, fortunately, this

THESSE conveyors facilitate the warehousing of refrigerators. (Left)—Two-way hand-operated alligator switch which receives from the inclined apron conveyor and switches either right or left on platform to reach desired car door. (Right)—Inclined apron conveyor fed automatically from live roll transverse lines and discharging to gravity rolls and hand-operated alligator switch

condition has been receiving greater recognition. An additional incentive to corrective measures has been the necessity, born of better business, of providing speedier, safer and more economical physical distribution of finished goods.

The materials handling system in this new warehouse is based on a series of interconnecting roller conveyors, controlled at strategic points by photo-tube actuated automatic switches, and also at certain points by hand-operated switches, serviced at storage areas by overhead traveling crane, and providing not only transportation through the entire warehouse, but an automatic sorting





of the various sizes of refrigerators while they are moving through to their respective storage points.

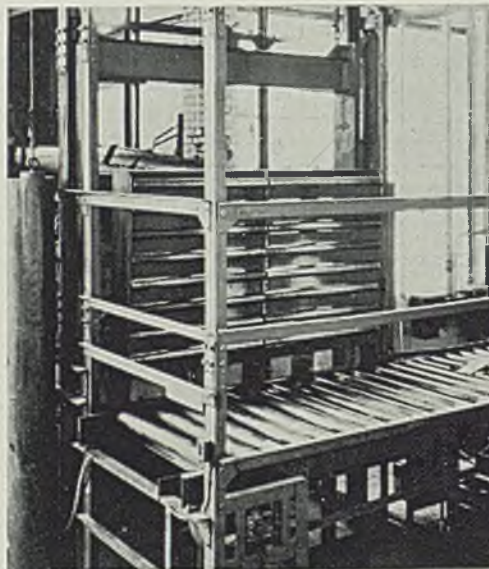
An enclosed overhead bridge connects the packing department in the manufacturing building with the new warehouse. Containers, in which refrigerators have been packed carefully, are transported by overhead chain conveyors across the bridge, and deposited on their sides on an upender, which immediately, in an automatic operation, places them on end, and starts them on the way to their allotted places in the storage areas.

From the upender, containers pass on a gravity roller conveyor around a right-angle curve to a point approximately in the center of two lateral lines of conveyors, where a 3-way alligator switch automatically sends them either dead ahead on a transverse line running down the center of the warehouse, or left or right on either of two lateral lines, each of which in turn connects with two transverse lines. Thus, a total of seven separate, but interconnecting, conveyors is employed, covering all parts of the storage areas.

The 3-way alligator switch is controlled automatically by a photo-

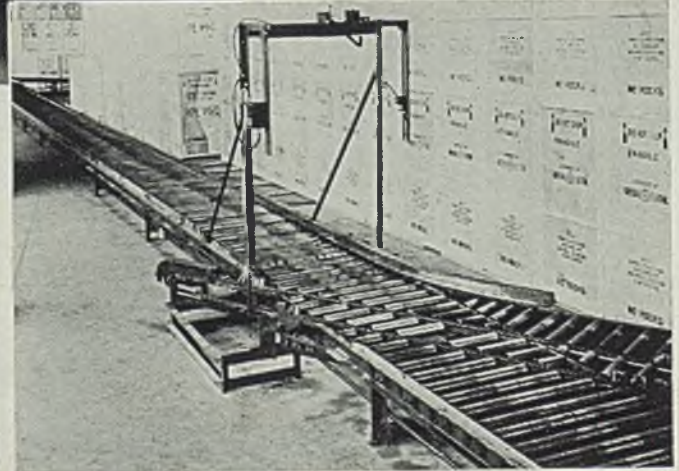
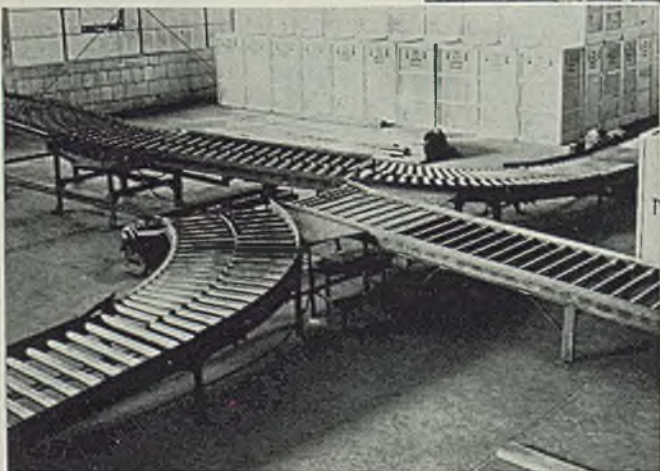
IN the sketch above is shown the general arrangement of conveyors in the refrigerator warehouse of the General Electric Co., Erie, Pa.

IN the illustration below is shown the 3-way alligator switch which connects three lines of roller conveyors serving various parts of the warehouse



STARTING point of the refrigerator warehouse system is the upender shown at the left. Cases from the packing department arrive at this point and are placed on end automatically. The illustration below shows a close-up of a deflector in the lateral line controlled by photoelectric cell. This deflector inserted in the line of the live roller conveyor separates containers according to height

—Illustrations courtesy Logan Co., Louisville, Ky.



FRAYS

*Ohio Ferro-Alloys Corporation
Canton, Ohio*

electric cell unit, which selects the correct switch position, depending upon the length of the container, dispatching the latter to its predetermined position. The three lines served by this switch are level live roller conveyors. An additional selection, by height of case, is made by two other deflectors inserted in the lateral lines and controlled by additional photocell units.

Thus, by means of the two lateral and the five transverse lines, containers may be not only conveyed to all parts of the huge warehouse, but also sorted enroute so that on arrival they are of the proper type and model. When they arrive at point of storage, they are removed by crane from the conveyor and tiered. When ordered out for shipment, the operation is reversed, the crane removing them from the piles and placing them on one of the five transverse conveyor lines. The latter deliver them to inclined aprons, located at the railroad siding end of the building, where they are discharged into 2-way hand-operated alligator switches leading out of the warehouse, and delivering either to right or left on a long line of roller conveyors extending the entire length of the shipping platform.

The overall lengths of the two lateral conveyors are, respectively, 178 feet 33/16 inches and 153 feet 43/16 inches. The center transverse line is 208 feet 8 11/16 inches, the next two run 216 feet 11 3/4 inches each and the two outside lines are 221 feet 10 inches each.

♦ ♦ ♦

Will Install Monorail

GARDNER W. CARR, vice-president, Boeing Aircraft Co., Seattle, states that the company's new factory building will not be ready

for occupancy until about Oct. 15. While the exact methods of handling materials are not yet ready for announcement, Mr. Carr says that monorail equipment will be installed in at least a portion of the new plant.

♦ ♦ ♦

Speedy Car Dumper

A CAR dumper of new design is being constructed for the Wheeling and Lake Erie Railway Co. This will be used in connection with loading of coal from freight cars to lake vessels at Huron. The new dumper will not be completed until the early part of 1937, but it is said that it will be unique in many of its features of construction, and may result in establishing a new record for speedy handling of coal at this important interchange point.

♦ ♦ ♦

Wire Rope To Haul Trailers

STEEL fabricators, contractors and others confronted with the problem of transporting long lengths of steel, booms, masts and the like, undoubtedly will be interested in a device used by lumbermen in Washington and Oregon in carrying logs and poles, up to 120 feet long on truck and trailer.

According to an article in *The Yellow Strand*, published by Broderick & Bascom Rope Co., St. Louis, the northwest lumbermen control the steering of the trailer by means of crossed wire ropes connecting the trailer with the truck or tractor.

Eyed hooks with turnbuckle attachments are made fast to the rear of the truck or tractor frame from 3 feet to 4 feet apart and equidistant from the center of the rear

axle. Lugs with eyes are attached to the trailer frame as far apart as the attachments on the truck and equidistant from the trailer swivel bunk.

The steering lines are of wire rope, usually 3/8 to 1/2-inch in diameter. These are attached ahead of the reach pivot to prevent their breaking when the truck and trailer are making sharp turns. The turnbuckles permit adjusting the lines to equal length.

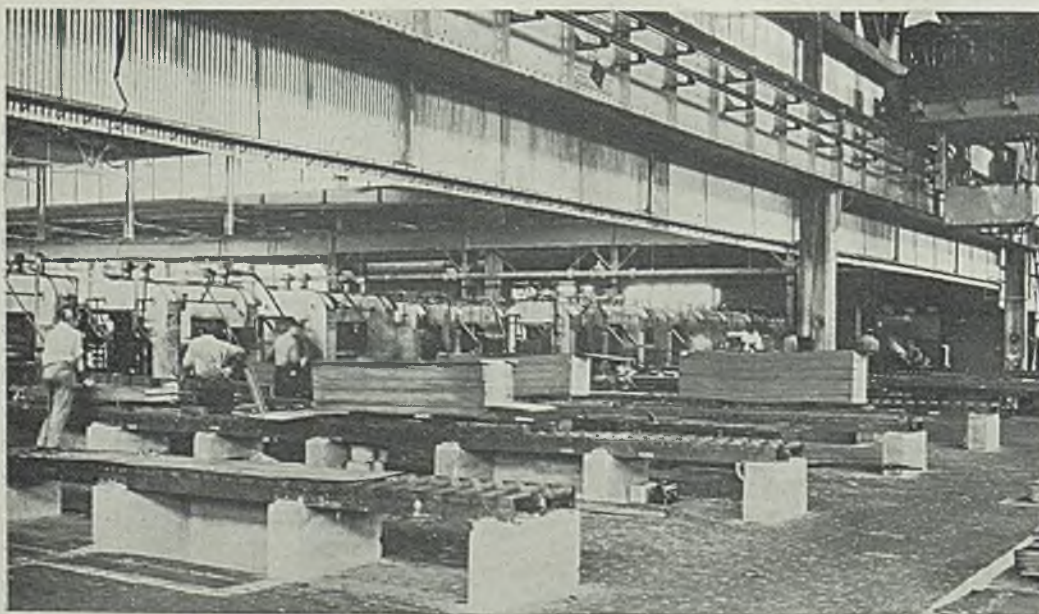
When this simple steering rig is properly adjusted the trailer, although traveling 100 feet behind the tractor, follows closely in its tracks.

♦ ♦ ♦

Co-ordinated System

ROLLER conveyors, monorail, electric industrial trucks and two-wheeled buggies are all components of a co-ordinated materials handling system in the plant of the Phoenix Mfg. Co., Joliet, Ill. In one of the earlier steps in the manufacture of the company's product, horseshoes, billets are rolled into bars, notched and then cut to length into blanks. The connecting materials handling link throughout these operations is a gravity roller conveyor. From the latter the blanks are loaded on steel leg skids, each of which holds approximately two tons of blanks.

The skids are picked up to a low-lift electric truck and taken to the machine shop where the blanks are bent and pressed into shape, the formed shoes being dropped on two-wheeled buggies. The latter are transported by lift trucks to the punching and finishing machines, and from that point are picked up and carried by monorail conveyor to the final process.



TYPICAL co-ordination between conveyors and crane. The sheet packs move out on conveyors until they arrive at edge of crane bay where they are easily picked up and moved to storage areas. Photo courtesy Mathews Conveyor Co.

GRINDING A HEPPENSTALL ROTARY PINCH KNIFE

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HEPPENSTALL COMPANY

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✓	ANALYSIS
✓	HARDNESS
✓	SIZE
✓	FINISH

Vari-Pitch Sheave adjusted for minimum diameter-low speed.

15% TO 25% VARIATION IN SPEED

Vari-Pitch Sheave adjusted for maximum diameter-high speed.

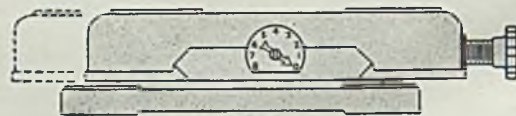
If YOU ARE INDIFFERENT
to efficiency... *then*
this page will not interest you

Competition is such today, that profits, in most cases, depend on the difference between approximate efficiency and high efficiency.

It is this fact that makes the new Vari-Pitch Sheave, for Texrope V-Belt Drives, of the most vital importance in the power transmission field. By a simple adjustment that takes but a moment, the diameter of the Vari-Pitch Sheave may be altered to a degree which will give a variation in speed from 15 to 25% per sheave. That means that you can experiment through a long range of fractionally increased or decreased diameters to ascertain at just what speed your machinery shows the highest possible efficiency; it also means that you can make different products on the same machine, some of which may require higher speed and some lower—and all this can be done

without dismantling and buying new drives, but simply by taking a few moments to make the desired adjustment.

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



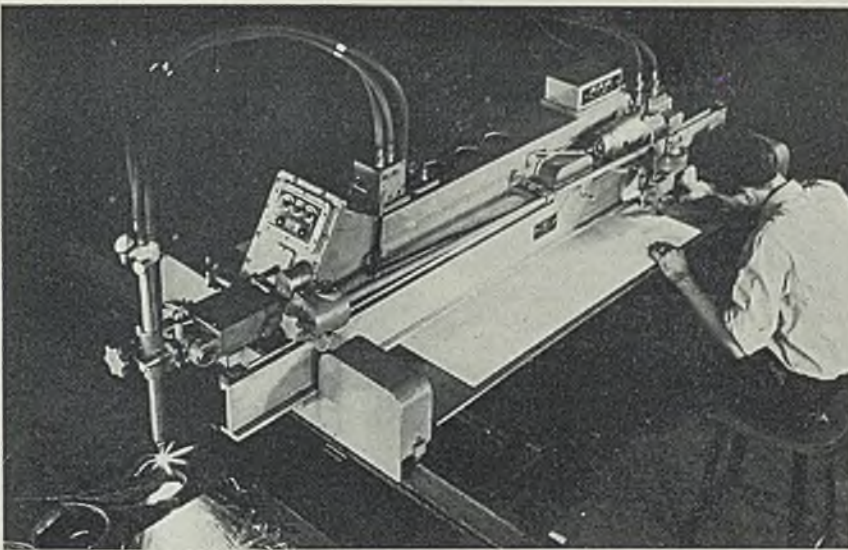
Straitline Automatic Ball Bearing Motor Base developed for the Motion Control Vari-Pitch Sheave. You simply turn the hand-wheel to alter the diameter of the sheave and simultaneously the base moves forward or backward to maintain the proper belt tension.

Write for Vari-Pitch Bulletin No. 1261

Belts by Goodrich

TEXROPE DIVISION
ALLIS-CHALMERS





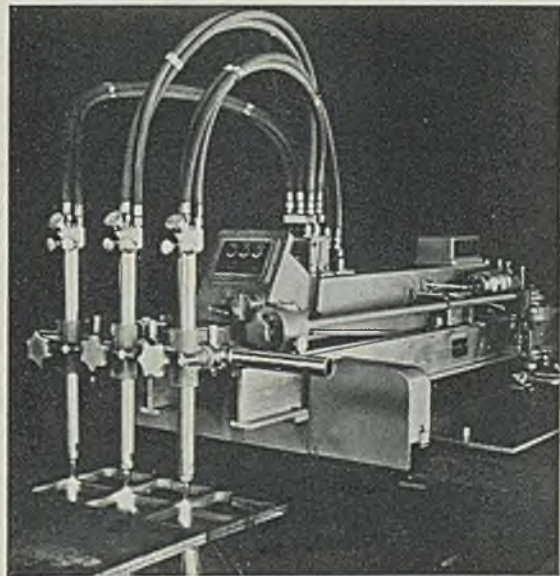
*S*HAPES infrequently cut are handled by hand tracing as here shown. For operations occurring more regularly, templets are made which the machine follows automatically, putting the work on a production basis

Wide Range of Shapes Is Produced by Automatic Flame Cutter

CUTTING of steel shapes with the oxyacetylene flame has assumed a role of distinct value in the metalworking industries. Flame cutting offers much—production is speeded up, costs are lowered, design is more flexible, retooling expense for new models is lessened. The progress of this process has increased with the development of flame cutting machines which permit a range of operations from simple straight-line cutting to production of complex shapes.

A recent contribution to flame cutting is found in the new Oxweld CM-12 shape cutting machine just announced by Linde Air Products Co., New York. A number of outstanding features distinguish this from previous equipment.

The machine is equipped with a specially-built 1/3-horsepower reversible motor. Its speed range is from 1 1/2 to 75 inches per minute. Equipped with standard nozzles it will cut material up to 12 inches in thickness and special nozzles are available which permit materials as thick as 20 inches to be cut. A cut-



Multiple blowpipes up to five in number can be utilized on this automatic flame cutter. Dual controls make possible control from either tracing or blowpipe position

ting area of 51 x 144 inches is covered and circles from 2 to 24 inches radius can be produced.

All important controls are duplicated to make operation possible from either blowpipe or tracing position and the machine can be rapidly converted from templet trac-

ing to hand tracing. An accurate and direct transference of motion combined with freedom from friction and vibration and a sensitive tracing mechanism make precision cutting possible.

Alloys have been used in its construction to impart the necessary

stability and rigidity and at the same time to provide a high strength-weight ratio.

The range of applications for the machine is wide. When once started in the cut it can follow intricate shapes without any attention from the operator. Automatic straight line cuts up to 144 inches long can be made parallel to the machine length without the use of templates or hand guiding and similar cuts 51 inches long can be made at right angles to the length of the machine. In addition straight lines can be cut at any desired angle in the horizontal plane.

Shapes of all descriptions can be cut either by using templates for large scale production work or by the hand tracing method for designs not as frequently used. A special circle cutting attachment is provided for 4 to 48-inch diameters. Bevels are easily made at any angle from 0 to 90 degrees. Multiple cutting has also been provided for, as the machine is designed to carry from 2 to 5 blowpipes for this type of production.

The ability of this machine to cover such a wide range of the flame cutting operations will broaden the

scope of the process for many who are already using it and will increase its availability generally. The introduction of machines capable of precision cutting is enabling many manufacturers to produce flame cut parts which require little or no finishing.

Recent exhaustive research has shown that flame cut surfaces of the more commonly used structural metals are satisfactory for almost any type of mechanical treatment or service. The advances of flame cutting are recognized by the revisions in many codes which now widely permit the use of flame cut materials. The result of this acceptance of the process is marked throughout industry by the adoption of many new applications.

Locomotive parts, involving the production of heavy members and of intricate shapes and often requiring three dimensional cuts are flame cut to meet the most rigid specifications. Many parts of cranes and conveyors are produced by flame shaping and such equipment as power shovels, truck bodies, concrete mixers and others requiring ruggedness and strength contain many flame cut members.

more widely used. In the field, furnace facilities usually are not available, and in the shop, fabricated equipment often is of such size and shape that it cannot be moved or handled in a stress-relieving furnace.

A wide range of portable electric heaters for stress relief work is manufactured by H. O. Swoboda Inc., Pittsburgh, and in recent months the company has been supplying a new type of heater to various customers. This heater, shown in the accompanying illustration, clamps together around pipe to form a complete circular unit. Arranged in three sections, the heater is adjustable to pipe ranging from 8 to 12 inches in diameter with maximum wall thickness of 1 1/4 inches.

Capacity of the heater is 27 kilowatts and it can be used on either 220 or 440 volts, 3 phase, with one heater section connected to each phase.

With the heater is supplied a portable automatic control panel for regulating and controlling the temperature during stress relieving and cooling. The control consists of a contactor, transfer switch for transferring from 220 to 440 volts or vice versa, push button, current input regulator for regulating the heating up and cooling off periods for various thicknesses of pipe, and automatic recording pyrometer for recording temperatures and controlling these temperatures during stress relieving.

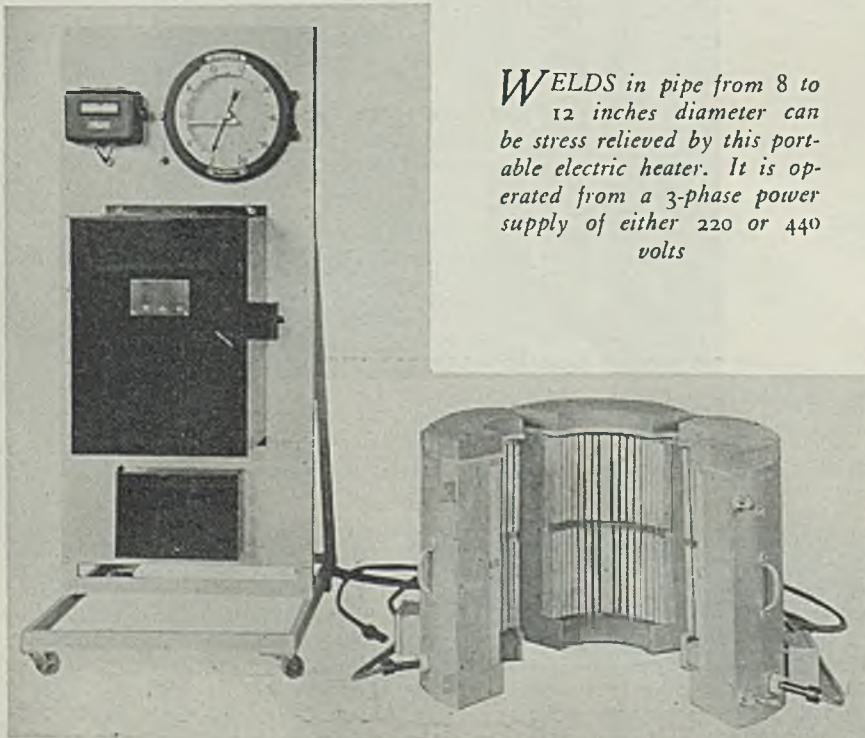
Location holes are provided in the heater section for inserting thermocouples for controlling and reading the temperature of the pipe. Plug type terminals are used and the control is supplied with a 50-foot length of flexible cable with plugs for making connections to the heater sections.

To insure uniform stress relieving temperature in the pipe for a distance of six times the pipe thickness on each side of the weld and to allow the temperature beyond this area to diminish gradually so that the temperature differential between hot and cold sections is not too abrupt, the heating face of the heater sections is 22 inches long.

Pipe Welds Are Stress Relieved By Portable Electric Heater

BECAUSE it is sometimes extremely difficult to accomplish proper stress relief of welded seams in large pressure vessels, high-pres-

sure piping, nozzle attachments, and similar equipment, the use of portable electric heaters which may be clamped to the work is becoming



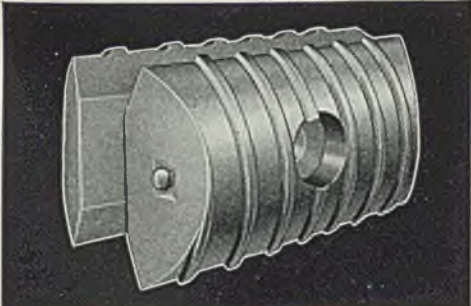
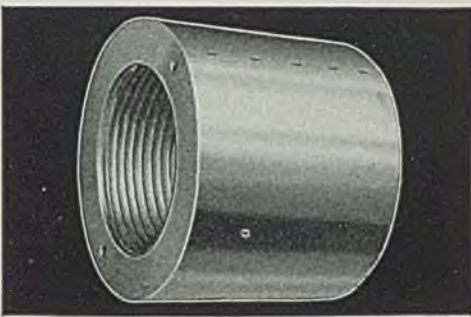
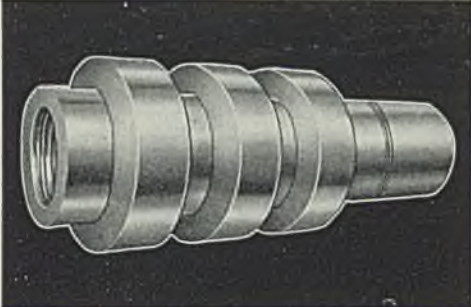
WELDS in pipe from 8 to 12 inches diameter can be stress relieved by this portable electric heater. It is operated from a 3-phase power supply of either 220 or 440 volts

Stainless Turbine Blades Repaired by Welding

Use of columbium-treated stainless steel welding rod was recently tried out successfully for the building up of broken cast stainless steel turbine vanes. This rebuilding process had been tried by other means and proved unsuccessful. It is interesting to note how rapidly new welding rods designed to meet a specific problem are seized upon for solving other problems of a similar nature.

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D H S Bronze Recommended for:

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|-------------------------|------------------------|-----------------------|
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| Bridge Expansion | Gate Stems | Telescopic Tubes |
| Tracks and Shoes | Pump Bodies | Lock Operating Parts |
| Pintles | Pump Impellers | Slippers |
| Trunnion Bearings | Centrifuge Baskets | Gears—Spur, Bevel |
| Bearings, Heavy Duty | Jordan Knives | Tunnel Liner Castings |
| Discs | Shaft Sleeves | Needle Valve Seats |
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Ultimate Tensile Strength (lbs. per sq. in.).....	120,000	115,000	105,000	90,000
Yield Point.....(lbs. per sq. in.).....	95,000	90,000	60,000	45,000
Elastic Limit.....(lbs. per sq. in.).....	60,000	55,000	50,000	40,000
Elongation—per cent in two inches.....	12	12	17	25
Reduction of Area—per cent.....	12	12	17	25
Brinell Hardness No.....	240	275	200	185
Weight—lbs. per cubic inch.....	.275	.278	.280	.285

Note: Recommended for applications where lineal contact speeds do not exceed 250 feet per minute.

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BALTIMORE, MARYLAND

WELDING, etc.—by Robert E. Kinhead

Electric Arc To Purify Metals in Gaseous State

GILBERT E. DOAN and William C. Schulte, in a recent paper describing experiments in the welding of pure iron in the gas argon, conclude that the impurities in the iron appear to be removed by differential evaporation in the arc in argon. Thus, trained observers seem to confirm by experiment a theory which has been advanced before to the effect that the electric arc may be used to separate metals from impurities in the gaseous state.

It is at least conceivable that the problem of separating a heterogeneous mass of metal comprising such elements as iron, manganese, sulphur, phosphorus, oxygen, nitrogen, etc. would be easier in the gaseous state than in the molten state. In the molten state, these elements and their combinations must be separated by the most complex chemical means. There are some reasons for believing that at arc temperatures in the gaseous state, the separation might be brought

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.

about by mechanical force such as in a centrifuge and that the operation would be aided by the different temperatures at which the elements solidify.

The implications of such a method are broad in the reduction of metal ores, to say nothing of the probable effect on the production of the common metals in open hearth, bessemer, electric furnace and crucible.

It is significant that the broad program of research sponsored by the American Welding society and the American Institute of Electrical Engineers of which the above mentioned paper is a part in nearly every case produces information which is just as applicable to the metal producing industry as it is

to the welding industry itself. The leadership in the production and working of metals may be passing to this new group.

• • •

Inventions

EXERCISE of inventive ability is the basis of most human progress. In its narrowest sense, an invention is an original idea which can be patented. In the broader and more correct sense, there is no relation between the act of invention and the fact of patentability. Thus, the idea of leasing welding apparatus at a nominal sum in return for a contract for the sale of supplies was an invention in merchandizing, in a broad sense; in the same way that the improvement of certain details of the welding apparatus is an invention in a patentable sense.

The great need of the welding industry has always been for inventions. The rate at which they have been forthcoming and adopted accounts for the prosperity of the industry and its future prosperity depends on precisely the same factors.

As a general proposition the number of inventions in any field is in direct proportion to the number of people interested in that field. Infrequently do more than half the inventions in any industry come from research departments or individuals directly employed by the industry.

Flash Welder Jaws Can Take It



SERVICE conditions under which steel jaws of flash welders operate bring quick disintegration. Recent development to curb this disintegration and lengthen jaw life is the application of hard facing to the jaws. Haynes Stellite was used for this facing, since it retained its hardness even at red heat

Sparks and Flashes

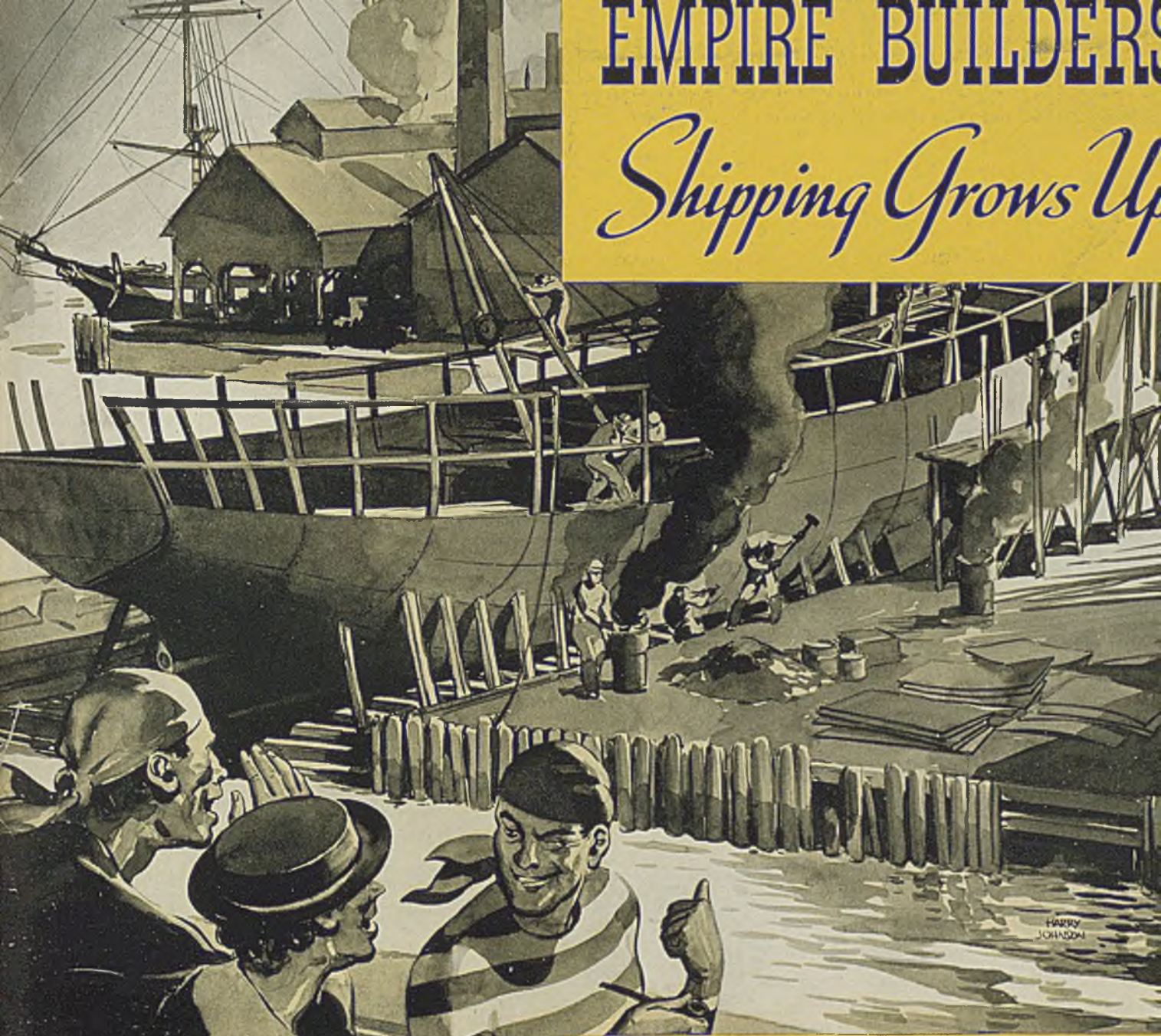
BRONZE WELDING is fact; it often eliminates warping difficulties in repair work; it is applicable to almost any metal including cast iron; it is almost foolproof. Bronze welding is welding. The fact that the melt rod is bronze does not change the fundamental condition that the joint is held together by molecular cohesion and is therefore a weld.

* * *

PROF. EDGAR DOUGLAS ADRIAN of Cambridge in England in his paper at the Harvard Tercentenary could not hold out much hope for mankind until human brains become about twice their present size. Having recently listened to an otherwise intelligent business man air his political views recently, we are inclined to agree.

EMPIRE BUILDERS

Shipping Grows Up



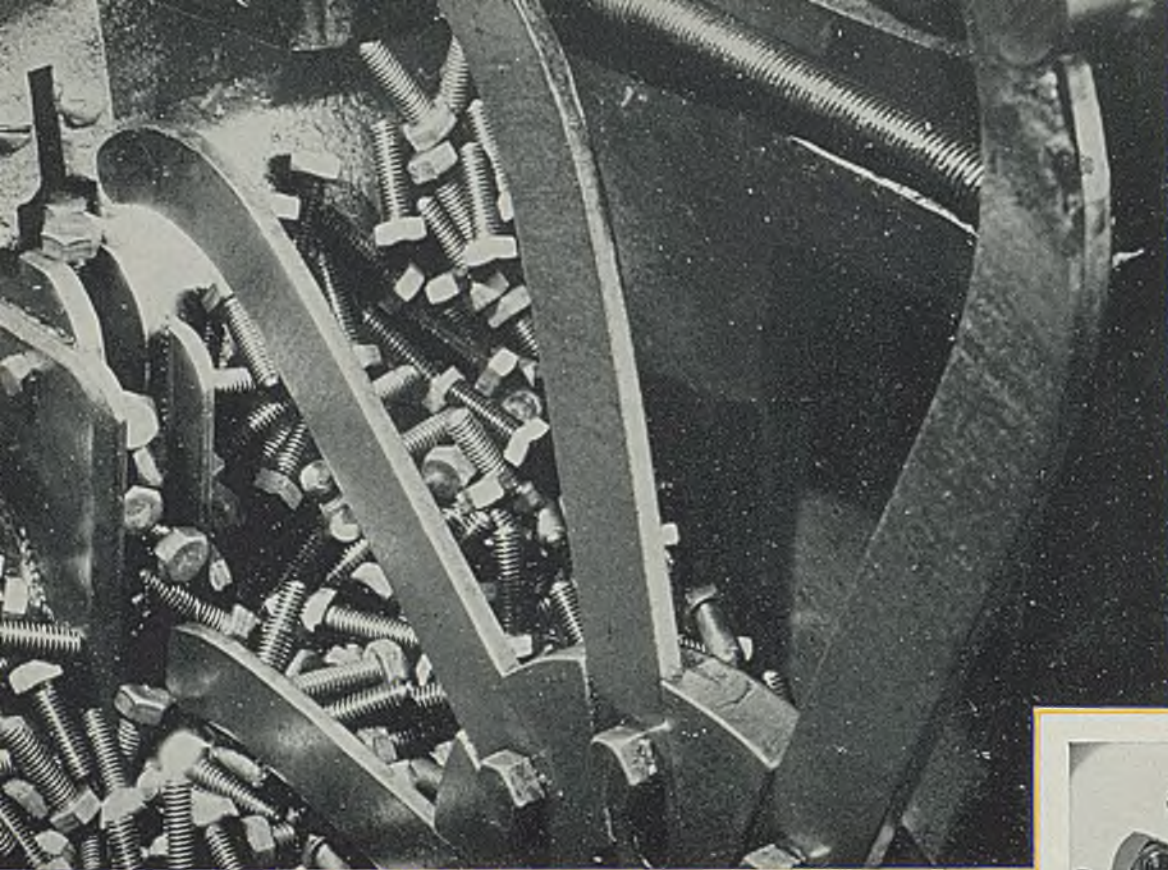
HARRY JOHNSON

IN the 1878 issue of Lloyds' Register of British and Foreign Shipping, the screw steamer "Annie" was classed as *steel*—the first ship to be so rated. Shipping had grown up—within the span of a single generation ships of *steel* supplanted vessels of wood and iron carrying the cargoes of the world. In this swift development, R B & W—already backed with 33 years of experience—played an important part by furnishing EMPIRE Brand Bolts, Nuts and Rivets for the assembly of hulls, machinery and equipment necessary for propulsion and navigation.

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NUTS: Cold Punched · Semi-Finished · Hot Pressed · Case Hardened · Slotted · Castle
RIVETS: Standard · Tinners' · Coopers' · Culvert
SCREWS: Cap · Machine · Hanger
WASHERS: Plate · Burrs
PINS: Clevis · Hinge
MATERIALS: Alloys · Steels · Non-ferrous Metals
RODS: Stove · Seat · Ladder
PLATED PARTS: Cadmium · Zinc · Chromium · Nickel · Hot Galvanized · Copper · Tin
SPECIAL UPSET AND PUNCHED PRODUCTS



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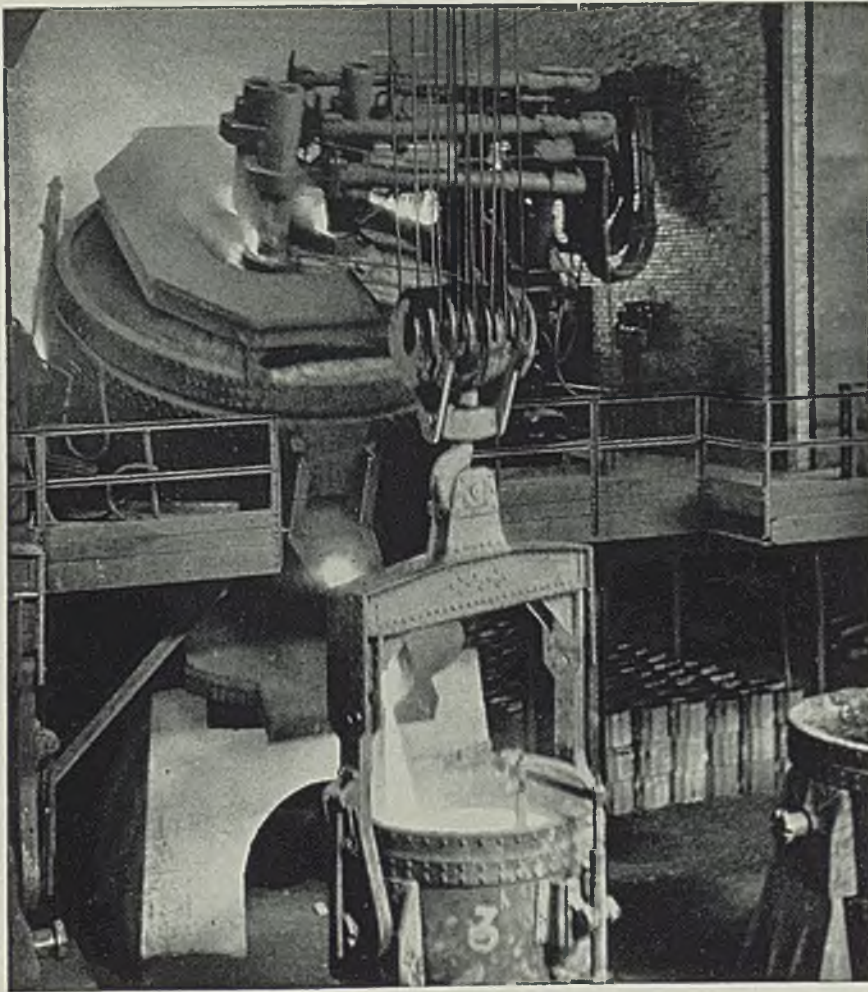
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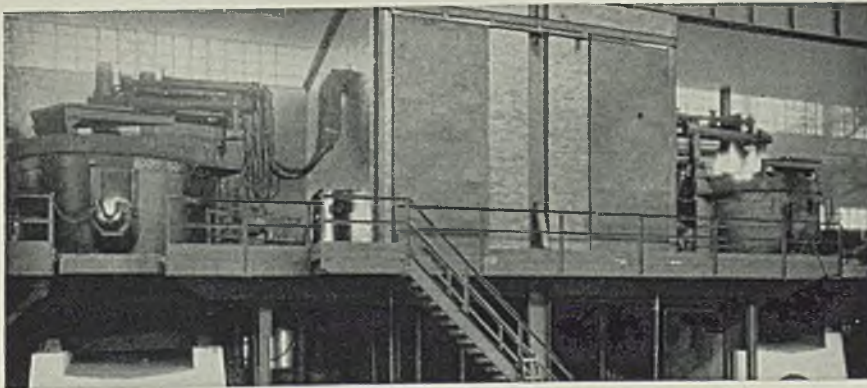
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(Above) Pouring one of this pair of Type 25 Heroult Electric Furnaces.
(Below) A double installation of Type 25 Heroult Electric Furnaces.



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WHEN you melt or refine any kind of ferrous metal—alloy and tool steels, iron and steel castings—by either basic or acid process, you will get efficient operation and excellent metallurgical performance with a Heroult Electric Furnace.

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- 1—Extremely sturdy design lowers upkeep costs.
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UNITED STATES STEEL

Current Practices in Wire Galvanizing as They Affect Ductility and Other Properties

PROTECTIVE coatings for steel in its many shapes and forms have long been a problem with engineers. Many metals, paints and wrappings have been tried with varying degrees of success. Durability under given conditions, cost of material, ease of application, nature and form of object being coated, are all factors governing the choice of protective media.

Zinc has been found to possess properties which, more nearly than other material, fulfill all the requisites of a good coating. The electrochemical properties of zinc, including its electropositive position to iron, affording maximum protection to base metal, are too well known to warrant further attention. It is desirable, therefore, to pass on to the more practical phases of applied zinc coatings and learn what is transpiring among the various schools of thought.

Two Common Methods

The two common methods in use for the application of zinc are the cold or electrolytic process, and the hot or molten zinc immersion process. The electrolytic method will be considered first.

Electrolytic galvanizing is not new to industry. The early days of the art

BY C. W. MEYERS
Development Engineer, American
Steel & Wire Co., Chicago

THIS is the first installment of a discussion of the effect of current practices in wire galvanizing upon the physical properties of the zinc coating. The discussion was presented by Mr. Meyers at a recent meeting of the Edison Electrical Institute in Detroit. The second and concluding installment will appear in an early issue of
STEEL

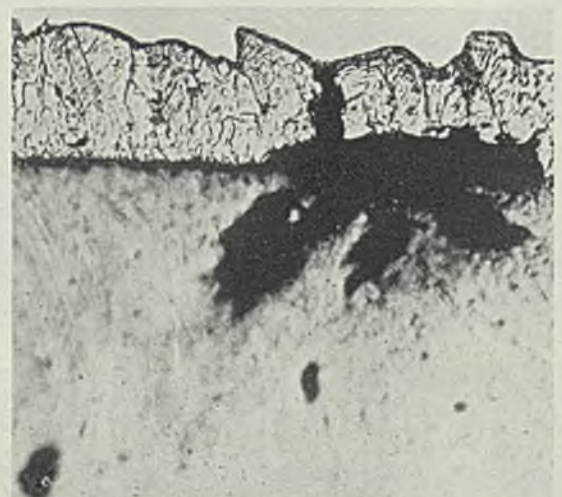
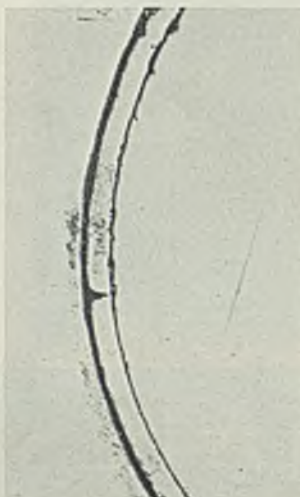
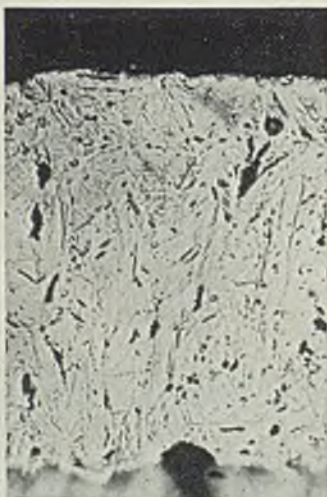
FIG. 1 (left)—This zinc coating was applied at high current density. Note highly porous condition. $\times 500$. Fig. 2 (center)—Definite break shown in this coating resulted from a bad spot in the surface of the bare wire or from a gas pocket in the quickly deposited coat. $\times 25$. Fig. 3 (right)—Illustrating the effect of surface imperfections in the bare wire. Except for this imperfection, the coating is dense and free from pores. $\times 500$

were marked by difficulties attendant upon obtaining high-purity anodes and stable and pure electrolytes. Development of the past few years have brought about two distinct practices. The first is merely the extension of older ideas of soluble (zinc) anodes and sulphate or cyanide electrolytes. The second is the use of insoluble anodes plating directly from an electrolyte prepared from ores leached in connection with the unit.

Current Densities Increased

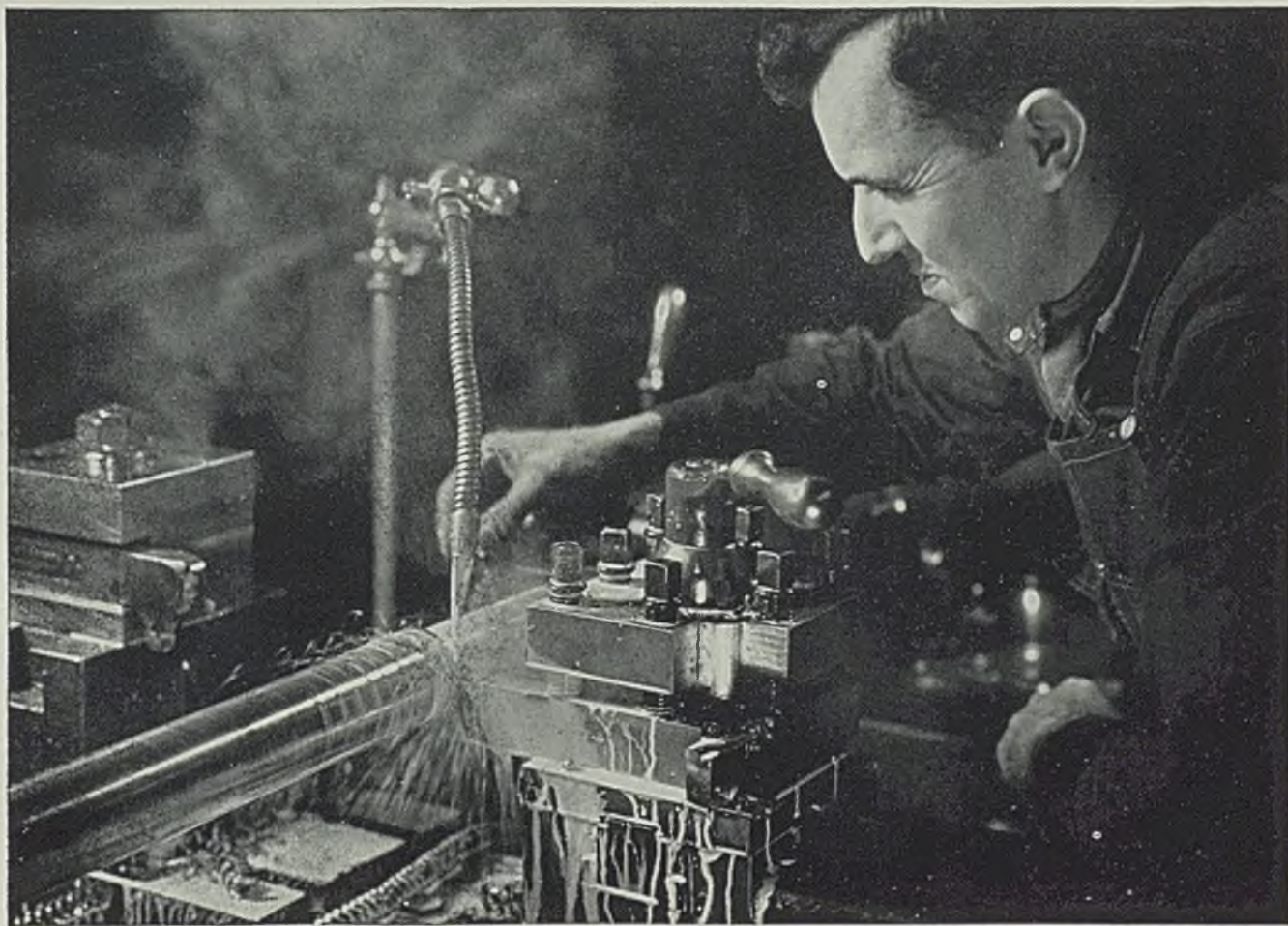
Both processes are concerned with higher speeds of application in order to reduce costs and compete more closely with hot methods. In the main, this higher speed has been obtained by increasing current densities. Formerly current densities of 50 to 100 amperes per square foot were considered good practice. Today 1500 to 2000 amperes per square foot are being used. Electrolytes are circulated and cooled to eliminate as much as possible gassing and boiling of solution which result in porous coatings.

The effect of these higher current densities is illustrated by the accompanying photomicrograph (see Fig. 1) at 500 diameters. This shows a weight of coating of 2.27



THE FIRST TEST OF A BAR IS AT

The Nose of a Tool



WHEN you select steel bars, consider first their machinability. Make sure you're getting bars that, under fixed conditions of speed and depth of cut, will allow the longest tool life per grind.

You will find that Amercut Cold Finished Steel Bars, made by the American Steel & Wire Company, are unsurpassed in machinability at maximum cutting speeds. They are free from roll scale which causes excessive machine wear and dulls a tool quickly.



But tool life is just one of the many important factors to consider in selecting cold finished steel bars. The correct grade and type of steel to meet the precise need of the job is very important for satisfactory results. In Amercut there is available any grade or type of bar you need—in the exact analysis and finish you require.

Complete stocks enable us to give you prompt service. And our engineers are always available for technical assistance.

AMERCUT *Cold Finished* STEEL BARS

American Steel & Wire Company, 208 S. La Salle St., Chicago.
Empire State Bldg., New York. Offices in all principal cities.



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

UNITED STATES STEEL

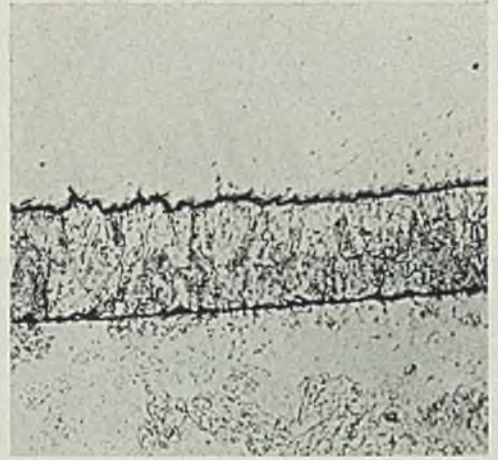
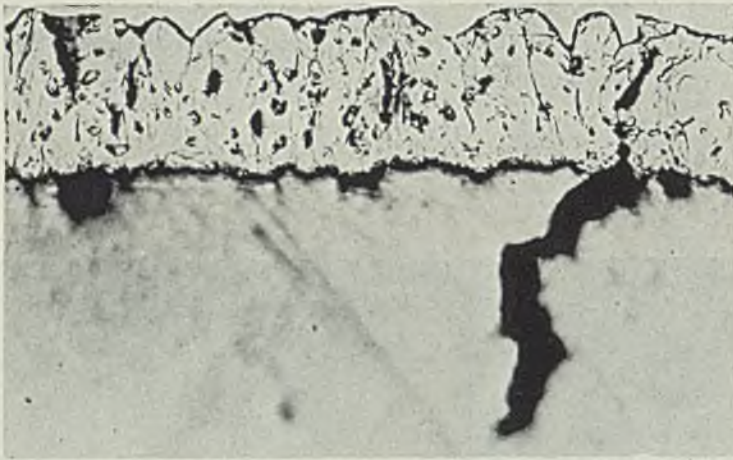


FIG. 4 (left)—Illustrating an example of poor electrogalvanizing. Note highly porous condition of coat and effect of surface imperfections in bare wire. $\times 500$ **Fig. 5 (right)** — Illustrating mechanical bond of electrogalvanized zinc. Line of demarcation is distinct here. $\times 300$

ounces per square foot applied by the use of high current densities. Note the highly porous conditions. This condition is hidden, in many cases by burnishing or polishing the surface of the wire, so that it presents a pleasing bright finish. Burnishing, by closing the pores of the zinc, increases the number of immersions the wire will stand (Preece test) before failure occurs. Fig. 2 at 25 diameters shows a definite break in the coating, resulting from a spot in the surface of the

line of demarcation at 300 diameters. If the steel is not carefully cleaned or etched, this bond will fail, and can sometimes be shown by making a button test and later

to the needs of good electrogalvanizing practice.

The ultimate effect of these various factors may be seen in Figs. 6 and 7. Breaks at the wire surface eventually show through and definite failure starts immediately. With developments of the art, and a greater assurance of uniform quality product, material advances are being made in this method.

Steel Analysis Important

An examination of the hot process for zinc coating steel begins properly with the analysis of the steel itself. In other words, good galvanizing begins at the steelworks. For reasons not yet absolutely clear, certain elements present in steel in minute quantities have a direct bearing on the adherence of zinc to steel and on the amount of zinc which can be applied in a given coating. It is a well known fact that in the case of steel wire both silicon and phosphorus have beneficial effects. Within well prescribed limits these elements are used to effect improvements in galvanized coatings which are materially beneficial to the ultimate user. High-carbon wires receive different treatment from low-carbon wires, and each specification must

(Please turn to Page 107)



FIG. 6 — Breaks shown in this bent wire are a direct result of imperfections shown in illustrations above

bare wire or from a gas pocket in the quickly deposited coat.

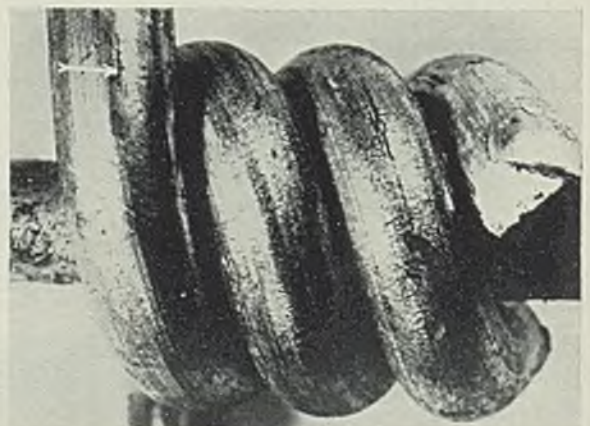
Fig. 3 and 4 at 500 diameters illustrate more clearly the effect of surface imperfections in the bare wire. It is seen that the surface seam, filled with oxide, has not been plated and that the break in the coating extends to the surface of the zinc. Here also is shown the porous nature of the electrodeposited coat. This illustrates the fact that under certain conditions electrodeposited zinc will not "bridge over" inert surface spots.

Careful Cleaning Vital

A characteristic of electrodeposited zinc is the mechanical nature of the bond, which depends for its holding power upon the granular etching of the wire surface so that the many small "teeth" are exposed to interlock with the deposited zinc. Fig. 5 shows this distinct

straightening the wire. This explains the emphasis placed on the subject of cleaning and the continual search being made for cleaning methods which will provide the correct type of steel surface peculiar

FIG. 7 — Arrow points to defect which is a definite failure of the zinc coating. Cause could be either imperfect cleaning of wire or gas bubble



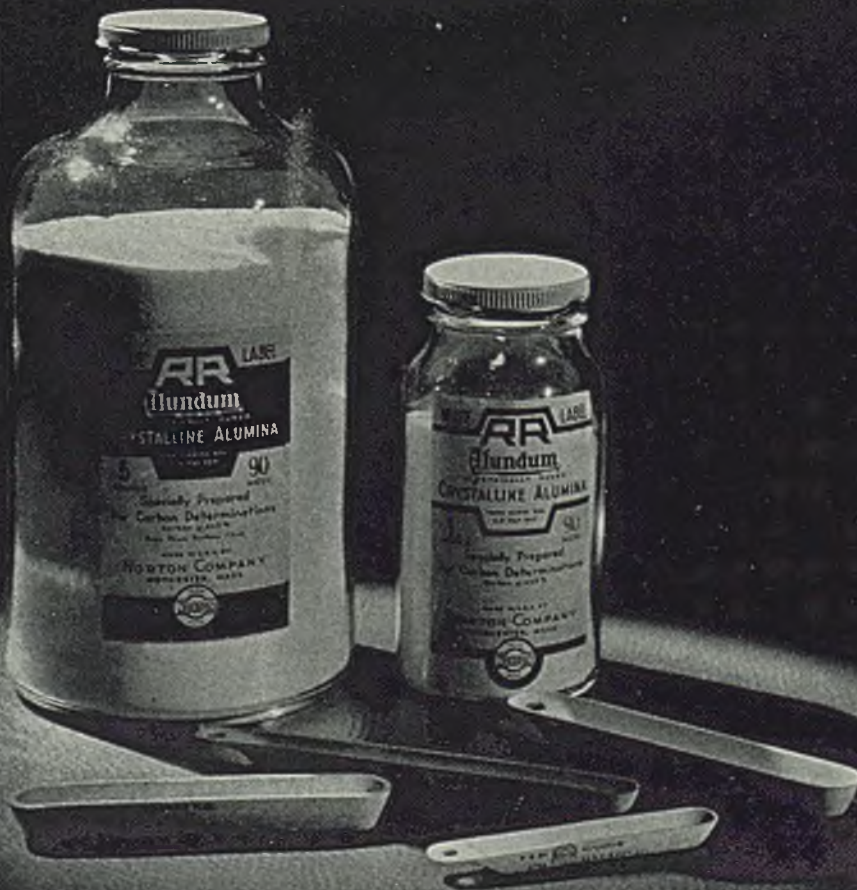
For Economical STEEL ANALYSIS...

NORTON COMBUSTION BOATS AND RR ALUNDUM GRAIN

In the plants of both the steel maker and the steel user, careful and frequent analyses are important. For years Norton Combustion Boats and RR Alundum have been popular with metallurgists for carbon determinations. Three types of Combustion Boats meet different conditions and preferences—and save costs because of their long life. RR Alundum is available in two grades (Blue Label and White Label) and is now packed in 25 and 50 pound packages for large users, at new low prices.

NORTON COMPANY, Worcester, Mass.

R-549



Crystolon Plates (silicon carbide) fill the need for a heavy duty refractory hearth in heat treating furnaces of American Electric Furnace Company and others. The strength, refractoriness, high heat conductivity and resistance to abrasion of Crystolon Plates make them outstandingly economical.



Norton Magnesite Cements are universally used in the lining of Ajax-Wyatt furnaces for melting high copper and nickel silver alloys. Recent Norton developments have resulted in cements that give even longer lining life.



Alundum Linings of the crack type have been extensively used by Detroit Electric Furnace Company in their furnaces, particularly in the melting of non-ferrous alloys. In this application Norton Refractories are rendering valuable service and lowering costs.

If you are operating furnaces for melting or heat treating metals it will pay you to consider Norton Refractories. Three materials—Alundum (trade-mark for fused alumina), Crystolon (trade-mark for silicon carbide) and Fused Magnesite—each with different chemical and physical properties, make it possible to meet widely varying conditions, to reduce costs for many concerns. Let Norton engineers consider your jobs.



For *HIGH SPEED STEELS...*

NORTON B-E BOND WHEELS

WHHEELS of Alundum and 38 Alundum abrasive plus the advantages of a new, improved vitrified bond; wheels that show a decidedly cooler and faster cutting action with even greater wheel life; wheels that are being enthusiastically received by tool room men because of the way they grind sensitive, high speed tool steels.

NORTON COMPANY
Worcester, Mass.

W-563



NORTON ABRASIVES

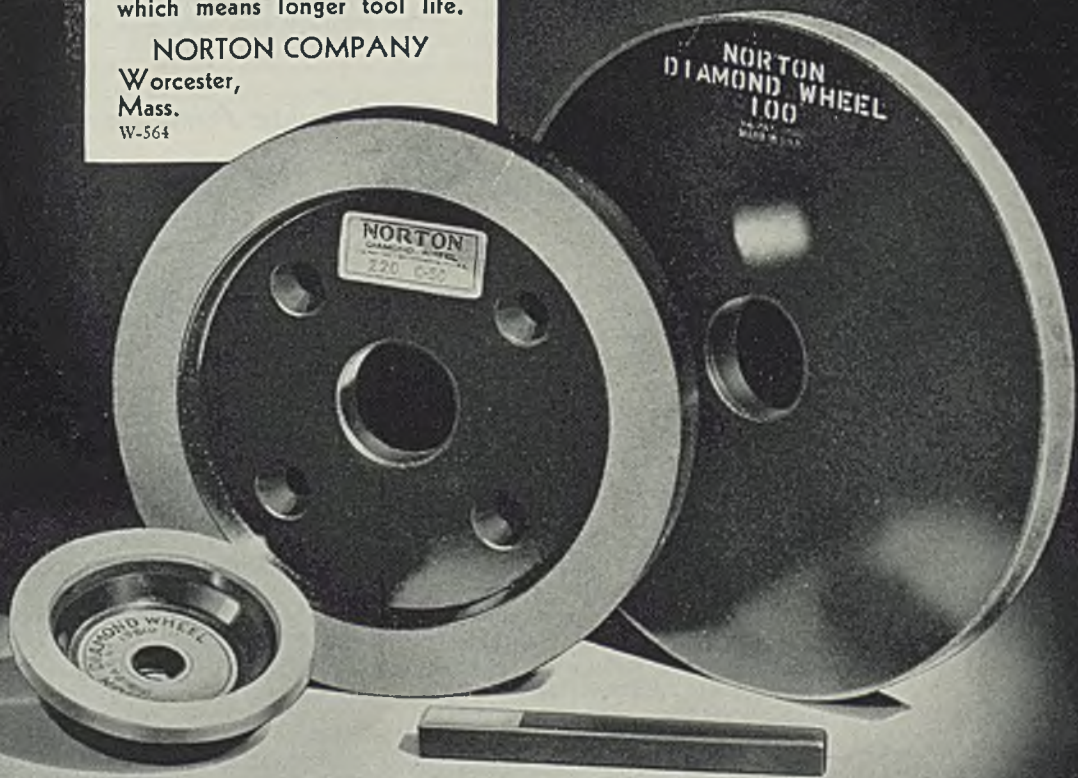
For *CEMENTED CARBIDES...*

NORTON DIAMOND WHEELS

WHHEELS whose abrasive or cutting material is genuine crushed diamonds ingeniously bonded by a special resinoid material. They are showing very high savings in time and grinding costs because of their fast cutting ability and extremely low rate of wear. They quickly produce the lapped finish which means longer tool life.

NORTON COMPANY

Worcester,
Mass.
W-564



NORTON ABRASIVES

POWER DRIVES

Engineers Should Keep An Inventory of Needs

In many cases inventories of repair parts and materials have become inadequate due to increased production, and an appropriation for greater stock is imperative. Here, too, examples of effects of past shortages help to carry the point.

Frequently plant engineers add a few items to the list, which they could use but are not really imperative, for "trading" knowing that they are not likely to get everything and are willing to waive some requests.

Sometimes plant engineers give up after making requests for betterments and being turned down a few times. Perhaps it was because they had not impressed the factory manager with the necessity of cost advantages. Practically every factory manager is willing carefully to consider suggestions for cutting costs; that is the language he most appreciates. However, he seldom recommends additional appropriations unless he is convinced of the benefits. For this reason, concise statements of present costs and probable savings are helpful in gaining more thorough consideration. If the plant engineer cannot convince his superior that the request has advantages, why should the money be spent? The factory manager, too, must explain why he needs his appropriations.

Above all, do not give up. If the request's turned down "try, try again." In the meantime endeavor to gather more evidence of losses or wastes from not having what is wanted and also to place the request and estimated savings in a more convincing statement for the next attempt.

Short Center Drive Costs

In comparing the cost of two or more methods of installing power drives the mistake is often made of considering only the cost of parts of the installation instead of the total cost, including installation, by different methods. Such is often the case on short center drives using the special pivoted motor base.

In many cases this special base is

considered as an extra item of cost. However, the pivoted motor base supplants the purchase of slide rails, which in the smaller sizes represent approximately half the cost of the base. Also by shortening the drive from a long, open center to the short center only from one-third to one-half the corresponding length of belt is necessary, which may equal or in some cases exceed the balance of cost of the special base. In addition, this saving on belt cost is a clear gain on each belt replacement.

In any case the operating advantages of better tension with less slippage and wear which result in the maintenance of more positive speeds is an added gain, even though difficult to estimate in advance.

* * *

Doctors of Lubrication

ANTIFRICTION bearings applied to equipment by well-established manufacturers should operate satisfactorily and trouble free. When they give continuous trouble something is wrong. It may be the wrong lubricant or incorrect application, or both. It is not always easy to determine the real trouble. However, continuous trouble on bearings call for the services of a "Bearings Doctor," rather than experimenting. Practically all of the large companies specializing in lubricants provide competent men for such services.

How this works out is shown in the following report of one of these "Doctors." The bearings on a 200-horsepower motor operating at 900 revolutions per minute ran hot continuously even though an excessive amount of lubricant was supplied and an air blast played on the bearings at all times. Overheated bearings invite possible serious difficulty. Therefore a lubrication service engineer was called in to "diagnose and prescribe."

A change to a lubricant of the proper consistency solved the problem, eliminated the necessity of the blast of air on the bearings, and reduced the consumption of lubricant to between 6 and 7 per cent of the amount formerly applied.

What was wrong? The "Doctor" did not say. Probably, however, the lubricant formerly used was not of

the proper type or consistency for the work and when the bearings began to heat the attendant applied an "over-dose."

Few oilers appreciate that too much lubricant may cause serious trouble, often causing heating of closed bearings. Only on open bearings, where the surplus lubricant can work out, can an unlimited amount of lubricant, either oil or grease, be applied safely.

Much of this trouble would have been saved, along with the possibility of an expensive failure, if the user had consulted the manufacturer of the motor or bearings, or a "Doctor of Lubrication" from a specialist in the manufacture of lubricants, when the bearings first began to overheat. Bearing trouble, like any disease, should receive competent attention before the "fever" gets to a high temperature.

* * *

Provide Armature Coupling

IN STEEL mills the practice is fairly common of providing a half of a flexible coupling for spare armatures on motor drives to equipment where the motor is likely to burn out frequently and changing time is of great importance because of the interrupted operation. This extra equipment eliminates the time necessary to remove the half-coupling from the damaged armature shaft and fitting it to the new shaft.

This is a practice which could be adopted in other industries on "key" machine drives operating under similar conditions where change-over time is valuable. In many cases the time saved on only a few changes will pay for the extra equipment.

* * *

Ground wires, which in many installations are exposed to breakage or injury from outside hazards, require enclosure in conduit or other protection. A broken or disconnected wire carrying current indicates its presence; an interrupted ground may cause serious injury or damage before it is discovered.

* * *

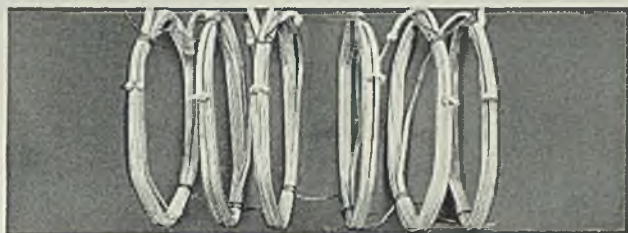
A tight casing with a proper supply of oil, applied automatically if necessary, will make a chain drive operate more satisfactorily, last longer and require less attention.



Scaled-in leads. Brought through an opening in the frame—and there anchored permanently with a special sealing compound. The roughest kind of service during installation or afterward cannot put strain on the field connections.



Special cuff insulation. Empire cloth inside of two special formed fibrous sheets is inserted in the stator core slots. A genius method of folding makes a self-locking cuff which gives permanent protection to the coil when it leaves the stator slot.



Group-wound coils. A phase group winding complete in one piece of wire reduces stub connections and eliminates a source of mechanical failure. Lead connections from these phase windings are welded, not soldered or brazed—an innovation in winding construction that keeps motors out of the repair shop.



Every motor is given a thorough vibrometer test to make sure proper dynamic balance. Eliminate vibration and you reduce to a minimum the wear on bearings. Sealed ball bearings and smooth running insure trouble-free service from F-M motors under the severest operating conditions.

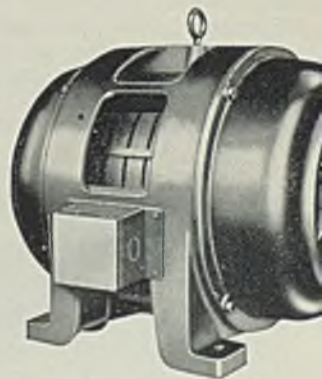
It's the little things that make a great motor

Certainly, a motor must come up to *electrical* specifications. But remember, a motor is an apparatus for converting electrical energy into *mechanical power*. And it's in the mechanical design and construction that you will find the biggest difference between one make of motor and another.

Fairbanks-Morse motors meet the most exacting electrical specifications. But with characteristic thoroughness, Fairbanks-Morse has achieved a posi-

tion of leadership in *mechanical* design and construction of motors.

We illustrate a few of the new, unusual methods which are employed to make Fairbanks-Morse "Type Q" motors give longer, trouble-free service. The complete story of this extra value in motors will be sent on request. Address Department M491, Fairbanks, Morse & Co., 900 South Wabash Avenue, Chicago, Ill. 34 branches at your service throughout the United States.



F-M "Type Q" Ball Bearing

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106
YEARS OF
PRECISION
MANUFACTURING

FAIRBANKS - MORSE

Motors



POWER, PUMPING AND WEIGHING EQUIPMENT



GATHMANN RESEARCH LABORATORY

IN our organization, the search for ever better designs of Ingot Molds and simpler methods of handling big-end-up ingots is the larger part of the day's work. The measure of our accomplishment is the progressive increase from year to year in the tonnage of steel cast in Gathmann type molds, not only in the United States but in practically all steel-producing centers of the world. To date, more than 50,000,000 tons of ingots have been produced by methods and in molds evolved by us.

There are no finer steels

NOWHERE are sounder or more homogeneous steels made than in the plants of Gathmann clients.

The reason? First of all, Gathmann mold users are quality-conscious and bring to every step of production an added interest and care that lead toward perfection; and secondly, there are embodied in the modern designs and methods that these producers employ, the scientific principles which we have established through more than twenty-five years of research and practical experience.

For the past several years, much of our research work has been directed toward the further improvement of ingots for special requirements—high-priced steels for use in aeronautics, for tools and other super-quality products.

Visit us at the National Metal Exposition and examine, with a microscope if you desire, some of the products of our clients. In addition to sections of tool steel and mill ingots, we will have numerous finished and semi-finished products for your inspection. Booth C-6.



THE GATHMANN

ENGINEERING COMPANY • BOX 8 CATONSVILLE P. O. • BALTIMORE, MARYLAND

GATHMANN INGOT MOLDS

PROGRESS IN STEELMAKING

Develops Pit-Type Furnace Equipment For Heat Treating Rods and Wire

H EAT treating low and medium carbon wire and wire rods in an improved type pit furnace designed for use with controlled atmosphere now is being accomplished by a large wiremaker. The accompanying illustration shows two charges in the cooling pit, another charge being transferred from the heating chamber to the cooling pit and one of the covers removed from a preheating pit to enable the charge to be transferred to the heating chamber.

How Wire Is Handled

In operation, an empty stem or spindle is placed in the retort in the preheating pit and then loaded with coils of wire. When the retort is filled and covered, the material is preheated for a predetermined length of time. The load then is transferred to the heating chamber and the furnace cover placed in position.

Following the heating operation the heated retort of wire is transferred to the cooling pit. When cool the material is unloaded and the empty retort and spindle returned to the preheating position.

A feature of this equipment is the means for relieving the pot walls of the weight of the charge when being removed from the hot furnace, but at the same time retaining the protective feature of having the charge contained within and protected by the pot at all times. This results in: First, the use of a light weight, heat-resisting alloy pot which affords a favorable gross to net ratio of metal heated. Second, ability to remove the pot and charge from the furnace as soon as the heating cycle is completed, thus permitting immediate recharging of the hot furnace without loss of time and waste of fuel required.

In using similar equipment for normalizing rods the practice is to charge the loaded spindle into the preheater. When the heating furnace is cleared of the previous batch it is charged with the loaded spindle from the preheater. Following the heating operation the loaded spindle is transferred to the cooling pit and then is unloaded releasing the

spindle for additional service at the preheater. When the equipment is being used for normalizing, the large alloy pots remain within the furnace. Both the furnace pot and cooling pots are kept supplied with a special protective atmosphere.

The furnaces are heated by high-pressure inspirator type gas burners firing tangentially into the heating chamber. A perforated wall of firebrick separates the retort chamber from the chamber in which the burners fire. Products of combustion pass through the perforations into the heating chamber containing the retort and are vented through flues located in the bottom of the furnace and communicating with the flues leading to the preheating pit. The burners are controlled automatically.

The foregoing equipment is designed and built for firing with either gas or oil by the Electric Furnace Co., Salem, O.

Protects Metal Surfaces

Research has culminated in the development of a new rubber paint for the protection of metal surfaces that are exposed to fumes or direct action of acids in pickling room and

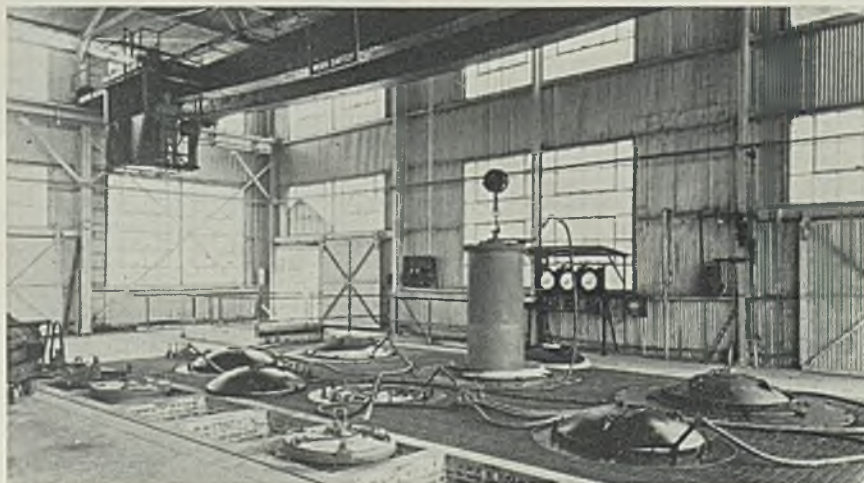
caustics in plating departments. The coating, which is made with an ideal brushing and dipping consistency, can be applied to concrete surfaces to prevent the penetration of moisture, acids and other disintegrating agencies. It is self bonding to sand-blasted or cast metals. The material made in various colors, dries in a short time to a smooth, glossy finish.

Measures Acid Temperature

Temperature of pickling baths, cleaning or neutralizing tanks may be obtained accurately by a new thermometer of the vapor tension type and with a range from 100 to 220 degrees Fahr. The thermometer is built with double braided bronze capillary tubing and bronze liquid temperature bulb. Special glass test tubes protect the bronze bulb when immersed in an acid solution.

Life of Roofs Is Doubled

Agate brick, a new grade of silica brick, which is claimed not to soften until it has attained a temperature of 3128 degrees Fahr., has been developed for heating furnaces in Spain. The new brick contain a high percentage of tridymite and a slight admixture of iron oxide. Claim is made that the new refractory, although costing more than ordinary silica brick, will increase the life of the furnace roof 100 per cent.



Three complete annealing furnaces for heat treating wire in coil form

Scientific Function of Industry Is Essential Part of Basic Structure

NEEDED for industry to include with its six basic functions—technical, financial, commercial, accounting, security and administrative—a seventh or *scientific* function was emphasized by Prof. P. A. J. Chevenard in a paper, "Scientific Organization of Works," presented as the fifteenth annual autumn lecture before the British Institute of Metals, meeting in Paris, Sept. 14 to 18. The objective of science in an industrial enterprise, according to Chevenard, is to maintain and improve. The engineer responsible for the scientific functions has a delicate and complex administrative task. His job is covered by five fundamental operations: Foresight, including creation of scientific equipment, collection of information for research, putting new processes and products into works' practice and establishment of a personnel; organization, which is divided between the director and the works manager; command and co-ordination, under which he should endeavor to communicate to all a scientific outlook, outline research programs, plan unity of control, divide the work, co-ordinate activities and draw conclusions; and control, including organization of the technical control of manufactures and control in its entirety of the scientific function.

Effect of Aluminum Impurities

Effects of impurities found in commercial aluminum were discussed by G. G. Gauthier. He stated aluminum follows the universal law that conductivity and temperature coefficient of conductivity both increase with the purity. To determine the exact effect of impurities, the experimenter began with aluminum exceeding 99.99 per cent pure and added small quantities of iron, silicon, vanadium, magnesium and titanium, singly and in combination. Resulting figures make it possible to determine conductivity of aluminum containing known quantities of these metallic inclusions.

Marquis R. de Fleury and H. Portier read a paper on "The Complex Interdependence of the Properties of Alloys and the Industrial Conditions of Their Manufacture, Testing and Use," a study of indirect factors affecting the quality of foundry castings, examination of their reciprocal action and the importance of their recognition in obtaining sound castings.

Prof. A. von Zeerleder and R.

Irmann presented results of investigations of aluminum and its alloys after heating for long periods at temperatures ranging from 75 to 300 degrees Cent. The values of the yield point observed in the normal short-time test after heating periods of one year form the basis for calculations for engineers. The permissible loads can be ascertained only by observation of the creep limit, and this property is now being studied by the authors.

A description was given of a dual anodic process designed for the

Hydraulic Compactor Forms Cables



WIRE cables carrying the load of the Golden Gate bridge are subjected to a tension of 63,000,000 pounds and comprise 27,572 individual strands. Each strand was laid separately and the bundles were then compressed into a circular cross section by the hydraulic compactor shown above which operates under a pressure of 8000 pounds per square inch. High-pressure hose for hydraulic connections on the compactors was furnished by the B. F. Goodrich Co., Akron, O.

treatment of aluminum surfaces in order to produce a high degree of reflectivity, by N. D. Pullen. Composition of the baths was given, as well as data to show comparable reflectivity with that of other materials.

A study of the forgeability of various light and ultralight alloys was summarized by Prof. A. M. Portevin and P. G. Bastien, who endeavored to determine by means of laboratory tests the optimum conditions for working these light and ultralight alloys. With this in view they compared the results obtained from static compression and bending tests and dynamic bending and tensile tests. The methods of testing employed made it possible to define the capacity of hot work of these various alloys.

Rare Metals Discussed

"Metals of the Platinum Group: Ores, Recovery and Refining, Fabrication and Uses, Properties," a paper by R. H. Atkinson and A. R. Raper, presented up-to-date metallurgical information about the six metals of the platinum group, including platinum, palladium, ruthenium, rhodium, osmium and iridium. Special attention was given to the refining of these metals in the Canadian nickel industry. An account was given of the properties of the metals and their uses.

Results of creep tests of long duration on tin and some of its alloys in the rolled condition were revealed by Prof. D. Hanson and E. J. Sandford. Effects of various metals in tin alloys were shown, and it was pointed out that in many cases no relationship exists between resistance to creep and ultimate tensile strength.

That the use of nitrate salt baths in the heat treatment of duralumin sheet has no deleterious effect on the corrosion resistance, but that salt residues are liable to foster local surface pitting of the material storage, was the gist of comment by A. J. Sidery and B. Evans.

Installing Equipment To Fabricate Steel Shingles

A new line of steel shingles has been developed by the Gulf States Steel Co., Birmingham, Ala., and will be placed in production in about two weeks. Shears and presses for their manufacture are being installed in the company's plant at Gadsden, Ala., where sheet mills are located. Eventually these shingles will be distributed throughout the United States. They will be of galvanized sheets, mostly 28 and 29 gage, in 16-inch squares.

In laying roofs with these shingles, galvanized strips, 11 inch-

STEEL leaders of tomorrow

will take a tip from steel leaders of today and wisely come to Valley when ingot moulds are in question.

A measure of future performance better than the yardstick of the past will never be found—for this reason we solicit today, your business of 1946.

VALLEY MOULD AND IRON CORPORATION, HUBBARD, OHIO

Plants: HUBBARD, O.; SHARPSVILLE, PA.; CHICAGO, ILL.; Western Office: 108 St. & Calumet River, South Chicago, Ill.



es wide, first are fastened along the edges of the roof after which the shingles are placed and nailed fast. The shingles are so made that they may be placed in proper alignment and locked to each other. They overlap by about 2½ inches, thus covering the fastening nails. A feature of the system is that there is no waste, since when shingles are cut, the remaining portions may be used somewhere else in the roof. For covering the apex of the roof, the company recommends its ridge roll sections which are formed from steel sheets.

While the company at first will market the new shingles with galvanized coating, it is engaged in the development of a special coating resembling porcelain enamel.

To be marketed under the trade-

name Super-X, the new shingles will be manufactured under license from the patentees. Gulf States Steel Co. began investigation of the new product about a year ago, when several buildings in the Birmingham area were provided with steel shingles of the new design.

Manifolds of Alloy Iron

A leading automotive company now is using nickel alloyed cast iron, along with varying additions of chromium or molybdenum, for exhaust manifolds to replace plain iron castings which have been cracking after 12,000 to 15,000 miles of operations.

Automatic-Cycle Broaching Machine Finishes 300 Dynamo Yokes Hourly

TWO dynamo yokes of flat hot-rolled steel strip welded together are finished broached per cycle at the rate of 300 parts per hour on a new Cyclematic-type broaching machine developed by the Oilgear Co., Milwaukee. One of the newer developments in the field of broaching, automatic broaches operating through any given cycle are proving efficient in many branches of the metalworking industry.

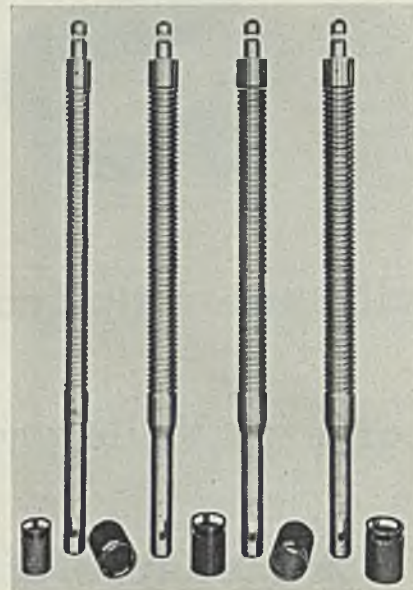
In the particular cycle through

which this machine operates, the operator's duties are confined to placing the work in approximate position on the table and tripping the foot pedal. Action of the machine automatically centers the work, completes the broaching operation and delivers the finished pieces down a delivery chute.

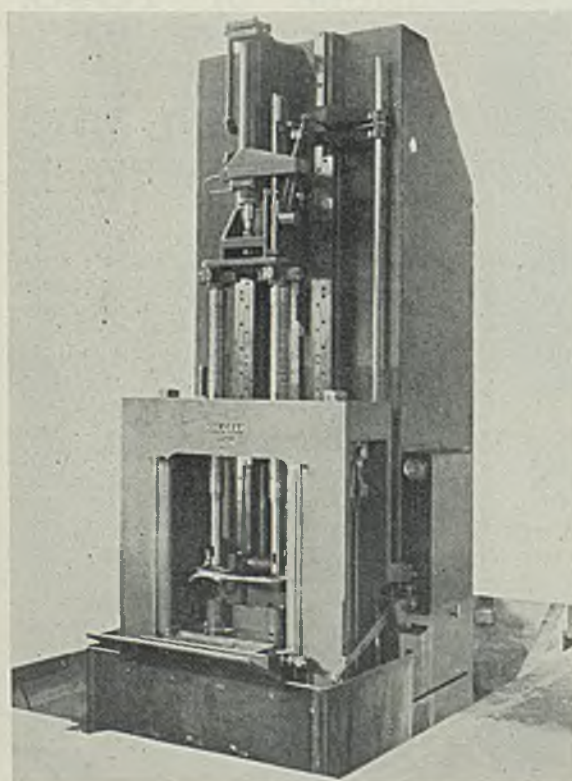
The cycle comprises six steps: Loading, done manually by the operator and finished automatically; engagement, tools being locked in

the lower sockets, at the same time accurately centering work; broaching; disengagement which frees the upper end of the tools; ejection by moving the finished pieces forward on a false table; and automatic return to starting position.

The tools have 52 teeth and approximately 0.035-inch stock is removed from each yoke. The four



The largest of these four tools weighs 260 pounds and has 52 teeth. The yokes which were broached are shown at the bottom and vary in length from 6 to 7½ inches and have walls 11/32-inch thick



OILGEAR type XM-80 Cyclematic broaching machine turns out 300 finish broached pieces per hour and operates in an automatic cycle

notches at the top of the tools are inserted in the detent at the upper tool holder crosshead so as to hold the tools in place during the loading operation and the major portion of the broaching stroke. At the end of the stroke the top is released to allow the work to pass out of the machine onto the false table which discharges it. The lower end of the tool is equipped with a slot through which a key is automatically inserted to hold the tools in position at the lower end during the operation. The broaching teeth of each tool are built in sections so that the roughing section may be discarded when worn and the other sections moved forward.

Dynamo yokes broached on this machine vary in size from 3 to 3¾ inches, and normal broaching capacity is 80,000 pounds. Cutting speed of the broach varies from 5 to 30 feet per minute. Coolant is pumped into the tool so that as the work moves upward, the space between the teeth is filled with liquid. Chips filling the same space as the work moves creates a liquid pressure in these spaces, assuring positive lubrication at all times.

INTEGRITY

No detail is overlooked in a LEWIS product.

Each machine comes to the user ready for a long life of fast, accurate and economical production.



LEWIS 60" ROLL LATHE USED WITH THE LATEST TYPE FOUR-HIGH MILLS AND CONTINUOUS STRIP MILLS



LEWIS FOUNDRY & MACHINE CO.

PITTSBURGH PA

NEW EQUIPMENT

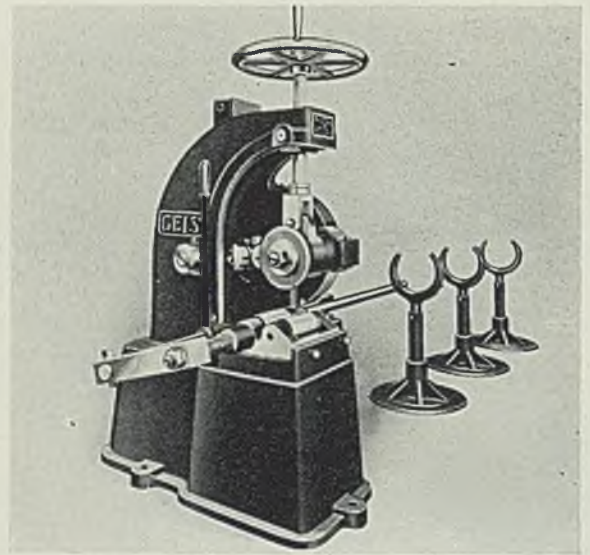
Milling Machine—

Hardinge Bros., Elmira, N. Y., are announcing their new Cataract vertical milling machine with ball bearing spindle construction. This type construction embodies precision preloaded ball bearings of the double row type, providing rigidity with minimum friction. Such a design affords high spindle speeds with precision and overcomes radial and end play, it is claimed. The machine is fully enclosed to exclude dirt, chips and the like and also to contain the driving belts to the spindle. An electric driving unit is mounted under the bench to give eight spindle speeds up to 5000 revolutions per minute. Two levers provide convenient operation of electrical switches controlling forward and reverse, low, stop and high speed operations. Also available with the milling machine are vises, index heads, tailstocks, swivel bases, universal adapters, right angle bases, lever feed arrangements and routing attachments.

Pipe Cutter—

Landis Machine Co., Waynesboro, Pa., has announced an improvement recently made on the Geist No. 4 roller pipe cutter. The shaft which carries the disk cutter is now being

Geist No. 4 pipe cutter will handle pipe ranging from 1/4-inch to 4 inches. Developed by Landis Machine Co.

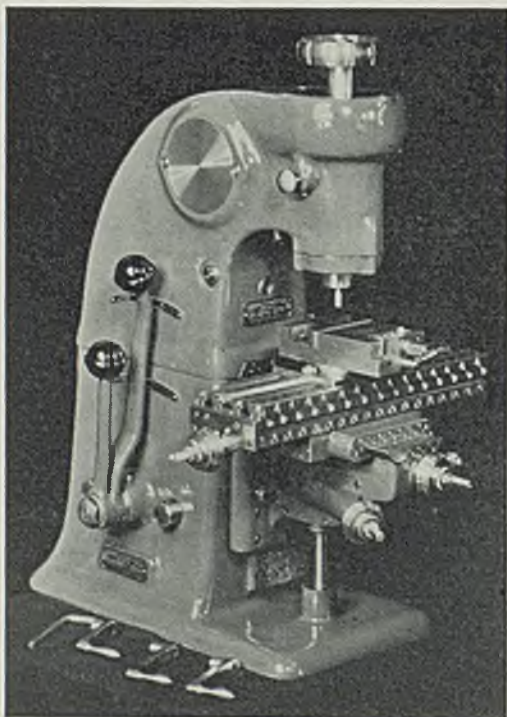


mounted on Timken roller bearings instead of the bronze bushed bearings previously used. According to the company, this construction makes for longer life, stronger construction and eliminates need for continual adjustments to compensate for wear on the bearings. Precise alignment between the cutter shaft and the rollers is now possible, reducing the burr thrown up on the pipe and lengthening the life of the roller cutters, it is claimed. The No.

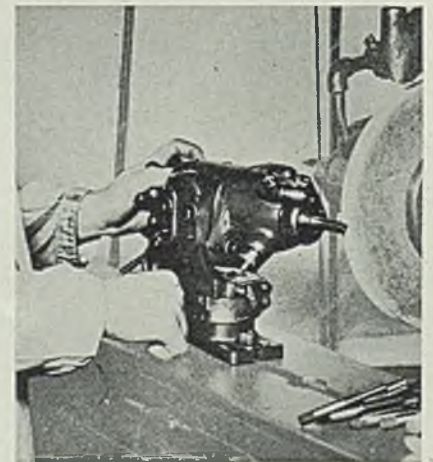
4 cutter has a total capacity for cutting off pipe within a range of 1/4-inch to 4 inches.

Tap Chamfering Fixture—

Detroit Tap & Tool Co., Detroit, announces a tap chamfering fixture for sharpening any size and type of tap up to and including 1 1/4 inches, irrespective of number of flutes or shaft length. Necessity for separate cams for each flute type and each tap with a different num-



Cataract vertical milling machine with ball bearing spindle construction

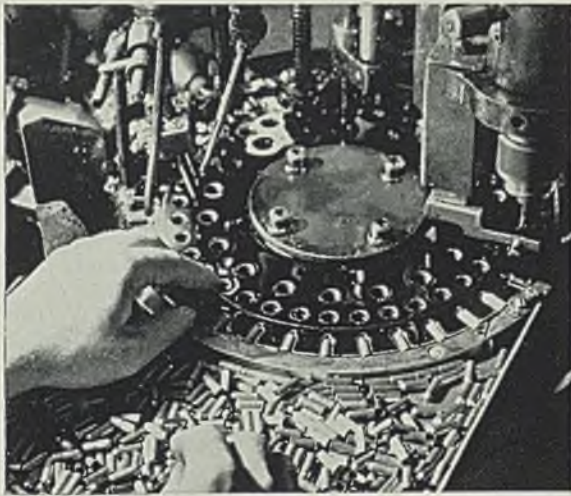


Tap chamfering fixture built by Detroit Tap & Tool Co. for sharpening any type or size of tap

ber of flutes is eliminated by rotating the tap on an eccentric axis and indexing by means of a finger and registering with the reground flute

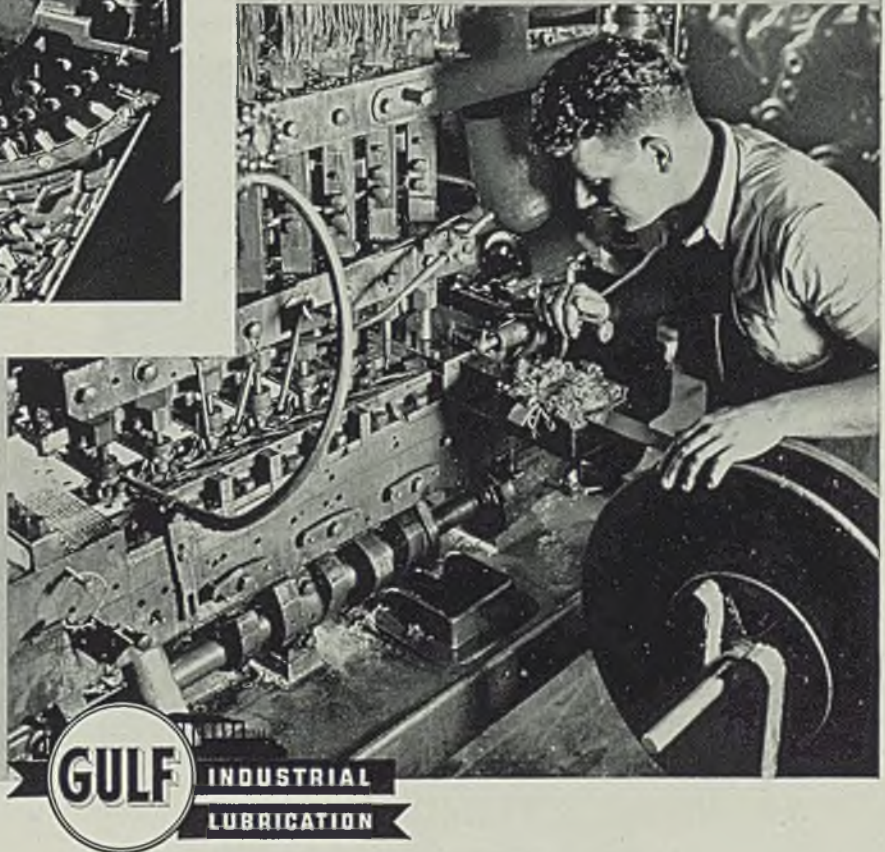
GULF LUBRICANTS *and* CUTTING OILS

Keep high-speed automatic machines operating at Peak Efficiency



The machine above, is a modern metal working plant, drills and taps small brass and steel parts at high speed. To maintain continuous, trouble-free operation, Gulf lubricants and cutting oils are used.

The machine at the right operates at very high speed and, by a series of operations, produces with extreme accuracy a large variety of steel and brass parts. Because of the close fitting dies and the long, deep draws, proper lubrication with the right Gulf oils is vital to efficient operation.



Makers of
**THAT GOOD GULF GASOLINE
AND GULFLUBE MOTOR OIL**



ACCURATE work and continuous production—those are the two big objectives in busy metal working plants these days!

That's why many leading plants have standardized on Gulf lubricants and cutting oils. When bearings are protected with the right Gulf lubricant, friction and wear are kept to a minimum, fine adjustments are maintained and proper alignment is assured.

A Gulf engineer can be of real assistance to you in placing the lubrication of your equipment on the most efficient basis possible. This safety measure will bring economies which will please you.

GULF OIL CORPORATION... GULF REFINING COMPANY

GENERAL OFFICES: GULF BUILDING, PITTSBURGH, PA.

face. Spring collets are used to hold and locate the tap in the fixture. Fixtures can be mounted on any type of grinding machine in either a right or left hand position and are adjustable for height. The amount of eccentric or relief may be quickly regulated by a graduated adjustment on the fixture.

♦ ♦ ♦

Silent Drive Units—

Mechanical Handling Systems Inc., Detroit, recently placed on the market a new silent variable-speed drive for conveyors. The new unit

is made in both vertical and horizontal types and with power range in standard sizes up to 7½ horsepower. The unit is mounted on a heavy steel base and is completely covered with a heavy steel casing, the sides of which can be removed by means of a hood-type latch. By removing four bolts, the main cover can be removed, exposing all working parts. Louvres and a fan-type pulley on the variable speed unit provide ventilation. Standard anti-friction bearings are used. Alloy steel shafts, cut steel gears and hardened pinions, oil reservoirs for lubrication of gears, high-pressure

lubrication fittings for bearings are other construction features. Vari-



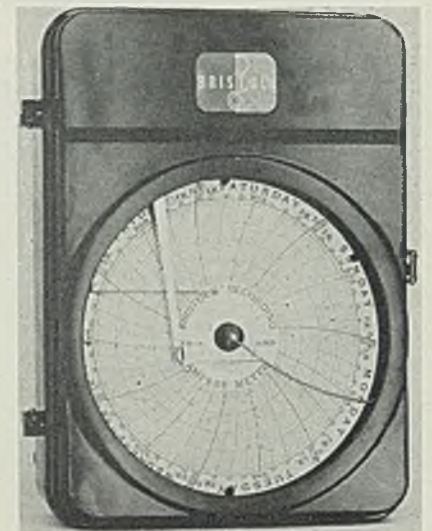
Silent variable speed drive for conveyors placed on the market by Mechanical Handling Systems

able-speed ratio is regulated by hand wheel at end of casing.

♦ ♦ ♦

Recording Meters—

Bristol Co., Waterbury, Conn., has designed a new line of round chart recording voltmeters and ammeters. They are intended for use in indus-



Bristol recording voltmeter or ammeter for controlling industrial processes

trial plants, especially for process work where voltage and current affect the quality and cost of the manufactured goods. The new electric recorders are offered in models for wall, switchboard, flush panel and pole mounting and also for portable use. Instruments are housed in a moisture, fume and dustproof case made of an aluminum alloy. Two-drop, fine bore platinum point fountain pens especially developed for these instruments are used. Either spring driven or electric Telechron clocks are supplied.

♦ ♦ ♦

Welder—

Eisler Engineering Co., 740-770 South Thirteenth street, Newark,



SEAMLESS CYLINDER WITH SPUN-IN OPEN END

To meet requirements of shippers of certain compressed gases and other commodities, Hackney provides a line of deep drawn cylinders. Illustrated is an example of this work—deep drawn, seamless, with open end spun to closure.

Many companies in various fields find their requirements in tanks, cylinders, special shapes—as well as barrels and drums—are efficiently and economically met by Hackney. Hackney employs many metals, including: steel, stainless steel, Monel metal, nickel, Herculoy, aluminum, brass, bronze, copper.



We suggest sending us specifications of your requirements, for study and suggestions.

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.

DEEP DRAWN SHELLS AND SHAPES

"Sure
We're
Right"



We're sure we're right, then we go ahead—then we inspect-inspect-inspect.

Superior quality for almost half a century hasn't been a long run of luck, it has been a matter of making a good thing better.

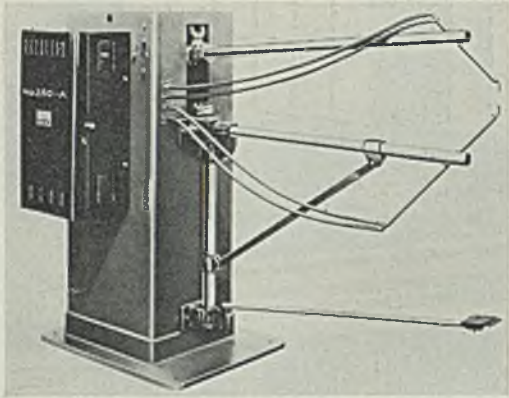
Let us show you how much better GOOD hot or cold rolled strip can be—and how much faster your order can be filled.

**SUPERIOR STEEL
CORPORATION**

General Offices

3122 Grant Bldg., Pittsburgh, Pa.

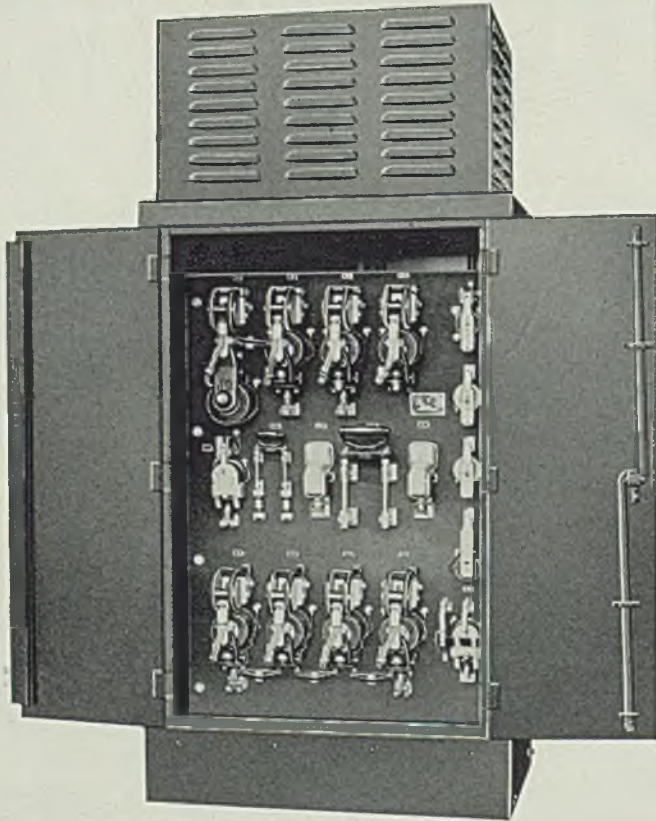
Superior



Eisler welder which is adapted for work in the manufacture of neon signs

N. J., announces a new welder for the neon sign industry. The welder is adapted to the welding of frames, letters and other accessories for the erection of neon signs. The welding horns are 48 inches long and the water cooled electrode holders are angled to permit the welding in corners or edges. Adjustment between electrodes is secured by raising or lowering the lower horn on the slide. With motor drive, this welder will produce 30 to 100 welds per minute. It is also available in foot or air operated models and is made in sizes up to 250 kilovolt-amperes. The welder is of the self-contained type with all accessories assembled within.

Clark-Sundh



CLARK SPECIAL FULL AUTOMATIC, REVERSING, DYNAMIC BRAKING, FULLY ENCLOSED MAGNETIC CONTROL PANEL

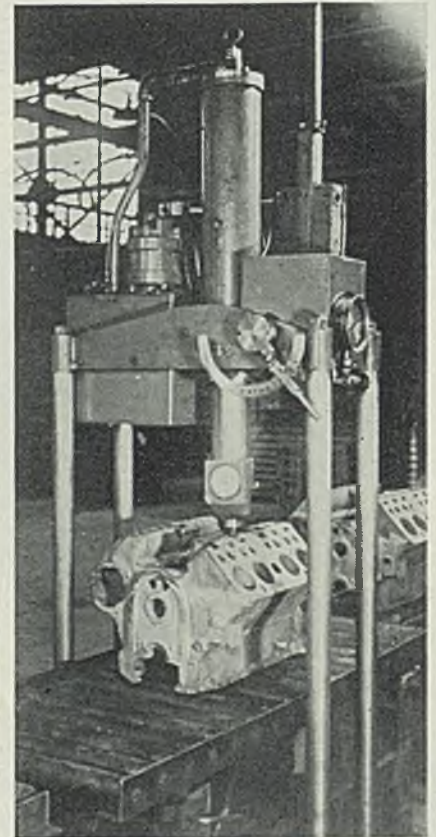
For use with a 50 H.P., 230 Volt, D.C. Motor operating a Strip Coiler with indexing feature. Note the sturdy construction throughout, including the heavy sheet steel cabinet. The Clark Edgewound Resistors are mounted in louvered enclosure on top of main cabinet.

THE CLARK CONTROLLER CO.

1146 East 152nd St.
CLEVELAND, OHIO

Testing Machine—

Detroit Testing Machine Co., 5137 Trumbull avenue, Detroit, is the maker of a new direct reading conveyor brinell machine, developed for testing cylinder blocks, cylinder heads, die blocks and the like on a conveyor without elevating them to testing position. The ram has a travel of 24 inches and may held at a height to accommodate the size



Direct reading conveyor brinell machine built by Detroit Testing Machine Co.

of blocks on production. The direct reading device is mechanical throughout and tests can be made without spotting and the use of the microscope. After tolerance hands

See the Acme
Exhibit of Colorstrip
at the Show—Booth M-9

"MADE TO
MAKE
CUSTOMERS"



ACME SUPERSTRIP STAINLESS ASSURES BEAUTY THAT LASTS YEAR AFTER YEAR

• Users of strip steel—hot or cold rolled—find that Acme Superstrip gives *plus* values in their particular product needs.

Whether it's flawless finish . . . difficult drawing or bending . . . high strength—Acme Superstrip proves the right answer.

Production is smoother. Products are better. Waste and rejections are reduced.

Above is illustrated an important appli-

cation of Acme Superstrip Stainless—typical of the wide acceptance for this strip. Store fronts that sell are being made from this steel that means gleaming, lasting beauty.

Whatever your need—if strip steel is used—send the coupon to Acme today. ACME STEEL COMPANY, General Offices: 2826 Archer Ave., Chicago, Ill. *Branches and Sales Offices in Principal Cities.*

Acme Superstrip
HOT ROLLED • COLD ROLLED  GALVANIZED • STAINLESS

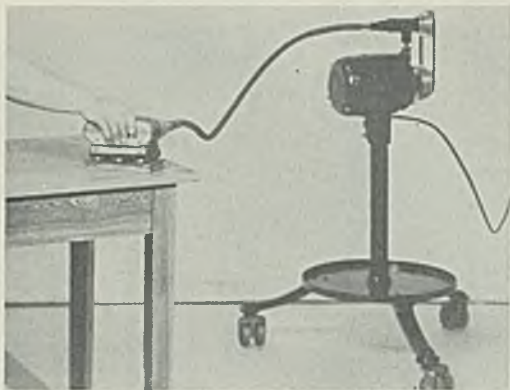
ACME STEEL COMPANY, 2826 Archer Ave., Chicago
Send me a copy of the booklet, "Batting 'Em Out."

Name

Firm

Street

City..... State.....

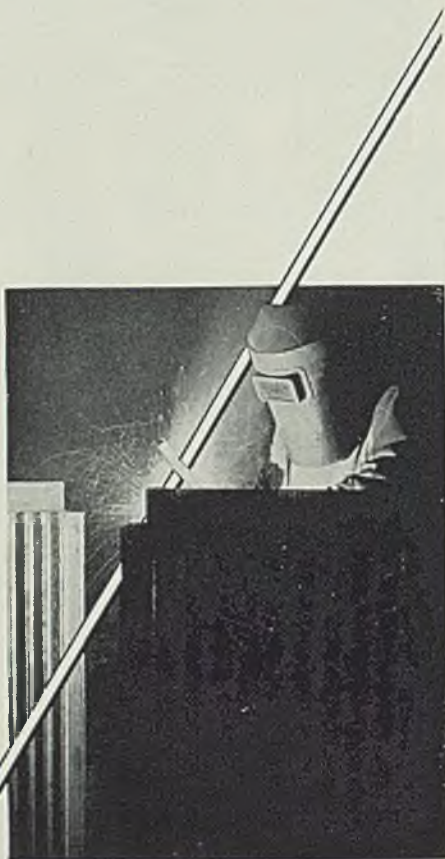


Electric sander featuring flexible rolls, adapting the device to sanding curved or irregular surfaces, developed by Sterling Products Co.

PAGE Hi-Tensile "C"

A high-speed, smooth-flowing, shielded arc welding electrode!

● This is an all-position rod of particularly high merit. It provides welds with a tensile strength of from 65,000 to 75,000 pounds. Ductility of from 20 to 30 per cent elongation in two inches. Impact resistance of 30 to 70



foot pounds, Izod. And fatigue resistance of from 28,000 to 32,000 pounds per square unit. Welds made with this rod have high corrosion resistance. It conforms to A. W. S. specifications. In every respect it is a highly efficient quality rod.

Your local Page distributor carries an ample warehouse stock and can supply you promptly.

PAGE STEEL & WIRE DIVISION OF
THE AMERICAN CHAIN COMPANY, Inc.

Monessen, Pennsylvania

In Business for Your Safety

District Offices:

New York, Pittsburgh, Atlanta, Chicago, San Francisco



PAGE Welding WIRE

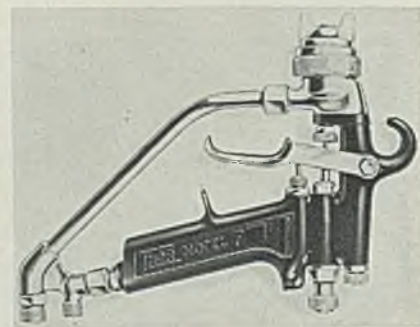
are set to the desired limits and the only duty of the operator is to see that the indicator rests within them. Oil is used as a pressure medium and is kept at a constant temperature by a thermostatically controlled heating element to assure constant viscosity.

Electric Sander—

Sterling Products Co., Detroit, presents a new electric sander featuring reciprocating action. The machine is driven by electric motor through a flexible shaft. The sanding action is reciprocal with a 3/8-inch travel of the sanding pad at speeds from 1750 to 2800 complete oscillations per minute. Flexible rollers of composition rubber and fabric are attached by pins to the sander block. This feature allows freedom of movement, making the sander applicable to curved surfaces and all types of work from delicate musical instruments to heavy duty sanding on automotive parts, according to the company. The machine is designed for wet or dry sanding and is provided with a water connection which makes a fine spray on either side of the block. Bench, ceiling and pedestal mountings are available.

Spray Gun Connection—

Binks Mfg. Co., 3114 Carroll avenue, Chicago, announces two new spray gun connections which make



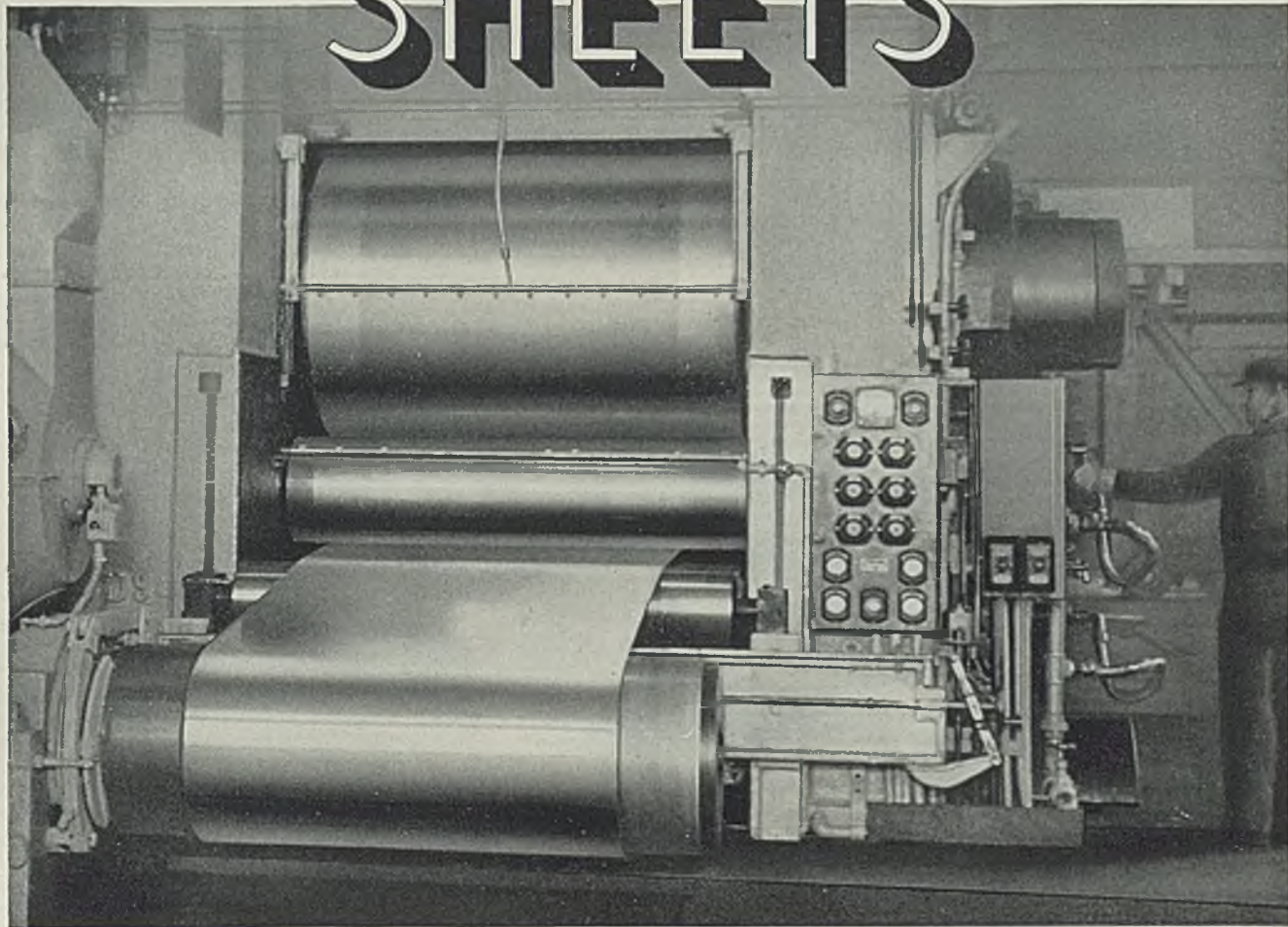
Thor T-785 spray gun connection developed by Binks Mfg. Co.

for closer control, better balance and faster production, according to the company. For spraying operations where it is necessary to bring both air and material hose to the bottom and back of the gun, the T-785 connection is designed. The new T-784 connection brings air and material connections together at the bottom of the gun handle. A standard 3/8-inch female pipe thread swivel nut and 3/8-inch male thread are supplied, which may be adapted to any size thread desired.

Electric Furnace—

Detroit Electric Furnace Co., 825 West Elizabeth street, Detroit, has

SHEETS



FOR TODAY'S DRASTIC FORMING OPERATIONS

THE product of Bethlehem's new continuous strip-sheet mill contributes definitely to the utility of flat-rolled steel, which in its rapidly expanding use is being subjected to forming operations of constantly increasing severity.

In this mill thoroughly modern facilities provide for the manufacture of sheets in a wide range of sizes and with extreme precision of finish. A source of raw steel



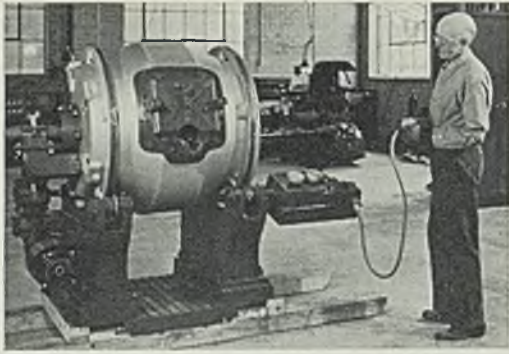
where the making is supervised by metallurgists who have had years of experience in producing ingots for high-grade sheet manufacture is assurance of accurate control of physicals. Backed by these facilities, Bethlehem metallurgists are

in an excellent position to collaborate with designers and fabricators of flat-rolled steel products to even further extend the usefulness of this form of steel.

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

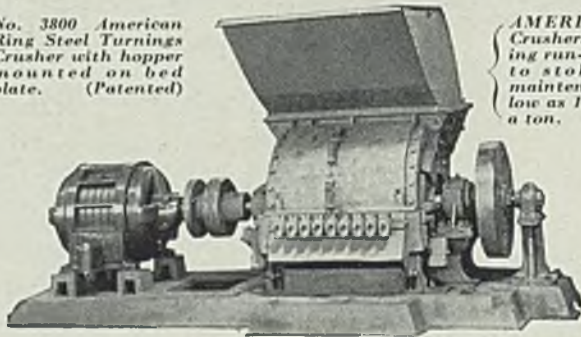


BETHLEHEM STEEL COMPANY



High temperature melting furnace built by Detroit Electric Furnace Co. which is equipped with remote flexible pouring control

No. 3800 American Ring Steel Turnings Crusher with hopper mounted on bed plate. (Patented)



AMERICAN Ring Crushers are crushing run-of-mine coal to stoker size at maintenance costs as low as 1/10 of a cent a ton.

EXTRA PROFITS by crushing your turnings!

Many shops and manufacturing plants are making extra profits by crushing their turnings into chips with American Ring Steel Turning Crushers. Chips not only bring a higher price, but they are easy to handle, require less storage space and are easier to ship.

Your long turnings will cease to be a nuisance after you put an American Ring Crusher on the job. It will pay for itself in a very short time, after which it will pay you a large weekly profit.

Do you want this extra profit?

ORIGINATORS OF THE ROLLING RING CRUSHER PRINCIPLE

AMERICAN PULVERIZER CO.
1539 MACKLIND AVE. — ST. LOUIS

brought out a new 350-pound high temperature melting furnace specially designed for melting copper, nickel, alloy irons and steels. The shell is of a larger diameter around the center than at the ends, permitting the arc at the center of the furnace to be farther away from the refractory than at the ends. The new furnace is equipped with automatic rocking control and a remote pouring switch which can be operated at some distance from the furnace. A magnetic brake motor is standard equipment on the rocking mechanism. Shell and refractory design is such that there is a tendency to bring the metal back to the center point adjacent to the arc, giving a constant action to provide a uniform temperature throughout the bath.

Watt-hour Meter—

General Electric Co., Schenectady, N. Y., has announced a new two-element single-disk watt-hour meter. The meter has a specially designed moving element which makes it possible for both electric elements to act on the same disk with negligible electric interference. This single disk construction feature permits size and weight reductions, according to company engineers. The new type disk which prevents electrical interference is composed of five laminations, each lamination having five radial slots. Laminations are assembled with insulation between them and with the slots staggered, which confines the eddy currents to the vicinity of the electrical element producing them. The meter is compensated for all classes of temperature errors, and will register energy consumption with an extremely high degree of accuracy up to 300 per cent of normal load current at both unity and one-half power factor.

Steel Desks—

Yawman & Erbe Mfg. Co., Rochester, N. Y., is introducing a new line of steel desks which have been redesigned to harmonize with modern office furnishings. Rounded tops and legs and redesigned hardware are features of the new line. Wire connections for telephone and lamps have been built in to eliminate external wires. Various types of executive, secretarial and typewriter desks are available as well as several types of tables. Finishes offered include olive green, walnut, mahogany and oak.

Layout Surface Plate—

Challenge Machinery Co., Grand Haven, Mich., is now manufacturing

+ SPEED CASE +

X 1525

THE MONEY SAVING STEEL

+

**HOLDING OLD FRIENDS
AND STEADILY MAKING
NEW ONES**

+

World's Fastest Machining Open
Hearth Carburizing Steel. Over 200
surface feet per min. Cold drawn
85000 lbs. tensile strength. Exception-
ally high impact values.

+

**SEE OUR EXHIBIT AT METAL CONGRESS
BOOTH M-55 CLEVELAND OCT. 19-23**

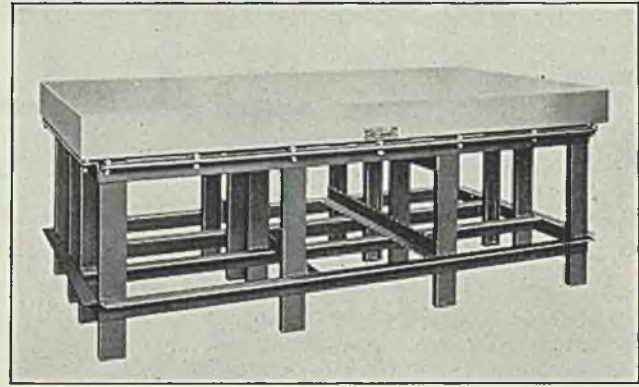
+

MONARCH STEEL CO.

CHICAGO + + + INDIANAPOLIS + + + HAMMOND

a new layout surface plate for accurate layout and inspection work. These plates are especially designed for use in industrial plants that require a true rigid surface for assembly, layout and inspection of products in process. The semisteel plates are planer finish, smooth, square and heavily ribbed underneath to prevent sagging. They are furnished in standard sizes ranging from 12 x 18 inches to 48 x 96 inches. Special sizes can be made to order. The all steel arc welded frame is provided with 32 lock leveling screws. Plates may be purchased with or without the steel supporting frame.

Challenge Machinery Co. is the maker of this layout surface plate for inspection work



Drum Truck—

Morse Mfg. Co., Syracuse, N. Y., announces a new barrel and drum cradle hand truck, constructed of steel angles. Each side is a continuous piece with double corners and riveted malleable iron nose piece. Trucks are built in shapes suitable for all sizes of barrels and drums. Two wheels are mounted on a straight axle, and two casters are on a swivel which may be swung into place after the truck is loaded. Capacity is 1000 pounds.



Cut-Off Machines—

A. P. De Sanno & Son, 1615 McKean street, Philadelphia, announce two new Radiac cut-off machines,



Model J Radiac metal cutting machine for production wet cutting

the types J and F. Type J machine is a new unit designed especially for the wet cutting of the larger sizes of bar stock and tubing. The head which supports the motor and contains the wheel spindle is well balanced and is of heavy construction in order to eliminate vibration and disk chatter. Capacity of the machine is bars of 2-inch diameter or



**A NEW DAY DAWNS
IN DRAFTING**

FOR SEVEN YEARS, Bruning Drafting Machines have lifted a huge burden of time-wasting drudgery from draftsmen's shoulders. For seven years, they have proved that they save from 25% to 40% of drafting time. It is a simple fact that no other machines of their kind have approached them in efficiency and ease of use.

And now, again, Bruning heralds a new day in drafting with new models of its Standard and Civil Engineers' Drafting Machines.

These new Bruning Drafters are the finest, most perfected tools ever offered to draftsmen.

They embody the widest range of exclusive advantages to be found in any drafting machines on the market. Yet they are simple in construction, and have the fewest working parts of any full-sized machine.

It is to your interest to know about the great forward stride that has been taken in drafting machines. So that you may have complete information, we have prepared an illustrated booklet describing the new Bruning Drafters. You are under no obligation in mailing the coupon for a copy. The coupon will bring you this FREE illustrated book.

BRUNING Since 1897

NEW YORK • CHICAGO • LOS ANGELES • DETROIT • BOSTON • NEWARK
ST. LOUIS • PITTSBURGH • SAN FRANCISCO • MILWAUKEE • KANSAS CITY • HOUSTON

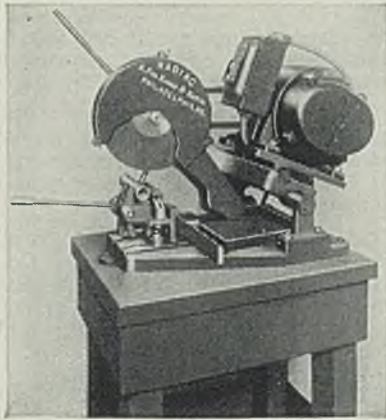
CHARLES BRUNING COMPANY, Inc.
102 Reade St., New York, N. Y.

Please send me your FREE Booklet, "How to Take the Waste Out of Drafting."

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State..... 728

A nation-wide service in sensitized papers, reproduction processes, drawing material and drafting room equipment.

tubes of 3½-inch diameter. It is powered by a 7½-horsepower splashproof ball bearing fan cooled motor. The coolant system is of 8-gallon capacity and the pump is driven by a ¼-horsepower motor. The type F machine is designed to fit the requirements of plants where the amount of different kinds of



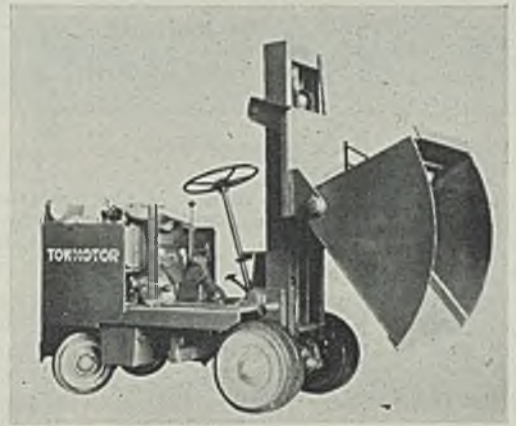
Radiac Model F portable metal cutting machine for light work on bars and tubes

materials to be cut is limited in quantity and size. Solid metal stock up to ¾-inch in diameter can be cut to size and tolerance. Metal tubing and fibrous materials up to 1¼-inch diameter can also be cut. The machine may be attached to any bench or movable table for portability. A 10-inch disk is used, operating at 13,000 surface feet which is stepped up when the disk becomes worn. Motor is 1½ horsepower and drive is through two V-belts. The clamping device is quick acting and holds the stock on both sides of the cut. The clamping pressure is adjustable so that thin walled tubing can be cut without distortion.

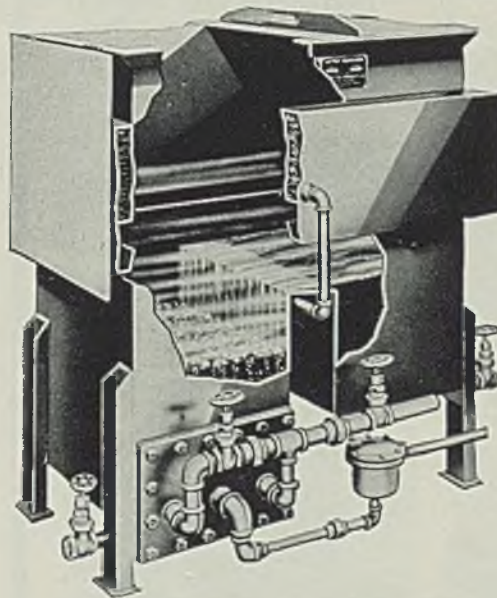
Scoop Lift Truck—

Towmotor Inc., 1226 East 152nd street, Cleveland, is offering a new gasoline powered industrial scoop truck for conveying bulk materials in and around manufacturing plants, steel mills, warehouses, ships and terminals. All parts of this new truck are interchangeable with the Towmotor lift truck with the exception of the scoop and its accessories. Driving wheels are under the load and the same tread is used for both front and rear wheels. Brake drums are turned integral with the wheels. Rear bumper and counterweight is formed of heavy steel plates welded to become an integral part of the frame. Load lift is hydraulic. The load capacity of the scoop is approximately 9 cubic feet and maximum load lift is 4000 pounds. Scoop will pick up and dump at any height within its lifting range.

Towmotor scoop truck which will pick up and dump at any height within its lifting range



TRIAL OFFER of a **DETREX DEGREASER**



Steam Heated Detrex Degreaser. Piping shown on front of machine is supplied by user.

You be the Judge!

Try a standard Detrex Degreasing Machine—in your own plant, on your own production—for three weeks without any capital investment.

The great saving in your cleaning costs, with better quality of product, will thus be proved.

You make the decision, regardless of the test results.

This free offer is made because of our experience with hundreds of satisfied customers who are using Perm-A-Clor and Triad safety solvents and Detrex Degreasers.

You will see how simply and efficiently this machine removes oil, grease, drawing compounds, and polishing and buffing materials from all kinds of stampings, castings, and screw machine parts. It effectively cleans steel, brass, aluminum, and zinc products. It is preferred as the best preparation for bonderizing, granodizing, plating, enameling, painting, lacquering, and the close inspection of machined parts.

TELL US NOW, WHERE AND WHEN TO SHIP THE UNIT. Your only expense will be the small transportation charges and the solvent used.

DETROIT REX PRODUCTS CO.

13009 Hillview Ave., Detroit, Mich.

Manufacturers of Triad Alkali Cleaners and Strippers

New York Office: 130 W. 42nd St.

Chicago Office: 201 N. Wells St.

RECENT PUBLICATIONS OF MANUFACTURERS

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

Graphic Instruments—Esterline-Angus Co., Indianapolis. Bulletin No. 336, illustrating the importance of graphic records in keeping operating efficiency at its peak.

Cast Steel—Farrell-Cheek Steel

Co., Sandusky, O. Booklet describing steel and cast steel products, listing exact physical qualities of the various grades.

Finishing Material—Parker Rust-Proof Co., Detroit. Folder on meth-

ods of finishing metal to assure lasting adhesion of paint to prevent rust.

Lightweight Tools—Utility Mine Equipment Co., 620 Tower Grove avenue, St. Louis. Folder describing light weight tools of tempered heat-treated aluminum.

Electric Traveling Crane—Cleveland Crane & Engineering Co., Wickliffe, O. Booklet on various types of electric all-welded traveling light weight tools of tempered heat-treated aluminum.

Plain and Universal Machines—Cincinnati Milling Machine and Cincinnati Grinders Inc., Cincinnati. Circular No. M-716, describing and illustrating the company's MH plain and universal machines.

Moltrup Steel Products—Moltrup Steel Products Co., Beaver Falls, Pa. Catalog No. 4, covering purposes, products, and processes, to provide insight to its facilities for handling practically any special or standard product.

Finish Baking and Drying Ovens—Despatch Oven Co., 622 Ninth street, South East, Minneapolis. Folder describing the company's various ovens for processing steel barrels, bed springs, display cabinets and auto trunks, steel cabinets, steel doors, and stoves.

Detergent—Pennsylvania Salt Mfg. Co., Widener building, Philadelphia. Folder on a new product, Orthosil, used as a detergent in the heavy-duty cleaning field, for cleaning ferrous metals preparatory to painting, plating, and vitreous enameling.

Continuous Gas Carburizing—Surface Combustion Corp., Toledo, O. Bulletin No. SC-76, describing Eutectrol process of continuous gas carburizing in giving accurate control of depth, type and character of case, and increased rate of penetration.

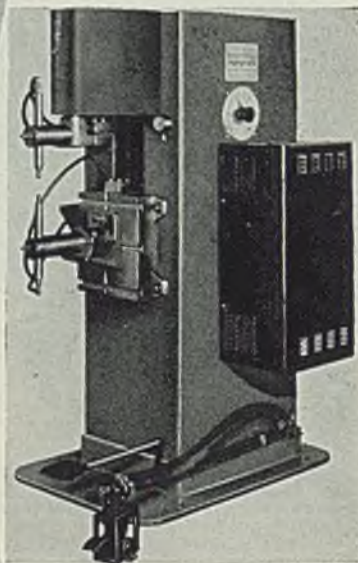
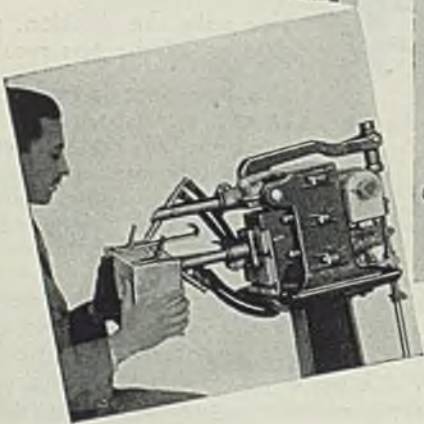
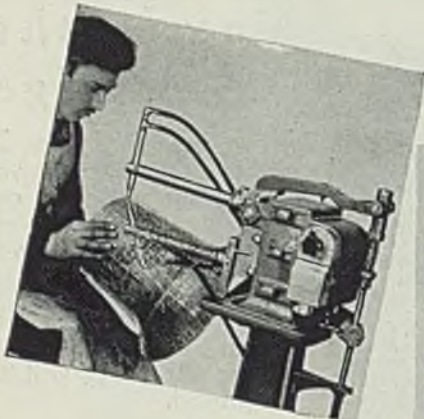
Materials Handling Equipment—Lewis-Shepard Co., Watertown Station, Boston, Catalog No. 20, describing and illustrating complete line of lift-trucks, portable elevators, floor trucks and special materials handling devices; replete with illustrations; 52 pages and cover.

Protected Steel Roofing—American Steel Band Co., 1400 Nixon street, North side, Pittsburgh. Folder describing the company's new line of factory finished type felt coat asbestos-protected steel roofing and siding material, its uses and method of manufacture.

Switches—Bull Dog Electric Prod-

The Eisler Solution for your WELDING PROBLEMS

Designers and Builders of Electric Welding Machines from ½ to 250 K.V.A.



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Water Cooled Holders Special Horns Transformers Job Welding

EISLER ENGINEERING CO.

762 So. 13th St., (Near Avon Ave.) Newark, N. J.

ucts Co., Detroit. Catalog on controlling and distributing apparatus for electric light and power, featuring the new vacu-break design which makes possible a reduction in size of the switch proper without sacrificing any of the necessary wiring space.

Adjustable Reamers — Wetmore Reamer Co., Milwaukee. A new revised general catalog No. 36, of their products. Descriptions of several additions to the line are included for the first time, together with data on a variety of special tools, standard precision reamers and equipment to reduce reaming costs.

Gas Conversion Burners—Barber Gas Burner Co., 3702 Superior avenue, Cleveland. Catalog No. 37, giving a complete presentation of the Barber line of gas conversion burners, burner units, pressure regulators, gas shut-off valves, and control equipment, also valuable engineering and technical data.

Agitator—Patterson Foundry & Machine Co., East Liverpool, O. Folder describing a complete agitator drive of integral self-contained construction with three major parts; standard motors with switch panel ready to mount starting equipment are used, making quick replacements possible.

Switches—Brown Instrument Co. division of Minneapolis-Honeywell Regulator Co., Wayne and Roberts avenues, Philadelphia. Folder illustrating contactor mercury switches; circuits made and broken in gas-tight glass chambers; hazards of open contacts in inflammable or explosive atmospheres are eliminated.

Pickling Inhibitor—E. F. Houghton & Co., Philadelphia. Folder describing a new inhibitor, Acitrol 100, a synthetic powder inhibitor which dissolves readily in strong or weak acid solutions, and leaves no greasy residue or stain on the steel; shows practically no breakdown at boiling temperatures, over long periods of time.

Disk Clutches — Conway Clutch Co., 1500 Queen City avenue, Cincinnati. Bulletin No. L28, describing single and tandem plate-stud drive with extended sleeve large size disk clutches. The clutches are manufactured to operate double throw, a pair operated by one shifter. A detailed price list is included with each illustration.

Wire Rope — Williamsport Wire Rope Co., Williamsport, Pa. Revised edition of their pocket catalog No. 34, giving complete information on all standard wire rope for the greater convenience of the user and distributor. In their plant the company covers every phase of wire rope making from drawing the wires to the finished product.

Silent Drive Units — Mechanical Handling Systems Inc., Detroit. Bulletin D-1, describing and illustrating a recently designed line of silent, variable speed drives for conveyors and other industrial uses; unit is made in two types, vertical and hor-

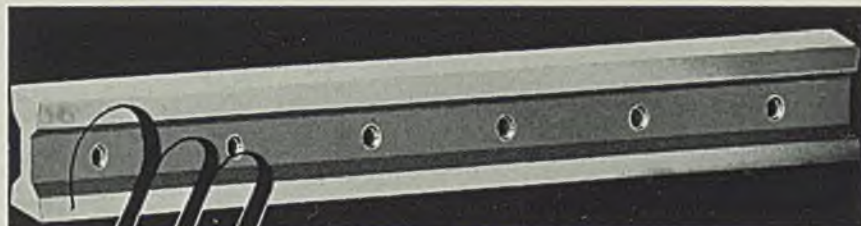
izontal; ratings and data concerning both types; illustrations and data on recent installation.

Outdoor Disconnecting Switches — Delta-Star Electric Co., 2400 Block-Fulton street, Chicago. Bulletin No. 32-C, describing outdoor disconnecting switches, fuse mountings and combination units up to 161 kilovolts; dimensions, insulator flashovers and cantilever strengths are given; a price list accompanies the bulletin.

Paper Technologist's Microscope —Bausch & Lomb Optical Co., Rochester, N. Y. Bulletin No. D-139,2, VIII-36, describing its new microscope for fiber analyses of paper:

finishes, speck analysis, fiber lengths, beating characteristics of pulps, particle size of filler and other materials, surface characteristics of paper, photomicrographic work, and metallographic work.

High Speed Steel Cutters—Edgar Allen & Co. Ltd., Imperial Steel Works, Sheffield, 9, England. Folder giving first-hand reports of many users of the company's Stag shapafom form-relieved high speed steel cutters. Also includes a brief and illustrated description of the shapafom principle and its advantages. Bulletin is also available on the range of tools and standard sizes, shapes, and sections consisting of pieces of super high speed steel



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AMERICAN SHEAR KNIFE CO.

HOME STEAD, PA. (Pittsburgh Dist.)

welded on to high grade steel shanks, which the company manufactures.

Wear Resistant Non-oxidizing Alloy—Colmonoy Co., Los Nietos, Calif. Folder No. 6, on a wear-resistant, corrosion-resistant, non-oxidizing alloy to be welded on with oxy-acetylene flame or electric arc.

Rotary Louvre Dryers—Link-Belt Co., 300 West Pershing road, Chicago. Folder No. 1511, on the rotary louvre dryers used for the drying of all types of granular materials, coarse or fine, or of irregular shape, size and consistency. It has also been employed as a heating or cooling unit; as a general reaction

vessel; and for evaporating liquids on a solid substance.

Dragline Buckets—Harnischfeger Corp., Milwaukee, Bulletin No. D4, describing its new all welded types of dragline buckets. Smoother, easier handling and less strain on the excavator is claimed. One of the features is the higher throat and adjustable hitch plates which allow the bucket to dig right in and fill up instead of sliding and skipping along the surface.

Compressor Units—Worthington Pump & Machinery Corp., Harrison, N. J. Bulletin No. W-620-B7E, describing and illustrating an improved line of compressor units for

garages, repair shops, and service stations. The single-stage units are available with vertical compressors, the two-stage units with angle two-stage compressors. The crankshaft is carefully balanced to insure smooth operation. Full floating wrist pins provide durability and quietness. The honed cylinder walls reduce friction and increase the life of the piston rings.

Maintenance and Lubrication of Bearings—Timken Roller Bearing Co. Catalog discusses recommended practice for assembling Timken bearings of various types, repair, adjustment and lubrication; photographs illustrate types of bearings discussed and diagrams show system of assembling marking for the four types in common use in rolling mills.

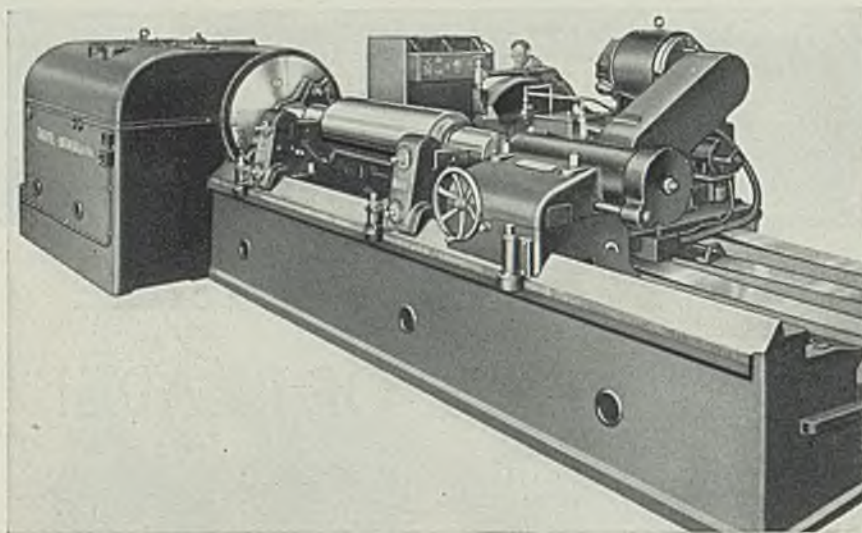
Odor Adsorbers in Air Conditioning—Consolidated Air Conditioning Corp., 114 East Thirty-second street, New York. Booklet covering the question of cost of operating an air conditioning system; necessity of reducing the amount of "make-up" air is stressed; set of tables showing the savings effected by reducing the amount of "make-up" air is included.

Nickel Alloy Steels—International Nickel Co. Inc., 67 Wall street, New York. Bulletin No. P-1, describing the properties and applications of heat treated wrought nickel alloy steels, in sections up to about 6 inches in diameter or thickness. Includes table on the approximate core properties of case hardened carbon and nickel alloy steel, and charts illustrating mechanical properties.

Speed Reducers—D. O. James Mfg. Co., 1120 West Monroe street, Chicago. Bulletin No. 11 covering right angle spiral bevel gear speed reducers with ratios of 1:1 up to 6:1. Bulletin No. 16 covers right angle spiral bevel continuous tooth herringbone reducers with ratios of 6:1 up to 45:1. Catalog No. 141 covers right angle spiral bevel spur gear speed reducers with ratios of 8:1 up to 1200:1.

Hi-Temp Fans—General Combustion Corp., Engineering building, Chicago. Bulletin No. 24, describing Hi-Temp fans suitable for heat interchangers, furnace heat recirculating, and similar application where convected heat at high temperatures must be conveyed to processes or disposed of. Includes tables indicating sizes of fans for different volumes of air at 600, 900, and 1200 degrees Fahr.

Wrought Copper Alloys—Chase Brass & Copper Co., Waterbury, Conn. Booklet form No. A-1012 on wrought copper alloys, compiled to fill the need for a comprehensive and authoritative source about the commercially more important wrought copper alloys. The tabular matter shows not only the more important physical and mechanical properties but also much about the working, welding and machining of these alloys. The tables of weights are all new.



HEAVY ROUGHING or FINE FINISHING

The Farrel Heavy Duty Roll Grinder does both. It is a dual-purpose machine, equally capable of taking heavy cuts in rough grinding and of applying the finest mirror surface to rolls of all types.

It is truly a *production* and *precision* machine, in which is embodied the ability to grind rolls of the accuracy and finish required by modern rolling mill practice and at the same time to give a high rate of output at minimum cost.

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FARREL-BIRMINGHAM
Company, Inc.

110 Main St., Ansonia, Conn.—322 Vulcan St., Buffalo, N. Y.

Facts on Resistance of Metals to Corrosion

Corrosion Resistance of Metals and Alloys, by Robert J. McKay and Robert Worthington; 492 pages; published as an American Chemical Society monograph, by the Reinhold Publishing Corp., New York; supplied by STEEL, Cleveland, for \$7, plus 15 cents postage; in Europe by the Penton Publishing Co. Ltd., Caxton House, Westminster, London.

The purpose of this work is to summarize the facts on corrosion processes and rates. It is inevitable that statements on the facts of corrosion rates will find some disagreement on the part of manufacturers and possible users who hope for better resistance properties, but the volume offers no panacea for corrosion difficulties, contenting itself with an accurate statement of the facts.

General and theoretical discussion is contained in the first part, covering such subjects as the rate factors, forms of corrosion, corrosives and metal corrosion properties. Part II is concerned with the corrosion behavior of specific metal and alloy groups such as magnesium, aluminum, zinc, cadmium, tin, lead, iron and steel and silicon-iron, molybdenum, chromium, nickel, etc.

Galvanizing Practice as It Affects Physical Properties

(Concluded from Page 80)

be covered by a well regulated steel-making practice so that the resulting wire may represent the maximum in sound coating.

After steel of the most suitable composition has been produced, a wire drawing practice must be laid out to produce a clean surface free from cracks, slivers, seams or extraneous matter. It has been said that if wire is properly cleaned, it is impossible to do a poor job of galvanizing. This is true, in a measure, and much care has been taken in the proper preparation of wire for galvanizing. Various forms of acid, electrolytic and molten salt cleaning are in use today. Some forms of cleaning are devised in an effort to correct defects in steelmaking. This, of course, represents makeshift procedure and the results are not basically sound.

(To Be Concluded)

Atlas Presents Physical Properties of Steels

Steel Physical Properties Atlas, by Charles Newman Dawe; cloth, 90 pages, 9½ x 11 inches; published by American Society for Metals; sup-

plied by STEEL, Cleveland, for \$2.50 plus 15 cents postage; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

This book is a compilation of average and conservative physical property data for the most generally used plain carbon and alloy steels and steel castings. Information of this type is scattered, thus this complete and concise *Atlas* will be most useful to the engineer or metallurgist requiring knowledge of physical properties of ferrous metals upon which to figure designs.

At a glance, properties of the vari-

ous types of steels as affected by carbon content, alloy content and heat treatment, as well as other influencing factors, are ascertained. The author employs a unique new method to present the data. Thirty-five attractive full-page graphs, many of them in three colors, are used. The timesaving features of this book add considerably to its value.

The contents include data on the most regularly used S.A.E. steels, cast steels, plates and rounds, 18-8 stainless steel, high-tensile steels and considerable additional information.

FAST BRAKE RELEASE

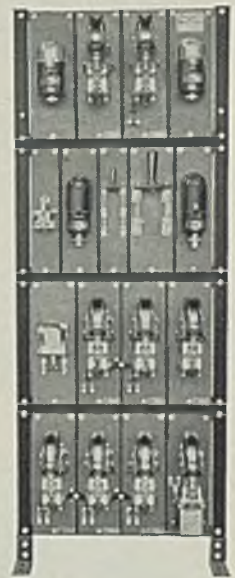
an exclusive feature of this EC&M Wright Dynamic Lowering Circuit Crane Hoist Controller

With this Crane Controller, the brake releases instantly. Instead of passing only a part of the line current through the brake on the first point lowering, the EC&M Wright Circuit is designed to allow all the current taken from the line to flow through the brake coil. The crane operator, no longer, need hesitate on the first step to give the brake an opportunity to release; instead, he can move his master controller immediately to any desired speed point. Improper brake adjustment has little effect on this quick release.

This improvement not only insures faster crane operation, but also provides greater accuracy and fewer movements when spotting heavy loads.

In addition to More Trips per Minute—the EC&M Bulletin 920 Wright Dynamic Lowering Circuit Controller permits a substantial reduction in power consumption, resulting in as much as a 30% saving in power consumed as compared with the previous type of dynamic lowering control.

For use in connection with this controller is the EC&M Bulletin 1182-1 Type NT Master Switch—sturdy, easily-operated, compact and of narrow width requiring a minimum space in the crane cab. Designed for upright or inverted mounting.



WRIGHT DYNAMIC LOWERING CIRCUIT CONTROLLER (WITH PROTECTION) FOR CRANES, HOISTS, ETC.



Specify EC&M Crane Control
for Quick Brake Release and More
Trips per Minute with Less Power Consumption

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AUTOMATIC CONTROL for CRANES • MILL DRIVES and MACHINERY
BRAKES • LIMIT STOPS and LIFTING MAGNETS.

3-way Savings Account for Popularity of These Tools

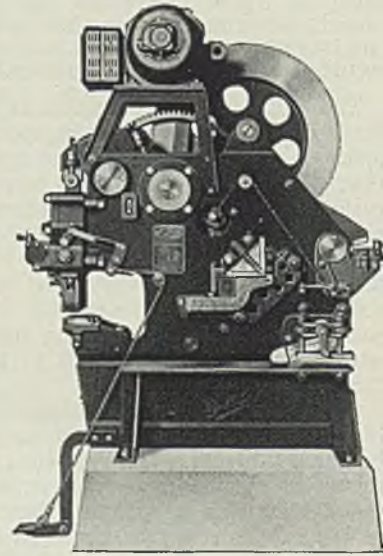
BECAUSE cutting, punching and bending metal shapes is a costly procedure, every shop executive is interested in ways to lower these costs. Buffalo Universal Iron Workers and Buffalo Bending Rolls offer three-fold savings: (1) They reduce TIME required to perform the various operations. (2) Because of their relatively light weight "Armor-Plate" construction, they save SPACE. (3) Simplified and very accurate operation reduces spoilage to a minimum—thus they save MATERIALS.

Read the detailed data below—have you a place where these machines can save money?

Buffalo Universal Iron Workers

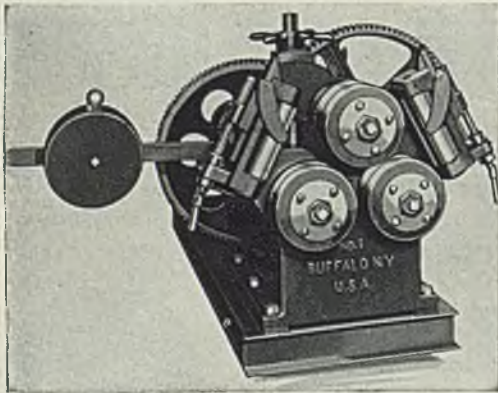
Universals are made in a number of sizes, capable of handling angles, tees, rounds, squares, flat steel—punching, bar shearing, angle shearing, plate slitting, coping and notching.

The semi-floating punch head is standard in all sizes. The standard die-blocks are so designed as to permit flange and web-punching of beams and channels without changes. The bar-cutter section cuts angles square and mitre.



SPECIFICATIONS

	No. 0	No. 1/2	No. 1 1/2	No. 1	No. 2	Low Throat Types		
						No. 2 1/2	No. 3 1/2	No. 4 1/2
Punches.....	11 x 1/2 3/4 x 3/8	1 x 1/2 3/4 x 3/8	1 1/2 x 3/4 1 1/2 x 3/8	1 x 1/2 3/4 x 3/8	1 1/2 x 3/4 1 1/2 x 3/8	1 1/2 x 3/4 1 x 1/2	1 1/2 x 1 1/4 1 1/2 x 1	1 1/2 x 1 1/2 1 1/2 x 1 1/4
Shears Plates.....	3/4"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	2 1/2"	2 1/2"	3"
Cuts Rounds.....	1 1/4"	1 5/8"	1 3/4"	1 3/4"	1 3/4"	2 1/2"	2 1/2"	3"
No. of Strokes....	36	30	25	30	25	28	26	24
Required H.P.....	2	3	5	3	5	10	15	20
Wgt. Pulley Drive	1730	3350	6000	5860	9200	7800	11,000	26,500



Buffalo Bending Rolls

All Buffalo Benders are of the single housing type with overhanging rolls, making the removal of finished circles possible without the necessity of dropping one housing.

The patented "Buffalo" "leg-in" attachment does away with the necessity of the reverse bend required up to now when bending angles leg-in.

SPECIFICATIONS

	No. 1/2	No. 1	No. 2
Angles—Leg Out.....	2 x 2 x 1/4	3 x 3 x 3/8	4 x 4 x 3/8
Minimum Diam.....	20	24	40
Angles—Leg In.....	1 1/2 x 1 1/2 x 1/4	2 1/2 x 2 1/2 x 3/8	3 1/2 x 3 1/2 x 3/8
Minimum Diam.....	18	30	48
Smallest Angle—Leg Out.....	3/4 x 3/4 x 1/8	1 1/2 x 1 1/2 x 1/8	1 1/2 x 1 1/2 x 1/8
Minimum Diam.....	8	13	18
Smallest Angle—Leg In.....	3/4 x 3/4 x 1/4	1 1/2 x 1 1/2 x 1/4	2 x 2 x 1/4
Minimum Diam.....	9	14	20

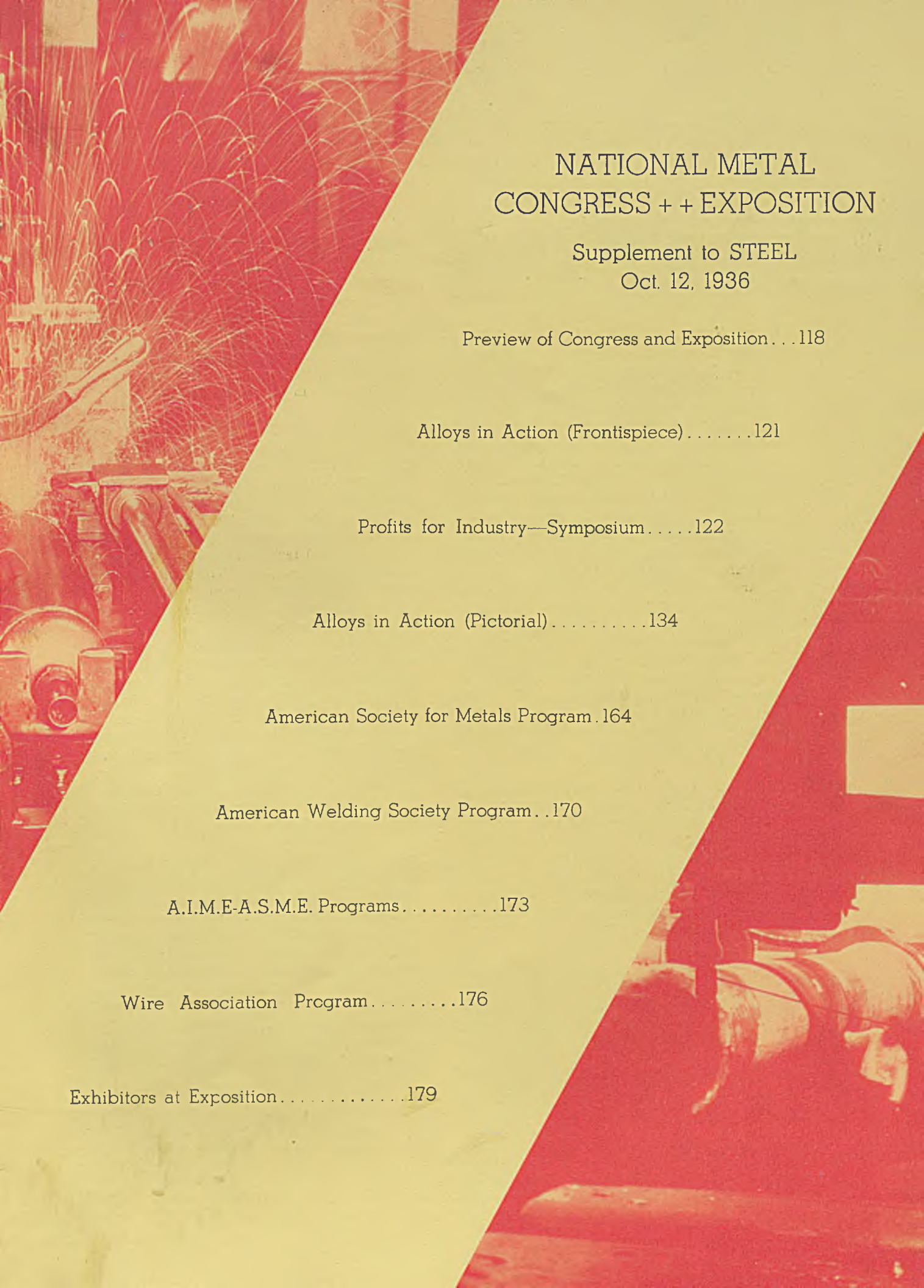
Buffalo Forge Company

446 Broadway, Buffalo, New York

In Canada: Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

Buffalo

Bending Rolls
Universal Iron Workers



NATIONAL METAL CONGRESS + + EXPOSITION

Supplement to STEEL
Oct. 12, 1936

Preview of Congress and Exposition . . . 118

Alloys in Action (Frontispiece) 121

Profits for Industry—Symposium 122

Alloys in Action (Pictorial) 134

American Society for Metals Program . 164

American Welding Society Program . . 170

A.I.M.E.-A.S.M.E. Programs 173

Wire Association Program 176

Exhibitors at Exposition 179

Preview of Eighteenth National Metal Congress and

WITH the Romance of Iron and Steel as its dominating theme, the Great Lakes exposition in Cleveland has for more than three months created a greater consciousness of the importance of the iron and steel industry to the economic welfare of the nation. The exposition comes to a close on Oct. 12, but with an intermission of only a week Cleveland becomes host to the Eighteenth Annual National Metal congress and exposition which will convene several thousand metallurgists, engineers and technicians, who are contributing to the progress of the iron and steel and metalworking industries.

Participating in the congress, which opens on Monday, Oct. 19, and continues through Friday, Oct. 23, are the American Society for Metals, American Welding society, American Institute of Mining and Metallurgical Engineers, the Wire association, and American Society of Mechanical Engineers. This year marks the third time that the congress and exposition have been held in Cleveland; previous occasions were in 1925 and 1929.

THE exposition, to occupy the Lakeside exhibition hall of Public Auditorium, will be the third largest of the eighteen shows held since the first in Chicago in 1919. Exhibitors will number approximately 220, about the same number as last year in Chicago, but, reflecting the greatly improved business situation, individual allotments of floor space are 17 per cent larger. Exhibit space will aggre-

gate over 70,000 square feet, as compared with 90,000 square feet in the largest show in Chicago in 1926, and 84,000 square feet in the second largest in Detroit in 1927.

AMERICAN SOCIETY FOR METALS, organizer and chief sponsor of the congress and exposition, will maintain headquarters at the Statler hotel and here all morning technical sessions will be conducted. Afternoon sessions will be at Public Auditorium to afford easy access to the exposition.

A total of 50 technical papers will be presented at the 14 sessions. Three sessions will be devoted to research, two to physical properties, and one each to heat treating, grain size, melting and X-rays.

The society will hold its annual business meeting on Wednesday morning, at which time officers will submit reports and the election of officers will be reported. At the adjournment of this meeting, J. P. Gill, metallurgist, Vanadium-Alloys Steel Co., Latrobe, Pa., will deliver the annual Campbell memorial lecture on tool steels.

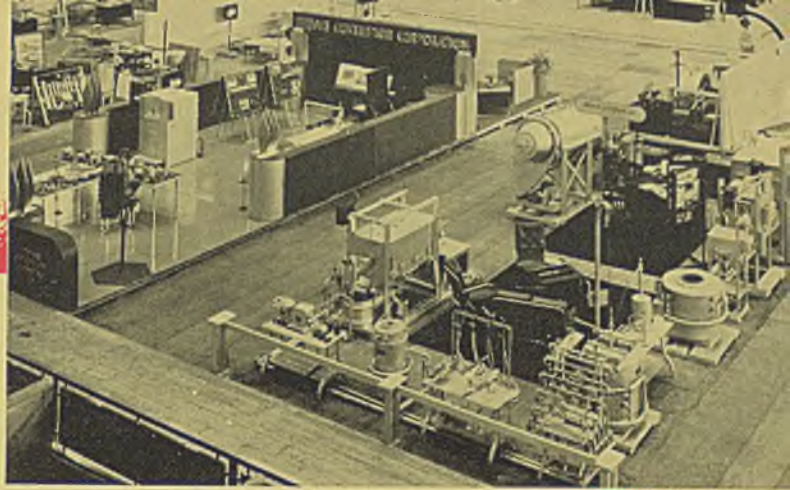
Following the precedent of last year, two educational lecture courses have been arranged, each comprising five lectures.

PARTICIPATION of the American Institute of Mining and Metallurgical Engineers in the congress is to comprise the fall meetings of the Iron and Steel and Institute of Metals divisions. Headquarters will be at the Statler hotel and all sessions will be held there except two on Wednesday afternoon, the latter to be at Public Auditorium.

The Iron and Steel division has arranged three sessions with 10 technical papers. One session will cover blast furnace practice, the second the open-hearth steel plant and the



Exposition



third devoted to X-ray metallography. Aging of metals, and constitution of alloy systems are subjects announced for two sessions of the Institute of Metals division.

The two divisions will conduct joint sessions on Thursday morning and afternoon at which eight papers are to be read on the subject of physical tests and their significance.

AMERICAN WELDING SOCIETY will hold its seventeenth annual meeting at Hotel Cleveland with activities getting under way on Monday morning and continuing through Thursday. Business will be conducted at the opening session, this to include reports of officers, election of new officers and award of the Samuel Wylie Miller medal.

Seven technical sessions embracing 24 papers have been arranged with the sessions on Tuesday morning and afternoon devoted to fundamental research in welding.

Members of the American Society of Mechanical Engineers will participate in two sessions on Thursday and on Friday members of the American Welding society are invited to attend two sessions sponsored by the A.S.M.E.

FOR the annual meeting of the Wire association to be held at Hotel Cleveland, a business session, six technical sessions and an informal dinner are scheduled. The meeting will begin with the business session on Monday afternoon at which officers will report.

Twelve papers are to be read and discussed at the technical sessions, these papers falling under the following general topics: Cleaning, heat treating, materials handling, springs, welding wire, research, cold working of metal, testing copper wire, power cable, power re-

quirements for drawing copper, and dies and tools.

Activities of the American Society of Mechanical Engineers in connection with the Metal congress have been arranged by the society's Machine Shop Practice, Iron and Steel and Petroleum divisions. The program includes four technical sessions at Hotel Cleveland on Thursday and Friday.

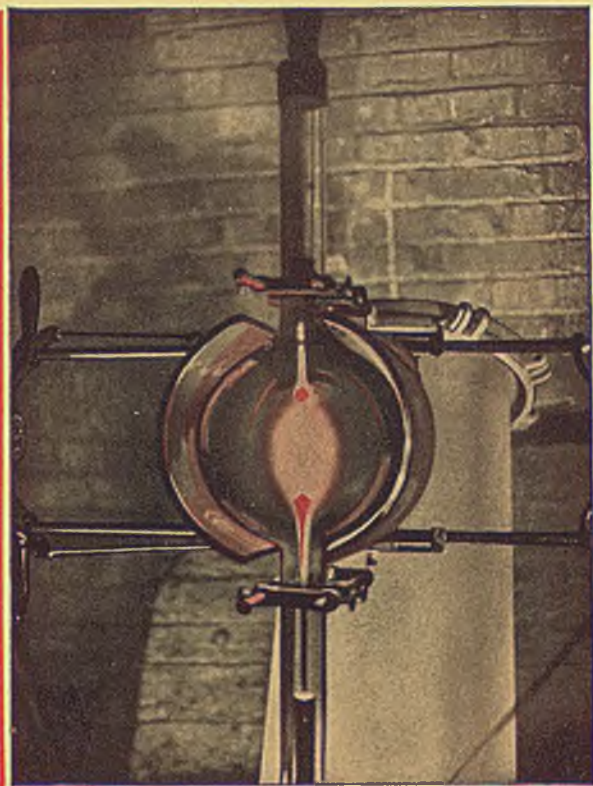
It is the intention that the four sessions will constitute a welding practice symposium to provide mechanical engineers with information which will be a useful guide on welding technique and its effect on design and production.

Because Cleveland has many and diverse manufacturing plants, arrangements have been made for congress and exposition visitors to visit a few of these plants.

WE LIVE in an age of alloys, a fact which will be doubly emphasized by discussions at the forthcoming National Metal Congress where the theme running through the majority of technical papers will, in one way or another, be related to some phase of alloy development. From an industrial standpoint it is difficult to conceive of any task in which metal alloys are not contributing to more efficient or more economical manufacturing. And every day new alloys are being developed and new uses being discovered for them.

Believing it appropriate at this time to call special attention to the subject of alloy metals, STEEL devotes a number of succeeding pages to "Alloys in Action." Introducing the presentation are statements contributed by executives of eight leading producers of metal alloys; following which is a series of pages which suggest pictorially a few of the myriad uses of alloys in present-day construction.

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buy
in
the
dark**



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"X-RAY INSPECTION"
ASSURE YOU BETTER
CASTINGS**

Avoid costly premature failures in
... retorts ... muffles ... tubes ...
curburizing boxes ... lead, salt and
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BOOTH M-6

National Metals Congress

The ELECTRO ALLOYS CO.

ELYRIA, OHIO

"QUALITY CASTINGS SINCE 1919"



Alloys



★ ★ ★ *in action*

How Modern Alloy Metals Provide

A Symposium in which Executives of Leading Producers of Alloy Materials Voice Their Opinions of the Profit Possibilities Their Products Offer to All Prospective Users

Blazing the Trail to Restored Profits

BY T. M. GIRDLER

Chairman and President,
Republic Steel Corp.

DEMAND for products of constantly improved quality has complicated the making of a profit in almost every manufacturing industry serving markets that are sensitive to changing prices. Improved machinery, standardized production and broader markets have all helped to find the way, but modern alloy metals have played an all-important role in solving the profit problem. One way or another, they have blazed the trail toward restoration of net profits in almost every metalworking field.

Alloys, and particularly alloy steels, have been basic in the development of more efficient, faster and better machine tools without which the low cost production for today's major mass markets—automobiles, household equipment, etc.—could not have been attained. Whether used in machinery or in materials of manufacture, alloys have met some urgent requirement of profitable enterprise with each new application.

Some have obviated the necessity for costly finishing operations, such as plating or rustproofing. Many, by reason of their formability and strength, have paved the way for the substitution of single stampings for units heretofore assembled at excessive ex-

pense. More than one has reached its greatest usefulness through inherent strength which permits the reduction of dead weight in transportation equipment and increases its potential earning power in consequence.

METALLURGICAL research is opening up new fields every day, through combinations which are yielding special alloys for almost every metal using industry. Steel, through its alloys, is annexing countless functions in the past fulfilled only by less plentiful and costlier metals. America is becoming alloy conscious as it rides on streamline trains, sturdier airplanes and more comfortable, faster motor buses whose performance and appearance are traceable directly to progress in this new sector of the steel industry.

Stainless steel is finding its way to favor as quality tableware and has long since established itself in the kitchen. In architecture it has already been applied extensively enough to have opened the whole field of building decoration, inside and out, to the makers of iron and steel.

Wherever these modern metals have been applied, they have carried qualities of superior strength and wear resistance which more than justify the painstaking research and profitless development work that always precedes the introduction of any new material. Reduced maintenance expense, slower actual depreciation and superior performance is being attained in almost every product to which these alloys are being applied. Whether they are called upon to function in furnaces, in pipe, in cutting tools, in automotive parts or pots and pans, the results are the same.

WEIGHED in the light of all these qualities, modern alloy steels are being produced today at costs which warrant greatly increased use in every field of manufacture. I know of no branch of industry which does not stand to benefit in some way from improved machinery or materials made possible

for More Profitable Manufacturing

On Land and in the Air, on the Farm and in the City, in Homes and in Industry – Literally Everywhere – Added Values of Alloy Metals Are Being Realized Advantageously

through the alloying of metals. The opportunities in food industries, textile and paper manufacture are available through channels just as well defined as for the automotive and other metalworking industries.

Recognition of the potentialities of alloy steels is growing rapidly. As it increases, production cannot fail to mount to a point where volume will be reflected in lower relative alloy costs. With the broad ultimate acceptance of these modern metals, all manufacturing industries will continue to reap substantial and increasing benefits.

Savings with Alloys Universal in Scope

BY B. F. FAIRLESS

President, Carnegie-Illinois Steel Corp.

ALLOY steels are commonly associated with the idea of improved machine efficiency, as in an automobile or a farm tractor. Less widely realized is the fact that these same steels are playing an important part in reducing industrial production costs.

Some of the most spectacular performances are being provided by the stainless steels in chemical industries. In the manufacture of nitric acid and the preparation of dyestuffs and many other chemicals, the resultant equipment has an indefinite life and gives a pure product. In preparing pulp for paper manufacture, where the separation of impurities is important and costly, a clean product is prepared at low cost. In dairy equipment, stainless milk coolers

make it possible to meet federal and state food regulations at low cost. In chemical and metallurgical processes, the stainless steels are used also at high temperatures, and have a long life with resultant low upkeep cost. Heat exchangers and steel treating equipment are examples.

ALLOY steels with lower alloy content, which are therefore much less costly than the stainless alloys, make for savings in costs which are sometimes less spectacular but in the aggregate amount to much more. Thus, in the oil and gasoline industry, alloy oil well drilling equipment and oil well sucker rods provide much longer life and ultimate great savings, particularly in the handling of deep wells. In gasoline cracking stills, alloy tubing operates at higher temperatures and higher pressures and the resulting greater efficiency makes for reduced costs. In coal and ore handling, steels having better wear resistance are showing marked economy in applications such as chutes, crushers and screens.

In moving structures, high-strength low-alloy steels provide lighter structures which are therefore moved at great savings in power. This applies not only to railroads, where the savings are obvious, but also to industrial applications such as cranes, hoists, derricks and shovels.

IN INDUSTRIAL shops, longer life of equipment or parts is an important factor. Shop economies are affected not only by the cost of the replaced parts themselves but also by the costly time of shut-downs when equipment and men are nonproductive. In forge shop equipment, alloy die blocks show improved life over ordinary blocks. In machining operations, improvement is found not only in the so-called free-cutting steels but has been introduced also to a marked extent in the alloy steels some of which were formerly considered difficult to machine. The improvement in the cutting tools themselves has also lowered machining costs. In wearing parts, such as

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Provides exceptionally good machinability and excellent heat-treating qualities. Available in three grades—.10/.20, .25/.35 and .30/.40 carbon. Ask the J & L Metallurgist at Booth E-15.

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CORPORATION

CLEVELAND AUDITORIUM ... OCT. 19-23, 1936



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**BOOTH
E-15**

An interesting feature of the J & L Exhibit will be an attractive large scale working model of a tilting open hearth furnace which represents, with effective realism, the tapping of a heat of steel. There will also be interesting demonstrations of the many advantages of J & L Steel of various grades.

J & L metallurgists will be available at the J & L Exhibit to discuss your steel problems, and to show you how the application of the right grade of J & L Steel will meet your special requirements.

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**J & L
STEEL**

machine bearings and mill bearings, the newer steels show greatly increased life and thus help to reduce production costs.

Even the small hand tools have helped in the program of economy. Such small items as alloy chisels, wrenches, saws, files and the like have in their great aggregate tonnage helped to reduce costs of hand operations enormously by their greater efficiency and longer life.

The improvement introduced by the use of alloys has been accompanied by an improvement in steel manufacturing methods, and this "alloy quality" has helped further to reduce fabricating costs. Standardization and uniformity of product have assisted in reducing the costs of forming, machining, welding and heat treating to a degree that was not possible some years ago.

Light Metals Give Notable Economies

BY S. K. COLBY

Vice President, Aluminum Co. of America

IMPROVED transportation, flood control, and revival in durable goods industries—three matters now occupying public attention—have created a marked demand for modern alloy materials. In all three fields, the alloys of aluminum, with their combination of strength and light weight, are playing an important part.

In the navigation and flood control program of the U. S. Army Engineers, for example, some 265,000 pounds of aluminum alloy was recently used in connection with the new Gallipolis roller-gate dam on the Ohio River. The aluminum alloy, in the form of structural shapes and plate, was employed in the construction of the emergency bulkheads used to unwater the giant roller gates. With the lightweight bulkheads, there is no necessity for expensive overhead bridge and cranes required to handle the heavier bulkheads used on other roller-gate dams.

Much of the flood control work in progress along the Mississippi River can be done most economically by draglines and dredges equipped with longer booms than those originally designed for the machines. It has been found that lightweight aluminum alloy construction permits the length of booms to be increased 15 to 20 per cent, or if increased working radius is not desired, it permits larger buckets to be used. Likewise, aluminum alloy construction in dragline buckets and power shovel dippers affords a means of increas-

ing capacities as much as 30 per cent without decreasing the stability of the machine or the swinging speed. Outstanding among the aluminized booms and dippers now in service are a 240-foot dredge boom and a 32-cubic yard power shovel dipper.

INCREASED traffic in recent years has resulted in excessive loads on many of our older bridges, and in some cases it has necessitated their rebuilding. Aluminum alloy construction is particularly well suited for this type of work, as was shown in the reconstruction of the Smithfield street bridge, Pittsburgh, in 1933. In this case, approximately 340 tons of aluminum alloys was used for a new floor system, which reduced the load carried by the bridge trusses some 750 tons and added many years to the life of the structure. Another example of aluminum alloys successfully employed to replace an outmoded floor system is the Stratford avenue bridge on the Boston Post road in Bridgeport, Conn.

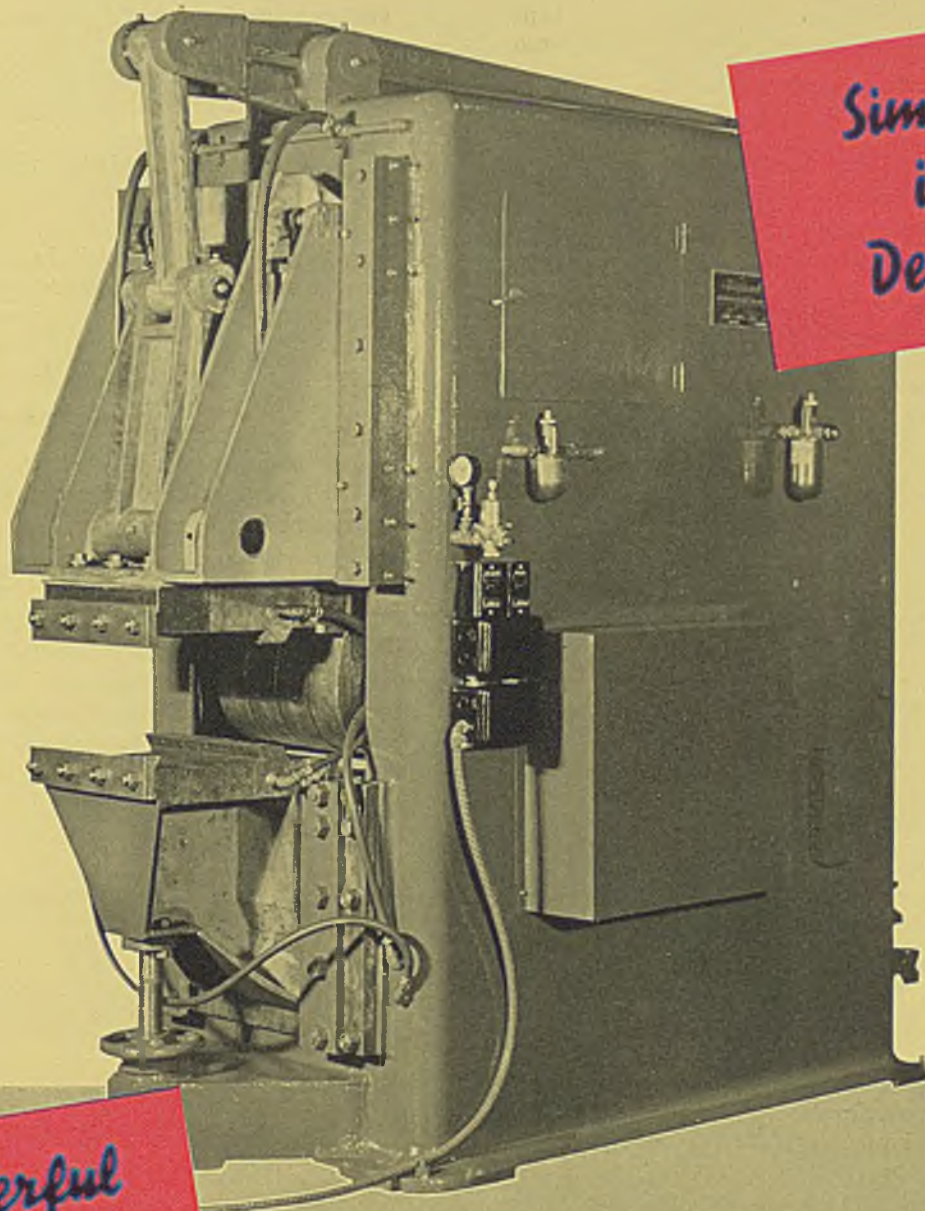
In the transportation field, aluminum is assisting in providing more profitable operations. Aluminum alloy construction in aircraft has become practically standard, so that aluminum is truly the metal of the air. There is a constant improvement in the alloys and the methods of producing wrought and cast aluminum commodities for aircraft consumption to keep pace with the ever-increasing demands of that industry for better performance.

The use of aluminum structurally and for interior trim in the modern lightweight, high-speed trains, is one of the important factors in their success. Of the aluminized trains in service, the Union Pacific's two new 12-car streamliners, known as the "City of Denver," are the latest and are constructed chiefly of aluminum alloys.

MODERN buses, in which safety and comfort are prime requisites, make extensive use of aluminum. A new Greyhound bus, for example, is built almost entirely of strong aluminum alloys, resulting in a vehicle 2 tons lighter than the former bus and possessing greater structural strength, superior braking efficiency, better balance, and smoother operation. Lightweight construction also makes it possible for bus operators to meet the weight restrictions of the various states.

Truck operators find it profitable to use the aluminum alloys in truck construction. The reduction in dead load permits a corresponding increase in payload, which often pays for the extra cost of the aluminum body in six months and results in a high return on the added investment after that period. A 50 per cent reduction in body weight is not uncommon. Aluminum bodies are employed on practically all types of trucks and trailers, including dump trucks, freight carriers, tank trucks, rubbish collection trucks and coal trucks.

Because of their excellent resistance to attack by marine atmospheres, several aluminum alloys are



Simple
in
Design

Powerful
in
Operation

... and another interesting *Federal* development in heavy duty projection welders has been perfected. The machine (above illustrated) is for welding sub-base spacers to side bar bottom plates on automobile chassis.

Constructed with an unbreakable fabricated steel frame and an aluminum cross-head, this unit proves a real brute for heavy production—all wearing surfaces being faced with hardened and ground steel plates... Added features being: 1000 KVA transformer capacity... 18" throat depth... Maximum opening between upper and lower dies 19½"... Air cushion operating cylinder with adjustable stroke... Maximum pressure on cross head 20,000 lbs.

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used to advantage on shipboard, particularly for superstructures and numerous accessories.

A free-cutting aluminum alloy developed for use on automatic screw machines is one of the latest additions to the list of commercial aluminum alloys. This alloy is comparable with brass in machining qualities and can be machined at the highest speeds available on standard automatic screw machines. Many screw-machine products which formerly could not be manufactured economically in aluminum are now being turned out on a commercial scale.

Aluminum alloys render valuable assistance in many other branches of industry in eliminating undesirable weight, speeding up operations, increasing capacities, and making production in general more profitable.

Effecting Economies In Use of Steel

BY QUINCY BENT

Vice President, Bethlehem Steel Co.

ALLOY steel of many grades and widely varying properties bids ever more insistently for the attention of the manufacturer who is thinking in terms of greater serviceability to the ultimate consumer. In instance after instance today's alloy steels of increased adaptability and greater dependability, which have figured so importantly in the development of airplanes and automobiles, are now bringing comparable gains in the utility of other products made from steel. The increased uniformity of physical properties in alloy steel and new knowledge pertaining to the control of these properties, both as the steel is made and as it must undergo heat treatment or other processing in production, now make alloy steel not only the best but often the least costly of materials from a manufacturing standpoint.

To begin with, improvements are constantly being made in the technique and control of the production of alloy steel in the melting furnaces. Alloy steels are now made so that desired balances of properties can be obtained with comparative uniformity. Much has been learned about control in the production of these steels, whether for parts to be machined from rolled bar stock for parts to be forged, or whether for steel castings themselves. Intensive metallurgical investigation has provided yardsticks to measure and maintain production practice control. Given a uniform and proper hot working and heat treatment, alloy steels free from mysterious failures of the past are now being regularly produced.

Hot working and thermal handling practices have been improved. The importance of proper heating

and cooling rates is better understood. The control of the temperature and atmosphere in the heating furnace is more accurate than heretofore. As a result of experience and experiment, the rate of reduction and range of temperatures during hot work for various alloy steels are now better regulated.

RAPID strides have been made in the improvement of heat treatment facilities and their control. The heat treater visualizes and aims for structures as they should be when revealed under the microscope, an instrument that has become as much of a tool for him as the valves of his furnace. Whereas, at one time, he merely quenched and tempered, producing a hard or a machinable product as desired, he now obtains definite and restricted physical property balances, microstructures, and hardnesses.

Thorough examination of completed products and critical investigations of successes and failures in service have been concurrent with this improvement.

Utilization of today's more dependable alloy steels is enabling manufacturers to meet competition with better products, by the sound practice of providing the greatest utility at the lowest cost.

Modern Alloys Hold Imposing Position

BY W. F. DETWILER

Executive Vice President,
Allegheny Steel Co.

MORE conspicuous instances wherein the use of modern alloy metals has been the answer to more profitable manufacturing have, in their relatively short period of existence, come to a matter-of-fact acceptance by both users of alloys in the classification of fabricating shops, and as well to the general public.

To illustrate, into this broad classification of accepted uses fall such as the modern streamlined railroad train, or such as the modern automobile both beautified with its finished trim and appearance and structurally strengthened by alloys. These two major uses are quite evident by now to the layman. Furthermore, these instances of modern alloys in action, while less than a decade old, have not only established themselves as evident on a wide scale, but wholeheartedly acceptable.

Yet behind these more apparent uses for modern alloys lies a vast group of new applications. Each in itself is showing a rapid growth. To mention a few examples and at the same time to show the vast

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The new high speed steels

APPLICATION—All high speed cutting-tools, punches, dies, wear and heat resisting parts.

APPROXIMATE COMPOSITION
C .50—.85 Mo 8.00—9.50
W 1.30—1.80 Cr 3.50—4.00
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The lower carbons are used for tools requiring great toughness. The higher carbons are used for tools requiring great hardness and especially great red-hardness. The carbon content of MO-MAX is in general about 0.10% higher than for comparable grades of 18-4-1 high speed steel.

WEIGHT—Density about 7.95—approximately 8% less than 18-4-1 high speed steel.

MACHINING—MO-MAX is easy to machine and grind. Its hardness after annealing is slightly less than that of most high speed steels.

HOT WORKING AND HEAT TREATMENT—Typical working temperatures are:

Forging 1900°-2000° F (MO-MAX is workable down to 1700° F)

Annealing 1500°-1550° F

Hardening 2175°-2250° F to be varied according to the carbon content and kind of tool.

Tempering about 1050° F.

HARDNESS—Rockwell hardnesses in excess of C 65 are easily obtainable.

TOUGHNESS—As tough or tougher than other well known high speed steels.

LIFE—Total life and life between grinds is at least equal to that of high speed steels now in general use.

For detailed information, consult your usual sources of supply.

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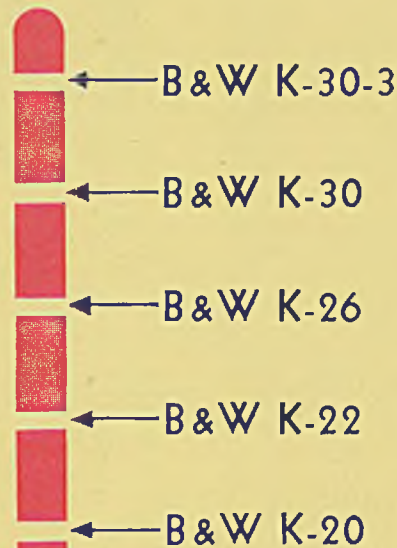
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R-41

breadth of the market, we find today that corrosion-resistant steel is being used in the form of hypodermic needles, in X-ray machines and in pigment rolls for the printing industry. In the dairy industry alone the uses for pasteurizers, holding tanks, separators, weighing apparatus and in ice-cream mixers mention but a few applications.

Radio tubes, watches and jewelry, tableware, highway markers, automobile license plates and even tennis court nets have come to be more profitably made by modern alloys, chief among which has been corrosion-resistant steel.

Thus modern alloys in the fabric of American life are assuming an imposing position. In every one of these multitudinous uses the producer of modern alloys hand-in-hand with the buyer of the same materials has obviously arrived at the conclusion that alloys for these thousand-and-one new uses have come to be specified for their qualities in appearance and their superiority in every-day wear.

Simplification To Aid Alloy Users

BY F. A. BIGELOW
President, Carpenter Steel Co.

THAT this is the age of alloys; that without them modern machines, methods and manufacture would be impossible; that hundreds of new and remarkable alloys are constantly being added to an already formidable list, are facts too well known even to require emphasis. The insatiable appetite of industry for better and still better materials of construction, and the ingenuity of research metallurgists in furnishing them can excite nothing but praise.

Therefore, if I might inject just one new thought into the picture, it would be this. You would think that every new or improved alloy that was developed would render obsolete some of the older alloys—at least the one whose very limitations made necessary the development of the new one. But this does not seem to happen. Each new alloy adds just one more to the list, until their number alone creates a confusion which cannot do other than hinder the progress that it was supposed to promote.

My suggestion would be that makers and users of alloys alike devote some serious thought to retiring superannuated alloys and trying to simplify and systematize those remaining.

There is a story told of a donkey who was stopped exactly midway between two equally attractive bundles of hay. In his indecision as to which one to eat first, he starved to death.

It takes more than two bundles of hay to confuse

an engineer, but confront him with a thousand different alloys, each screaming its own virtues, and he will certainly be stopped for a little while at least, with an excellent chance of picking the wrong one when he does make a choice.

I would therefore suggest, in the interests of both the maker and consumer of alloys, that, while our research laboratories devote one hand to creating new and better alloys, they apply the other to scrapping, consolidating and simplifying the many older classifications.

Custom-Built Steel— More Value Per Ton

BY FRANK PURNELL

President, Youngstown Sheet & Tube Co.

DURING the past decade the manufacture of steel has undergone much transformation. It is questionable whether the public at large—or even some of the actual users of steel—realize the nature of this transformation.

It many lines of manufacturing, the trend of the last ten years has been toward standardization of product, thereby enabling manufacturers to take advantage of mass production principles and economies. Of course, this trend has existed in the steel industry. Steel has been just as alert and progressive, with respect to standardization, as other manufacturing industries. At the same time the industry has carried through a remarkable and extensive program of diversification and adaptability of product.

This is true particularly with respect to the newer alloys which have recently been perfected and which now bid fair to change materially the whole machinery and equipment field. Whether the need be for corrosion resistance, weight reduction, tensile strength, formability or resistance to high temperatures—or a combination of these—there is available to the builder of equipment a particular steel specially adapted to that particular job.

BUT this has greatly complicated production. A steel mill today finds itself in somewhat the same position as would the owner of a men's clothing factory whose customers all insisted upon custom-made suits. The problem is one of utilizing mass production equipment to turn out individually designed products.

Today, with physical as well as chemical properties specified in practically every individual order, the making of steel presents difficulties which are utterly beyond the experience of manufacturers in

many other lines. An automobile producer, for instance, can concentrate upon a few models, but a steel mill today is required to furnish hundreds of different specifications.

There are limits, therefore, to how far the steel industry can go in the direction of mass production. It cannot let its desire to effect production economies threaten its ability to deliver custom-built steels. Upon the growing adaptability of special steels depend broader future markets for steel and more value per dollar for the steel buyer.

Solving Problems of Transport Field

BY A. W. MACE

Assistant to President, Ludlum Steel Co.

A TRUE history of the revolutionary changes marking the development of American transportation facilities during the past few decades must include substantial tributes to the research work that produced so many high-grade alloys. Likewise, any presentation of a march of time as reflected in better equipment for the household, the farm or the factory, or in more practical and useful tools and machinery for manufacturing, or for construction work, to be complete must include more than passing reference to this same research in alloys.

It is more than coincidence that the period of greatest advance in transportation paralleled the years when alloys flashed out of the laboratories and into fields of practical application. That 64 per cent of the tonnage sold by the Ludlum Steel Co. in 1935 consisted of alloy steels which were either totally unknown to the metallurgical world, or at best were laboratory curiosities prior to 1919 indicates in part the contribution of that company to this advance.

TODAY when the entire population of the United States can be transported at one time in registered automobiles owned by our people, and over the greatest network of highways in any country on the face of the globe, many still may recall that up to 1920 one outstanding deterrent for the motorist was the burning and warping of valves. The current valve steels were mostly unreliable and the best were exceedingly expensive. In 1919, Ludlum invented a new alloy steel containing less than 14 per cent of alloy elements, other than iron, and possessing

stability of surface and internal structure under operating temperatures as high as 1700 degrees Fahr. This alloy, called Silcrome One, in its name gave recognition to the two principal alloying elements, silicon and chromium. By 1922, this was a perfected product and in that year the first regular production motors were built with Silcrome steel valves as standard equipment.

In another three years, Silcrome steel in valves became widely used and was standard on many makes and models of cars. The new speeds made possible by this development in valve steel soon brought new ideas in design and equipment; new research activities in engineering, metallurgy and chemistry; research in construction steels generally. By 1933, it was estimated that 90 per cent of all exhaust valves in cars manufactured in the United States were of Silcrome steel.

When each year saw a striving for still higher speeds, higher cylinder compression and more powerful fuels, Ludlum fortified its line with a new series of perfected valve steels, its new Silcrome X series (STEEL, June 1, p. 44). Today, a graduated series of valve steels is available for all current requirements. This development in valves has been called by a recognized authority "one of the most important factors in the development of the present-day automobile and airplane."

IN MANY other directions various Ludlum alloys are solving manufacturing problems. For example, Silcrome RA is being utilized successfully for truck bodies and other equipment used in the manufacture of colors and dyes. Until recently, iron rust, resulting from the acid action of the cake on the iron containers, caused contamination. Silcrome RA has been found no more difficult to form than mild steel, but it resists the rust and its discoloring action.

A prominent Detroit automobile manufacturer is using Python steel rivet sets. The performance record shows that such a set is in good condition after use on 4500 rivets as compared to previous runs of approximately 500 rivets.

An Eastern electrical manufacturer has adopted Seminole steel as standard for parts in electric starters for his aircraft engines. The alloy offers high strength and toughness on a job where frequent breakage troubles were encountered in previous practice.

In building Boulder Dam transmission line, the world's greatest, dies used for drawing and shaping cable sections are made from Huron steel, a Ludlum oil-hardening die steel. Strength, resistance to wear and ability to maintain a glazed surface on the drawing operation are characteristics.

These are but a few of the many accomplishments of the Ludlum alloys. Their success is acting as a spur to more intensive research to the end that these Ludlum contributions to industrial progress may continue.



TIME TELLS THE STORY

Time does tell the story of whether or not a fuel is adequate and economical. Knowing this, the wise owners and efficient operators of power plants take the long view in the selection of coal. They evaluate the factors which govern its use value, considering these more important than price per ton. They think in terms of over-all steam cost, not fuel cost, as the true measure of economy.

As time marches on, they learn that poor coals mean high overhead; that good coals mean low overhead. ACI Coals, which are good coals from the high volatile fields of Kentucky, Tennessee, Virginia, and West Virginia, offer nine distinct advantages over low grade coals.

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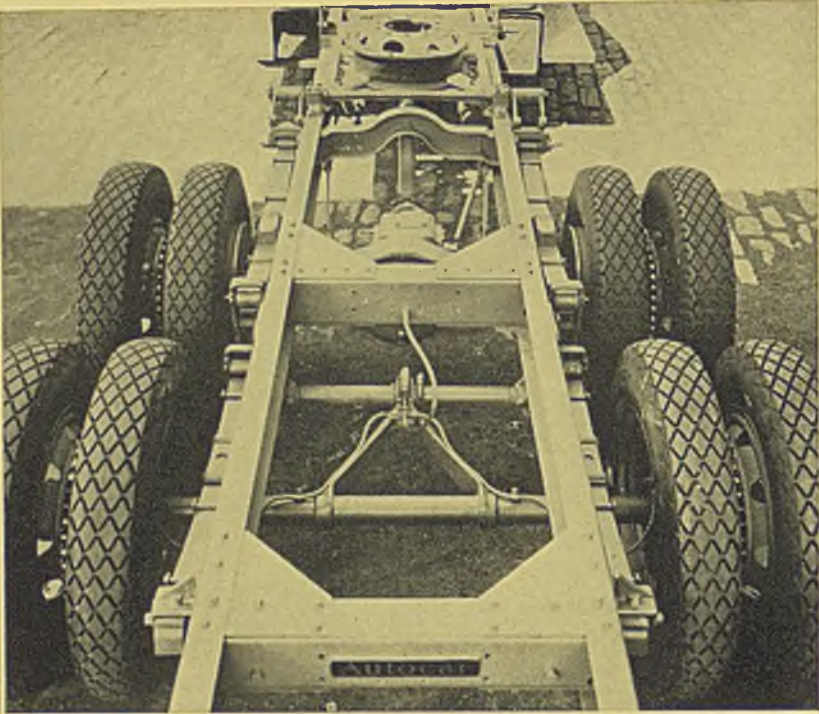
To learn more about ACI Coals and the important roles they play in the iron and steel industry, consult the agents listed in "Where to Buy ACI Coals."

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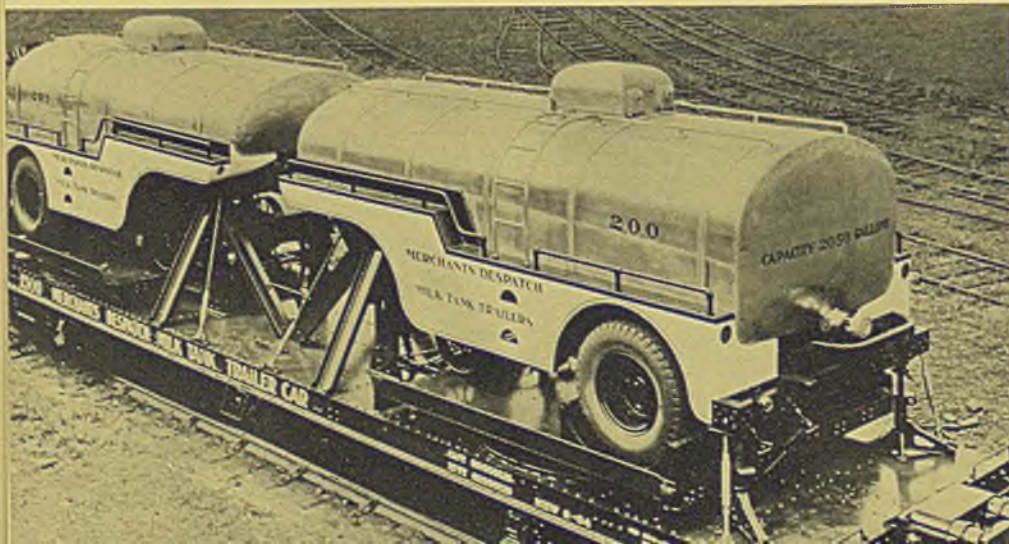
TRANSPORTING America's motor truck freight, heavy-duty third-axle units of the type shown at the left must rely on heat treated alloy steel, in this case S.A.E. 3140 bar stock, for their strength and dependability

ROAD machinery puts alloy steels to a real test. Here are tractors, scrapers and bulldozer fighting their way through the wilderness of a Wyoming mountain to level off a roadway for tomorrow's automobiles



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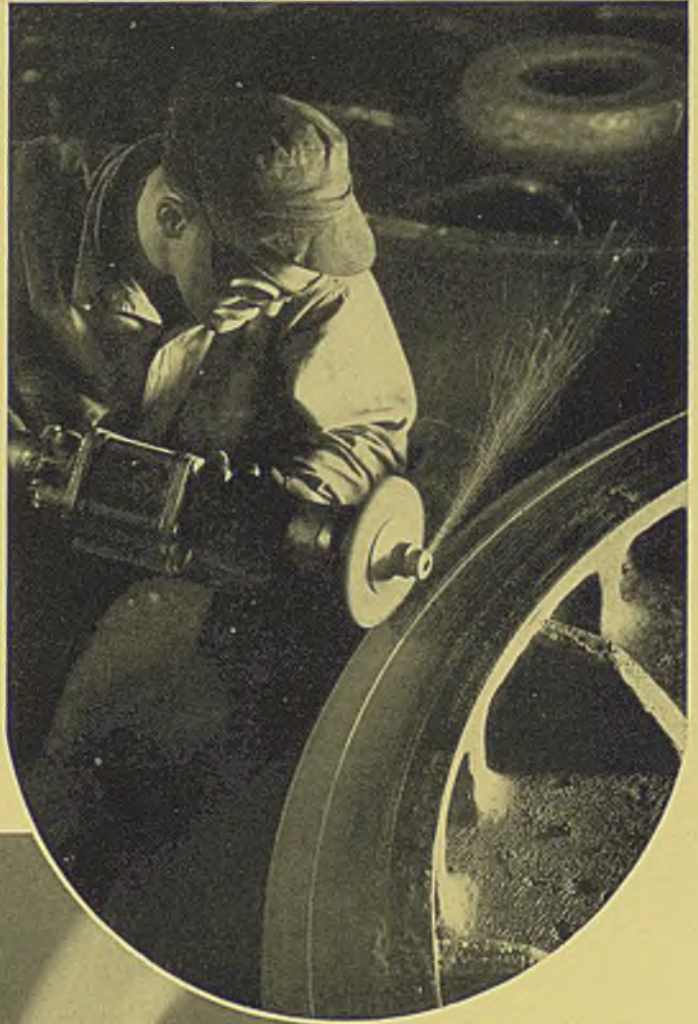
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REG. U. S. PAT. OFF.

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



● An Aloxite Brand Aluminum Oxide Wheel in 60 grit, J grade, grinding steel casting for ring gear. The operation is spot grinding for Brinnell test.

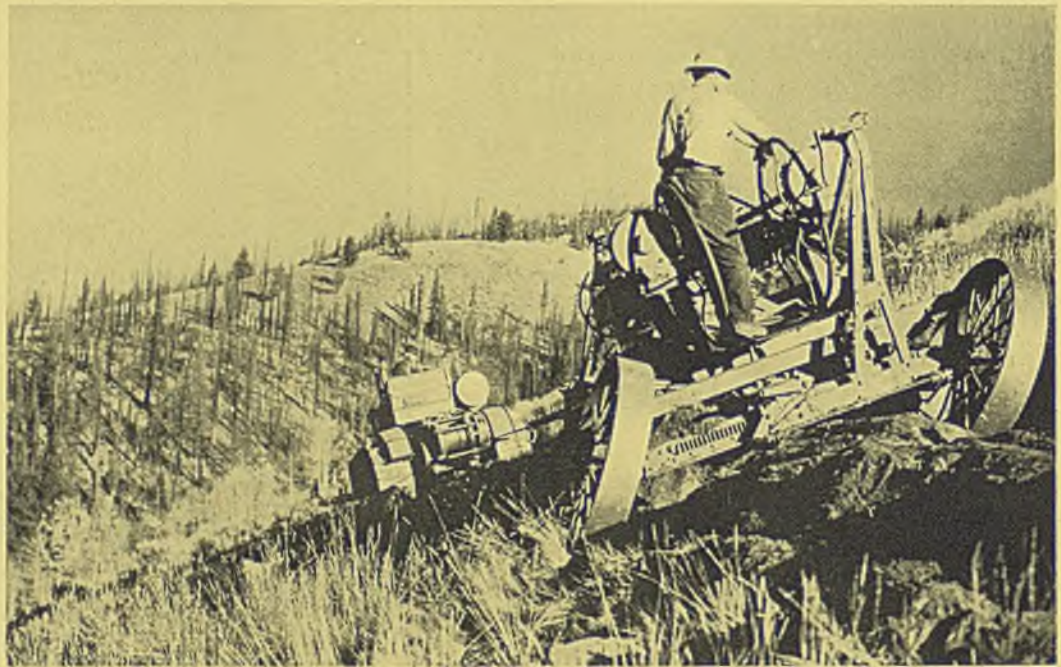
● Grinding small steel castings or parts. The wheel, Aloxite Brand Aluminum Oxide in 16 grit, 12 grade.

THE CARBORUNDUM COMPANY

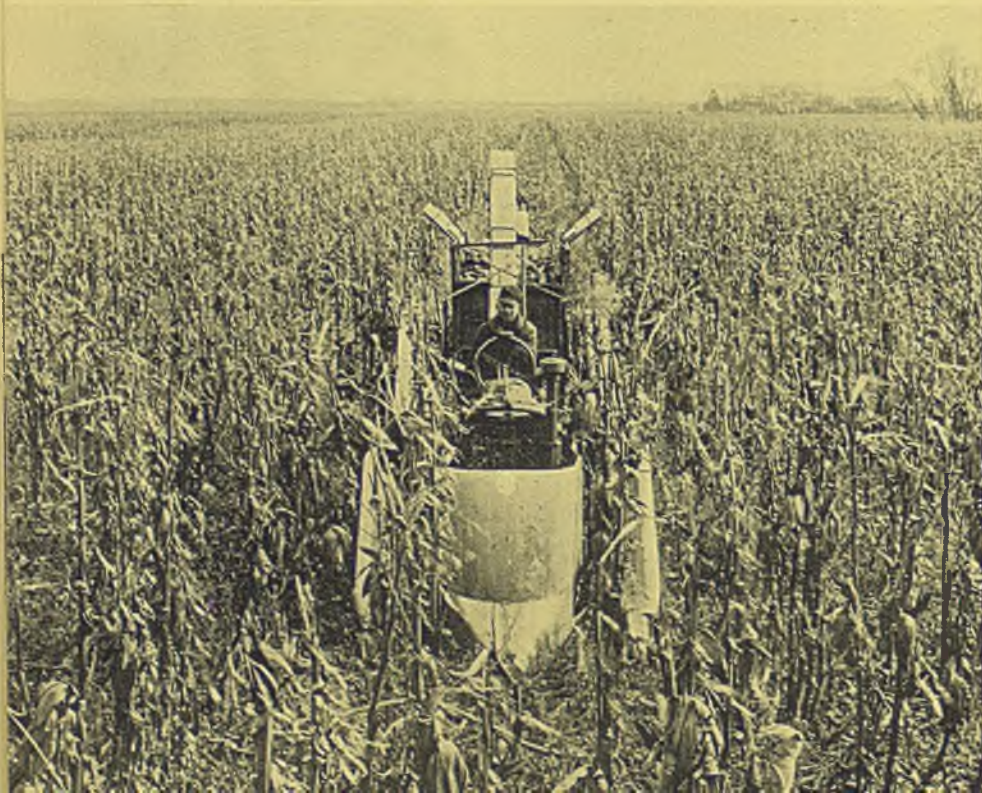


A LLOY steels on the farm are essential in these days of mechanized agriculture. At left is tractor and hay loader in which nickel steel is used extensively

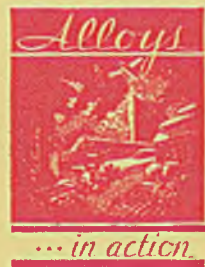
NO SIDE - HILL gouger is this device (right) but instead a leaning wheel grader at work a mile above sea level in the Pacific Northwest, marking the trail for a new road



—All photos International Nickel Co.



OUT where the tall corn grows, you will see many of these mechanical two-row corn pickers. Tough alloy steels have removed at least some drudgery from the daily toil of farm hands

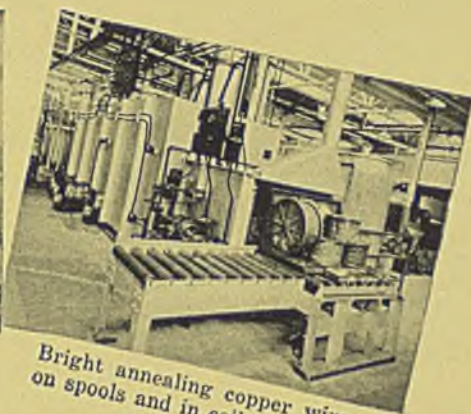




Two recuperative type furnaces annealing coiled strip.

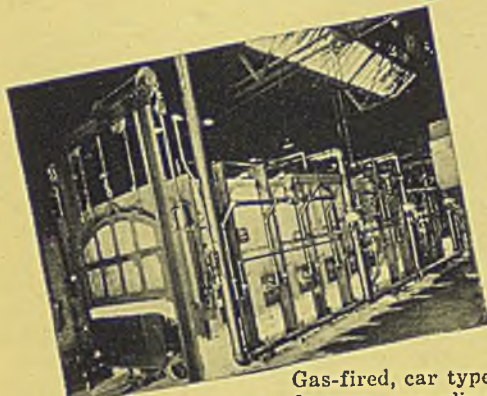


Bright annealing copper tubing in coils and straight lengths.

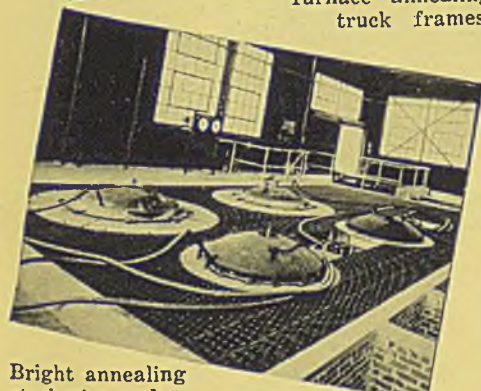


Bright annealing copper wire on spools and in coils.

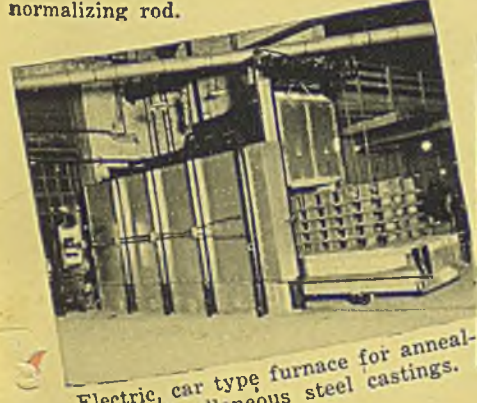
While you're in Cleveland



Gas-fired, car type furnace annealing truck frames.



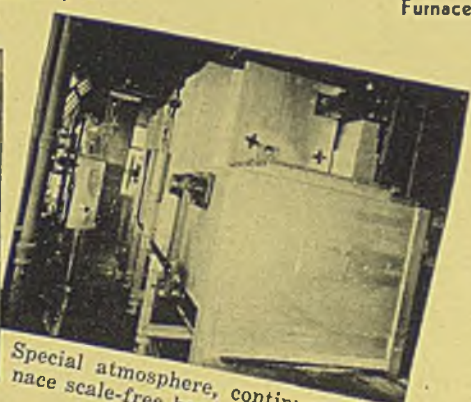
Bright annealing steel wire and normalizing rod.



Electric, car type furnace for annealing miscellaneous steel castings.



Completely automatic installation—heat treating axles.



Special atmosphere, continuous furnace scale-free hardening bolts, etc.

PERMIT us to show you installations of some of our outstanding furnaces and auxiliary equipment in Cleveland and vicinity. We have furnaces operating on practically every product and process.

Just tell us what kind of equipment you are interested in, or get in touch with one of our engineers at our booth (L-21 in the lower exhibition hall) at the National Metal Exposition. We will be glad to make arrangements for you to

Inspect Some of Our Furnace Installations

Also see the large display of photographs showing various types of electric and fuel-fired furnace installations and material handling auxiliary equipment at our booth.

See the latest developments in special atmosphere equipment for bright and clean annealing various ferrous and non-ferrous products including tubing, wire, strip, sheet, stampings and other finished and unfinished products.

Also see the new continuous furnaces for copper brazing and for heating with complete absence of scale, as well as other continuous and batch furnaces of various types for normalizing, annealing, forging, billet heating and other processes.

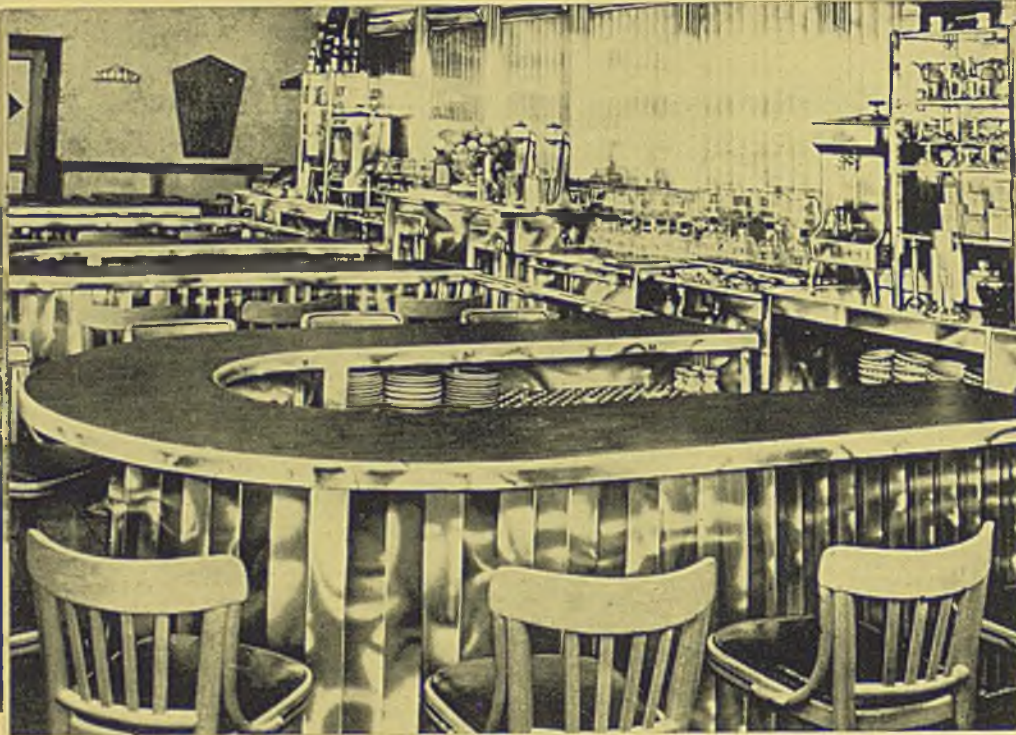
Our engineers will be glad to work with you on any of *your* annealing or heat treating problems.

The Electric Furnace Co.

Fuel Fired
Furnaces

Salem, Ohio

Electric
Furnaces

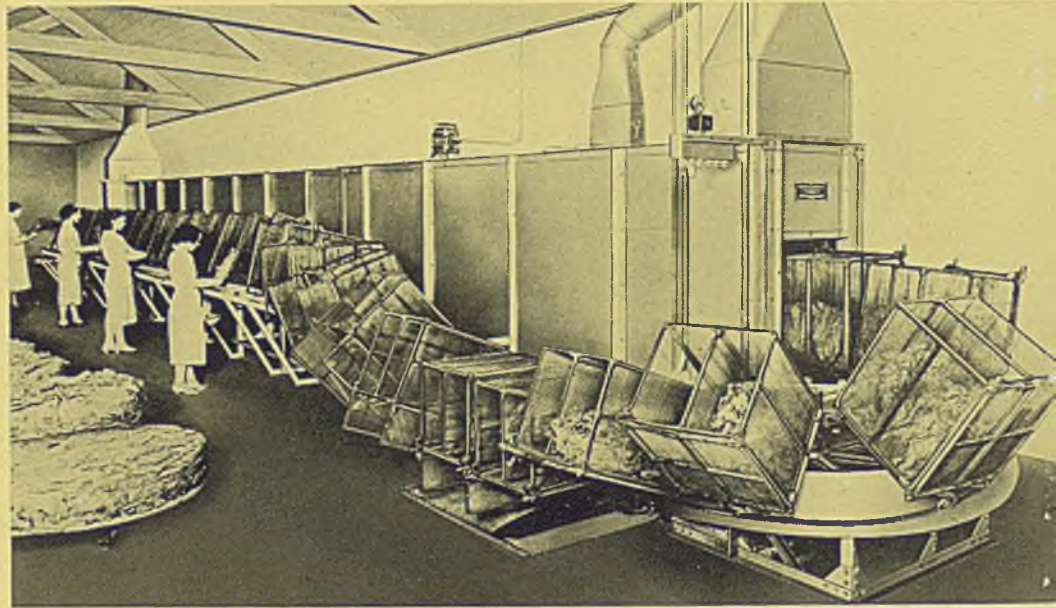


—Republic Steel Corp.



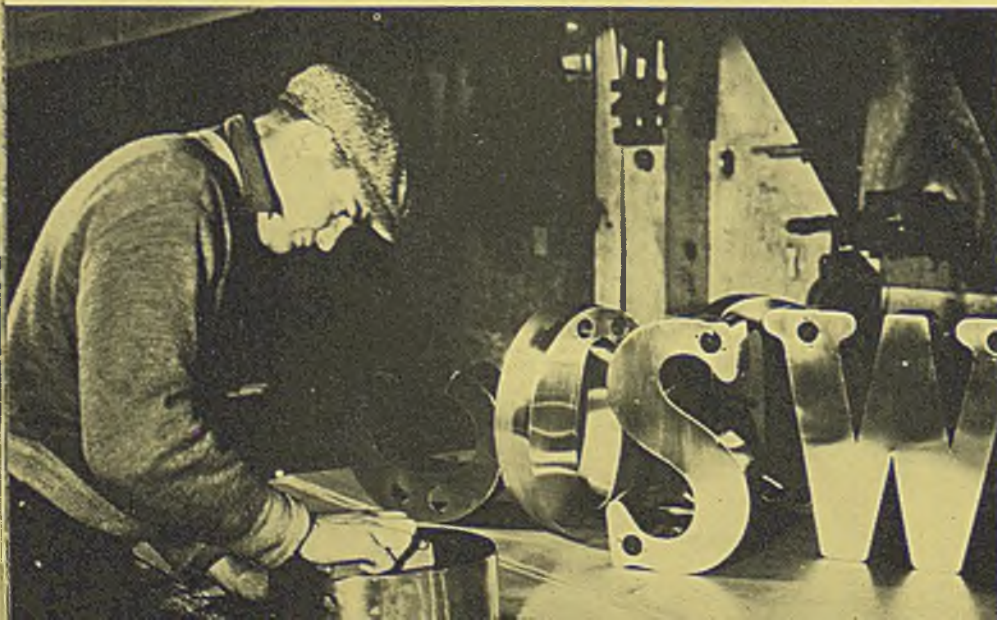
STAINLESS steel of the 18-8 chrome-nickel type gives a brilliant decorative tone to this new restaurant and soda fountain. For interior treatment of this type stainless steel is finding an ever-widening market

WHETHER you walk a mile for your cigarettes or whether you like them toasted, chances are the tobacco has passed through this style of blending, conditioning and cooling equipment, built largely of 18-8 stainless steel



—Electro Metallurgical Co.

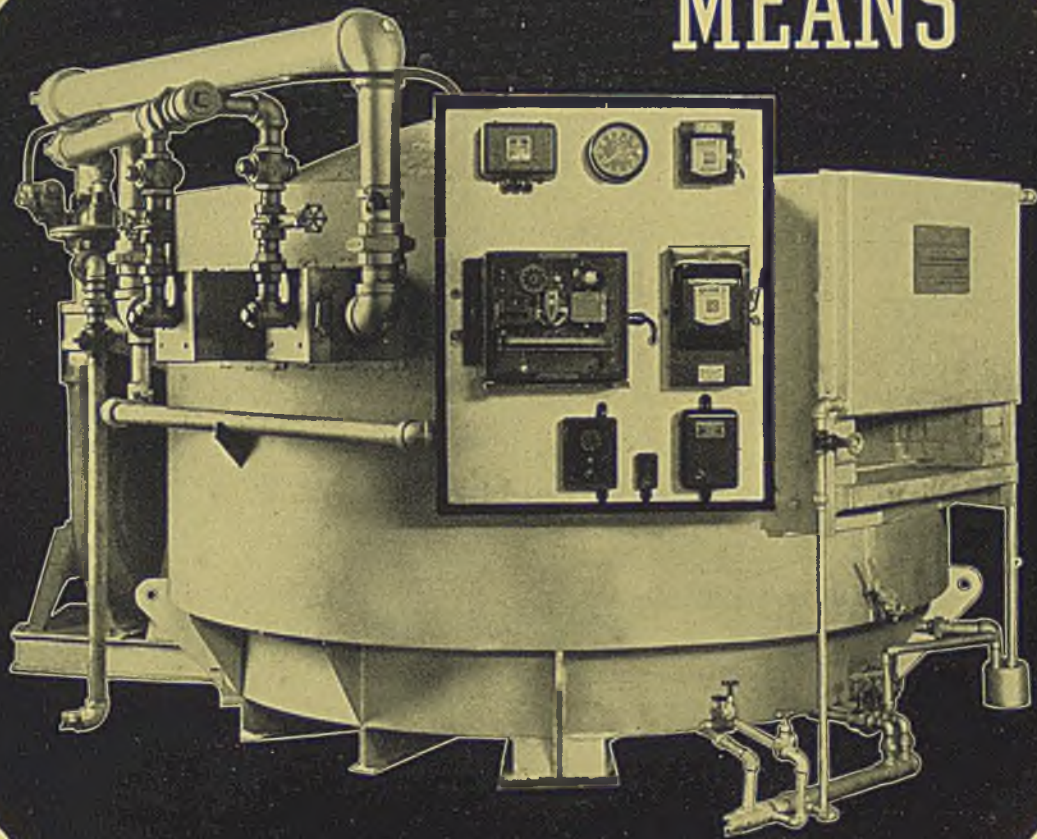
—Allegheny Steel Co.



A GAIN demonstrating its versatility, stainless steel is the material used in these channel letters for a large sign over a Cincinnati clothing store. As is well known, this steel is an ideal material for use in outdoor applications

Scientific Heating

MEANS



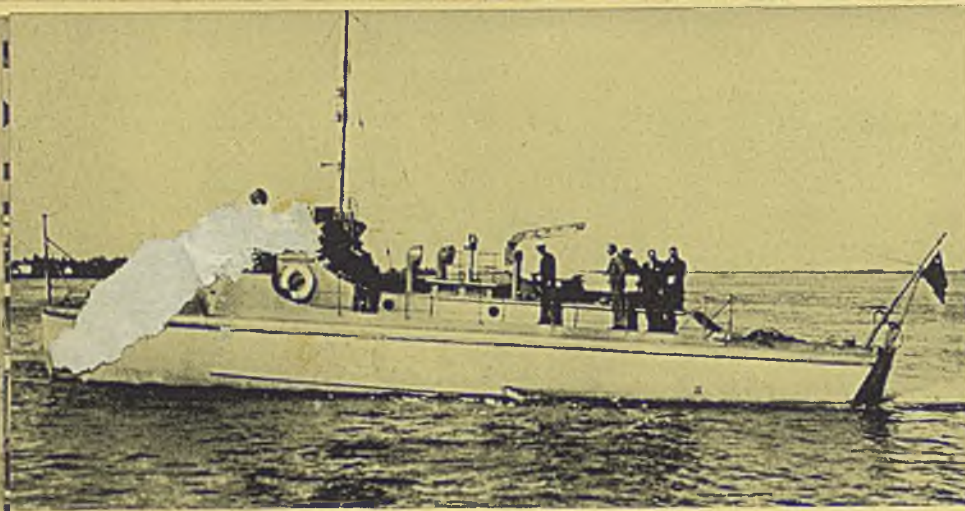
Better Forgings

BBETTER Forging Practice is assured with a ROTARY FORGE FURNACE with WATER SEAL and SYPHON VENTS (patented), wherein stock is heated under controlled temperature and atmosphere. Uniformly heated stock is delivered to the forging unit with machine-like precision with practically no scale loss or surface decarburization, insuring more accurate forgings, longer die life and reduced production costs. ROTARIES are available with capacities to suit all normal conditions.

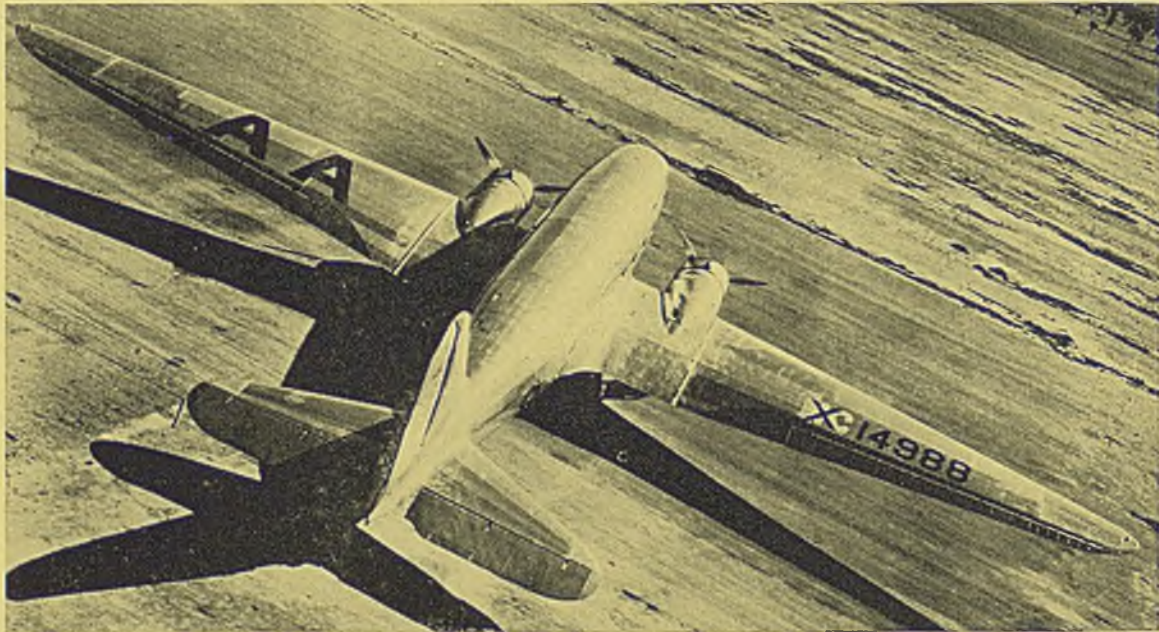
The Gas Machinery Company are designers and manufacturers of furnaces built to meet specific requirements for the heat treatment of steel and nonferrous metals, and for heating preparatory to forging and rolling. Consult us with your heat treating problems. Our engineers will be glad to render service without obligation.

The Gas Machinery Company

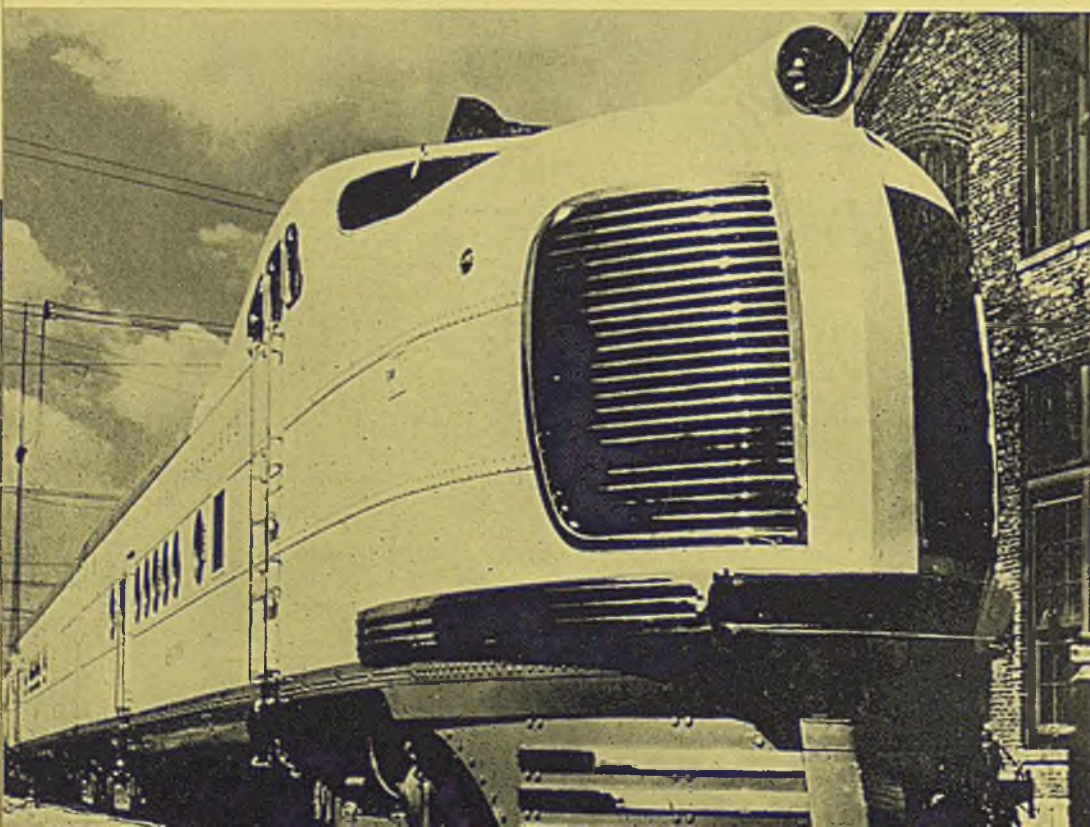
16100 WATERLOO ROAD • CLEVELAND, OHIO



HIGH-STRENGTH and light-weight aluminum alloys are contributing their part to transport development — on land, water, and in the air. At the left is a 65-foot all-aluminum patrol boat of the Royal Canadian Mounted Police, operated on the St. Lawrence river. Hull, deckhouse, engines, fittings, mast, dinghy davit and other accessories are all of aluminum



—Photos Aluminum Co. of America



ALL-ALUMINUM Douglas sleeper plane, equipped with two 980-horsepower engines, is shown above. Length of the ship is 65 feet, wingspread 95 feet. Operated by American Airlines, it is equipped with 16 berths and has daytime capacity for 24. At the left is a head-on view of the "City of San Francisco", one of the newest of Union Pacific's all-aluminum streamlined trains

BUILT BY

MORGAN

Engineering

stripping Ingots—BIG END UP—AND STANDARD

● Two of the Morgan 150-ton, 73'6" span, screw type Ingot Strippers at work stripping standard and big-end-up ingots in a northern Ohio mill. Efficient, rugged, dependable—such huge machines play an important part in stepping up steel production to meet demands of the blooming mills. Morgan Engineering has designed and developed strippers to perform three

distinct stripping operations without making changes in the stripping unit. Today this machine is designed to (1) strip small-end-up or standard ingots; (2) strip big-end-up ingots; (3) break small-end-up ingots loose from stools. Faster, more easily controlled than older machines but built to the same high standards of Morgan Engineering integrity.

★ DESIGNERS • MANUFACTURERS • CONTRACTORS

★ Blooming Mills • Plate Mills • Structural Mills
★ Electric Traveling Cranes • Charging Machines
★ Ingot Stripping Machines • Soaking Pit Cranes
★ Electric Welded Fabrication • Ladle Cranes
★ Steam Hammers • Steam Hydraulic Forging
★ Presses • Special Machinery for Steel Mills

★ THE MORGAN ENGINEERING CO.,
★ Alliance, Ohio

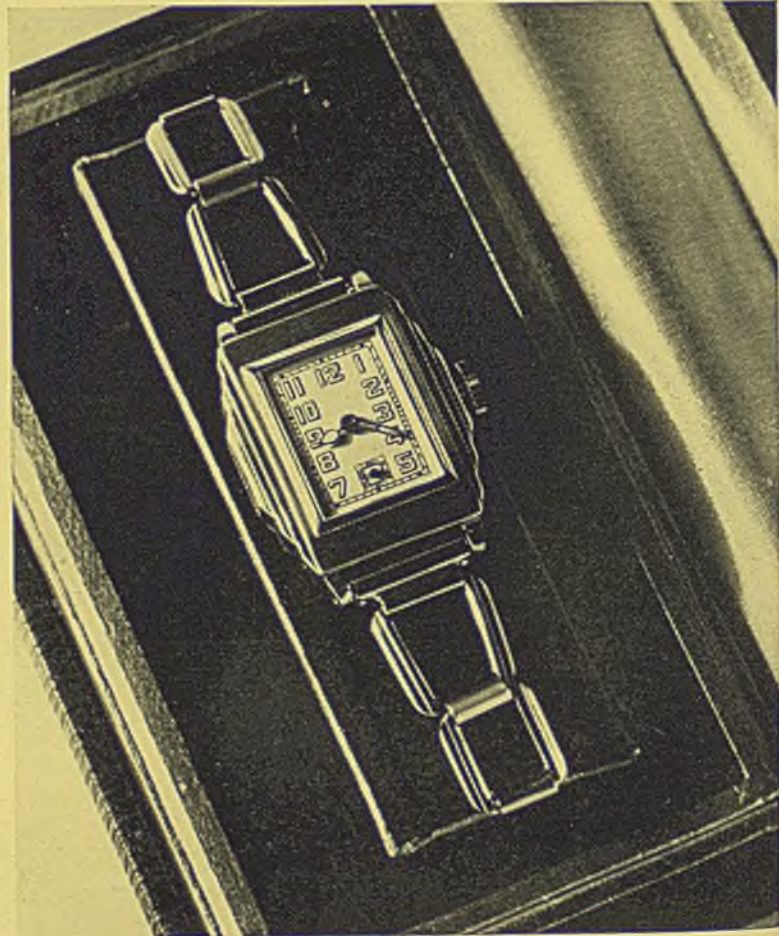
★ Pittsburgh, 1420 Oliver Bldg. • New York, 11 W. 42nd St.
★



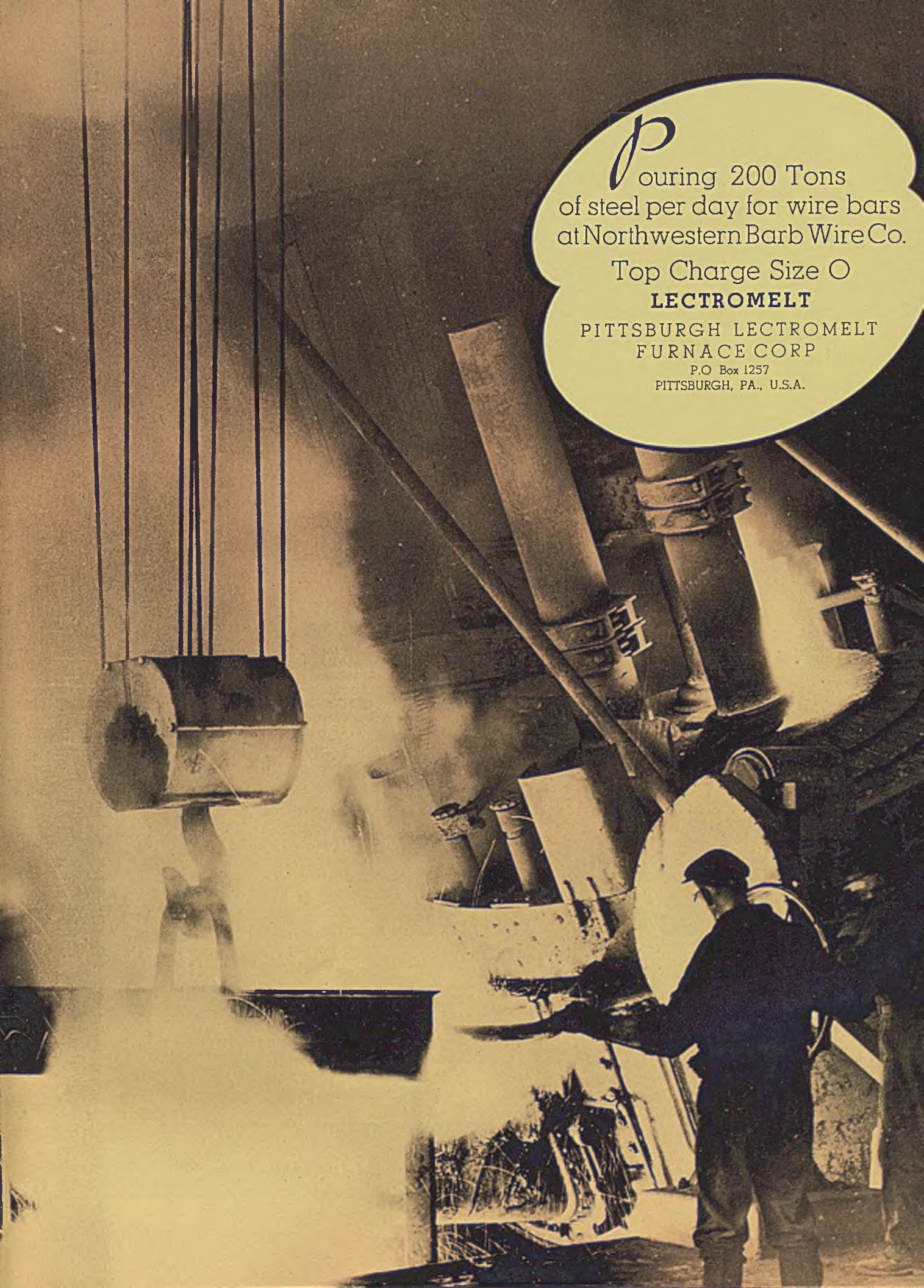
—Fairchild Aerial Surveys Inc.



FROM skyscrapers to wrist watches is a long jump, typical of the widespread applications of 18-8 stainless steel. Above is the towering spire of New York's Chrysler building, one of the earliest uses of stainless for architectural purposes. Peak of the structure is entirely sheathed in metal and has made the building a landmark since its erection some eight years ago. At the right is a popular make of wrist watch, with case and band of stainless steel—the first invasion of stainless into the field of precious metals



—Republic Steel Corp.



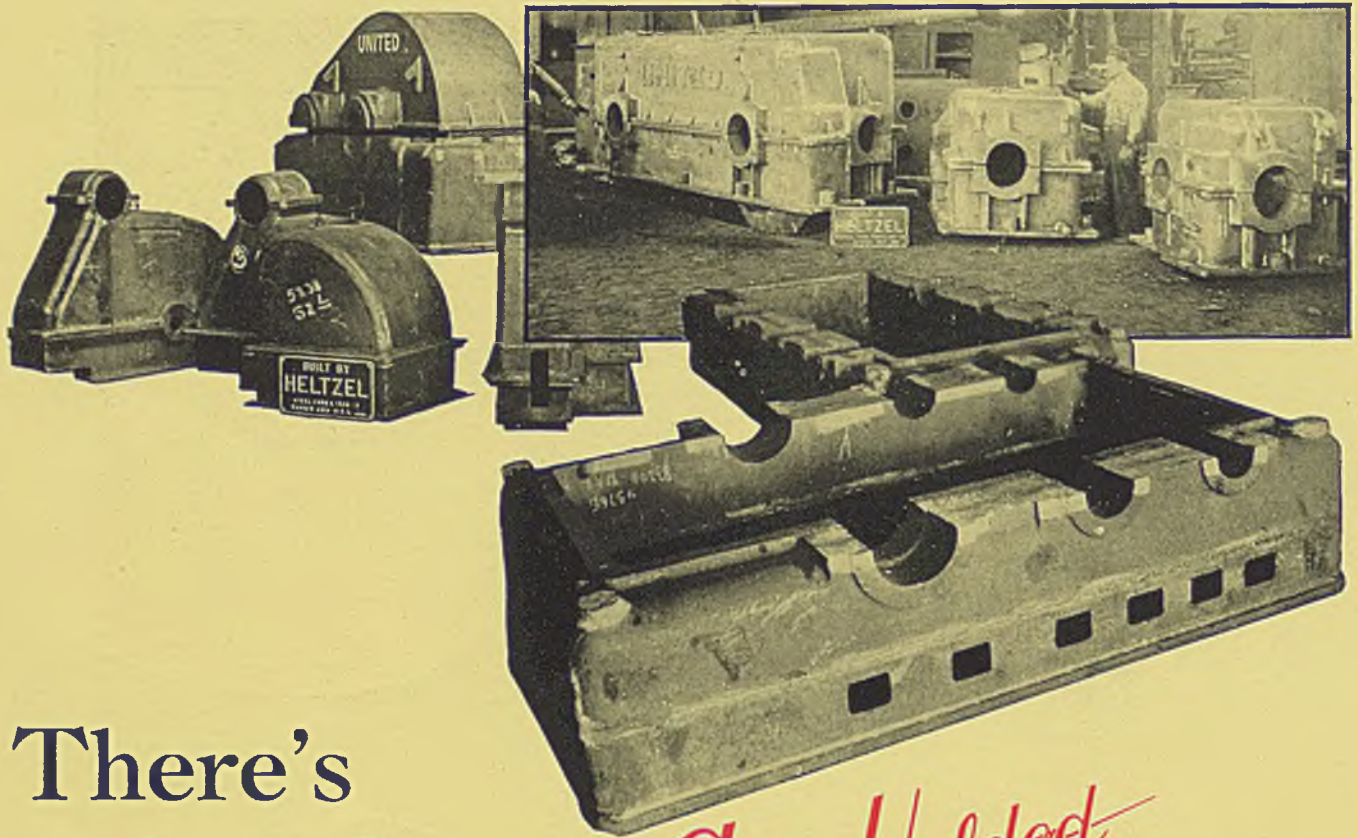
*P*ouring 200 Tons
of steel per day for wire bars
at Northwestern Barb Wire Co.

Top Charge Size O

LECTROMELT

PITTSBURGH LECTROMELT
FURNACE CORP

P.O. Box 1257
PITTSBURGH, PA., U.S.A.



There's freedom in *Arc Welded* fabrication

In an amazing number of applications, arc welded fabrication has shown its ability to produce a higher quality job, at lower cost, than any other method. These huge parts of a rolling mill were cut by Airco-DB gas cutting machines and were arc welded with a Wilson Arc Welder. Pleasing forms and rounded corners such as these are common practice; excess bulk is discarded and time and production costs saved by eliminating costly patterns.

See



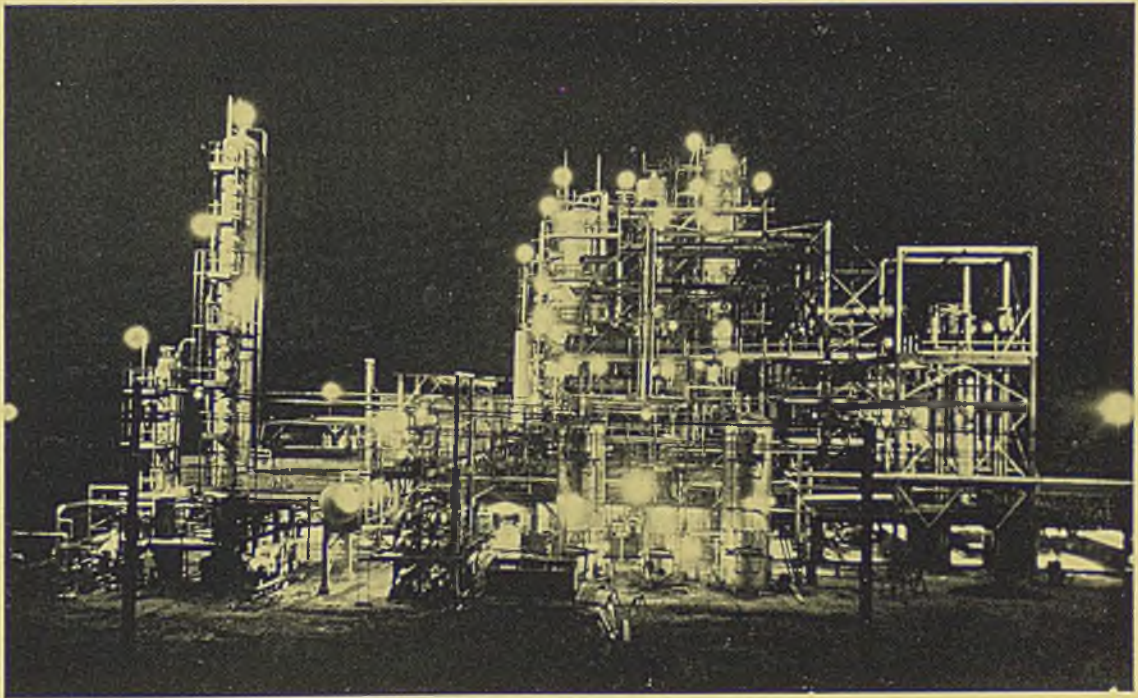
The Wilson Arc Welder—"the machine that makes the arc behave"—makes these savings possible with sound welds—free from pinholes—made with a minimum of spatter. A copy of the Wilson Bulletin, showing why these machines give such consistently good results, will be mailed to you on request.

WILSON WELDER & METALS CO., Inc.

General Offices: 60 E. 42nd St., New York, N. Y.

Distributed through AIR REDUCTION SALES CO.

In Action - NATIONAL METAL SHOW - BOOTH G7

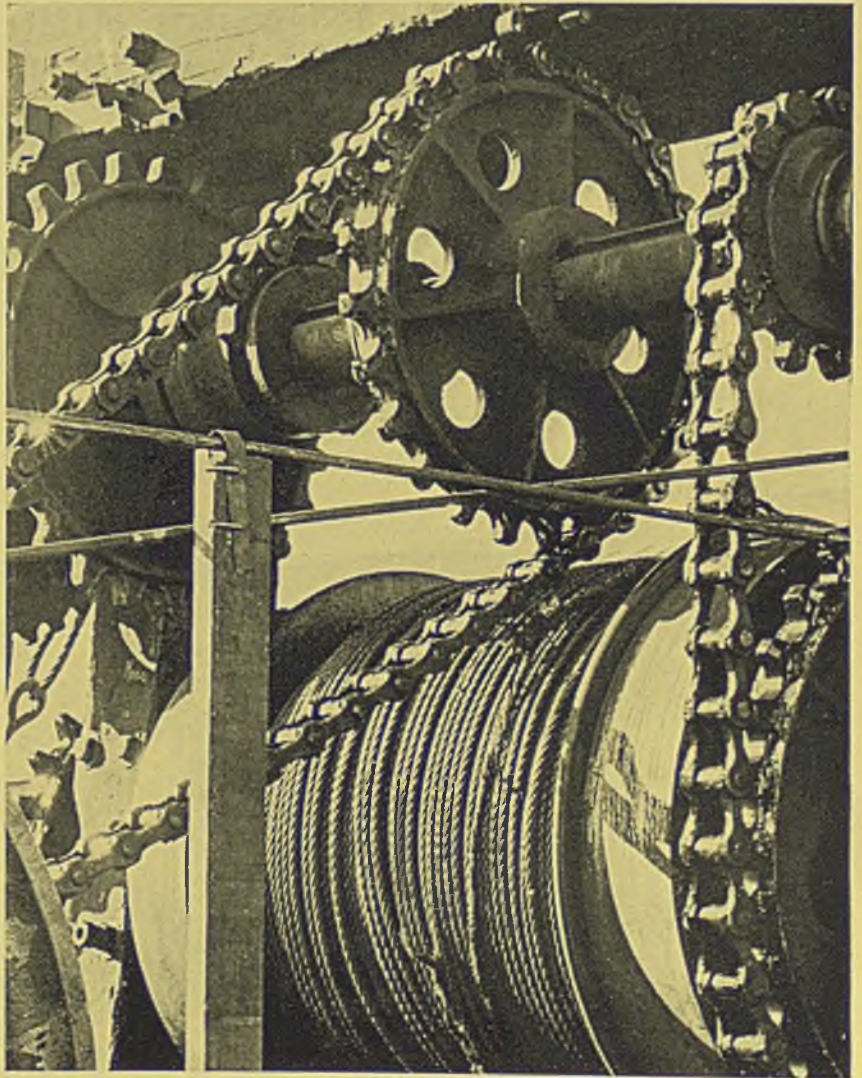


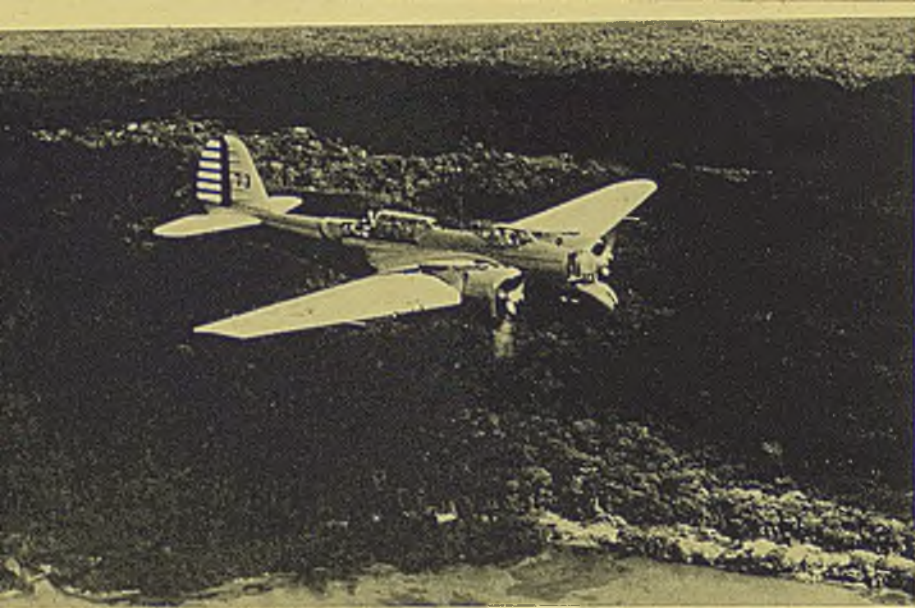
—Gasoline Products Co. Inc.-M. W. Kellogg Co.

—National Petroleum News



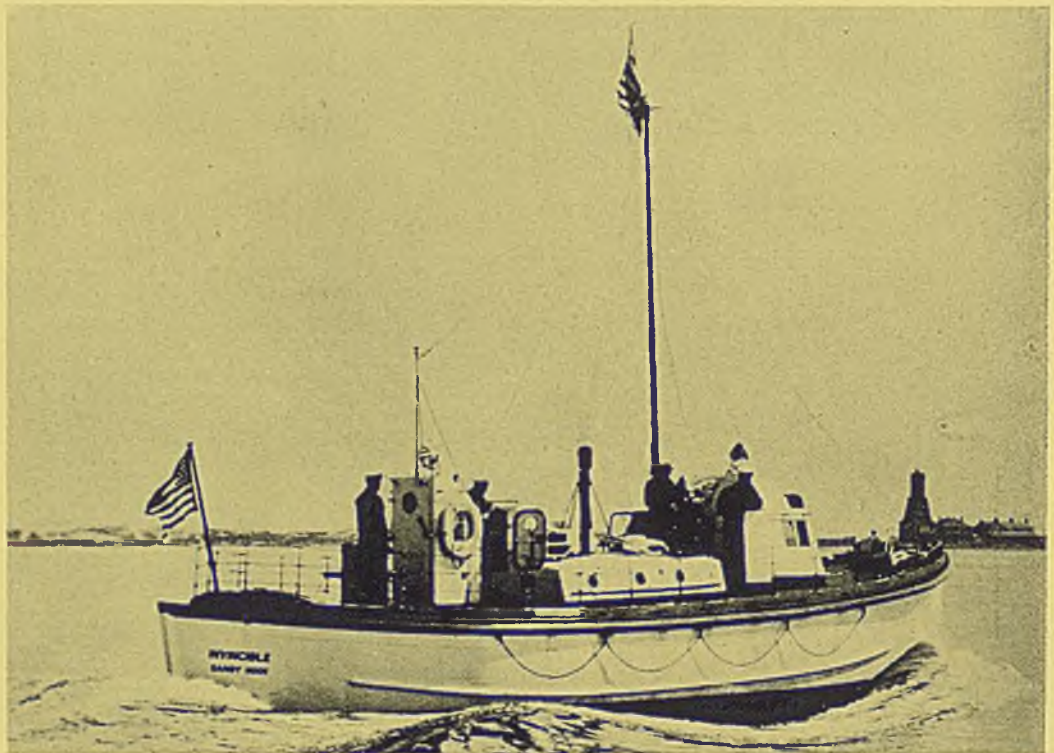
REMARKABLE strides have been made in recent years in the development of better alloy steels for oil well and oil refinery service. Typifying this trend is the above striking night view of a large combination cracking unit on the Texas Gulf coast for processing 20,000 barrels of crude daily. In the construction are used a wide variety of corrosion and heat resistant alloys for furnaces, vessels and mechanical parts. At the right is a camera study of cable reel and drive on an oil derrick floor for handling drilling tools





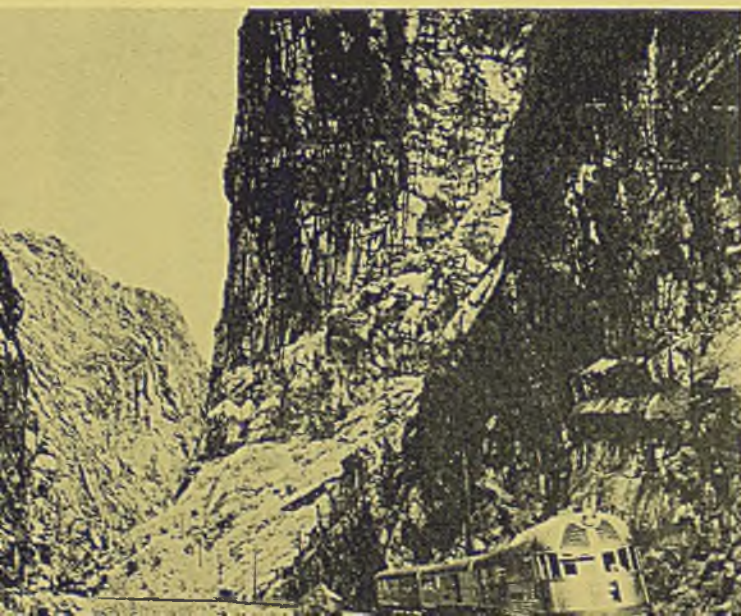
ALLOYS and aircraft go hand in hand, present-day planes embodying many varieties of both ferrous and nonferrous materials. The large Martin bomber, shown at the left in flight over Panama, for instance, features a retractable landing gear of beryllium copper

—American Brass Co.



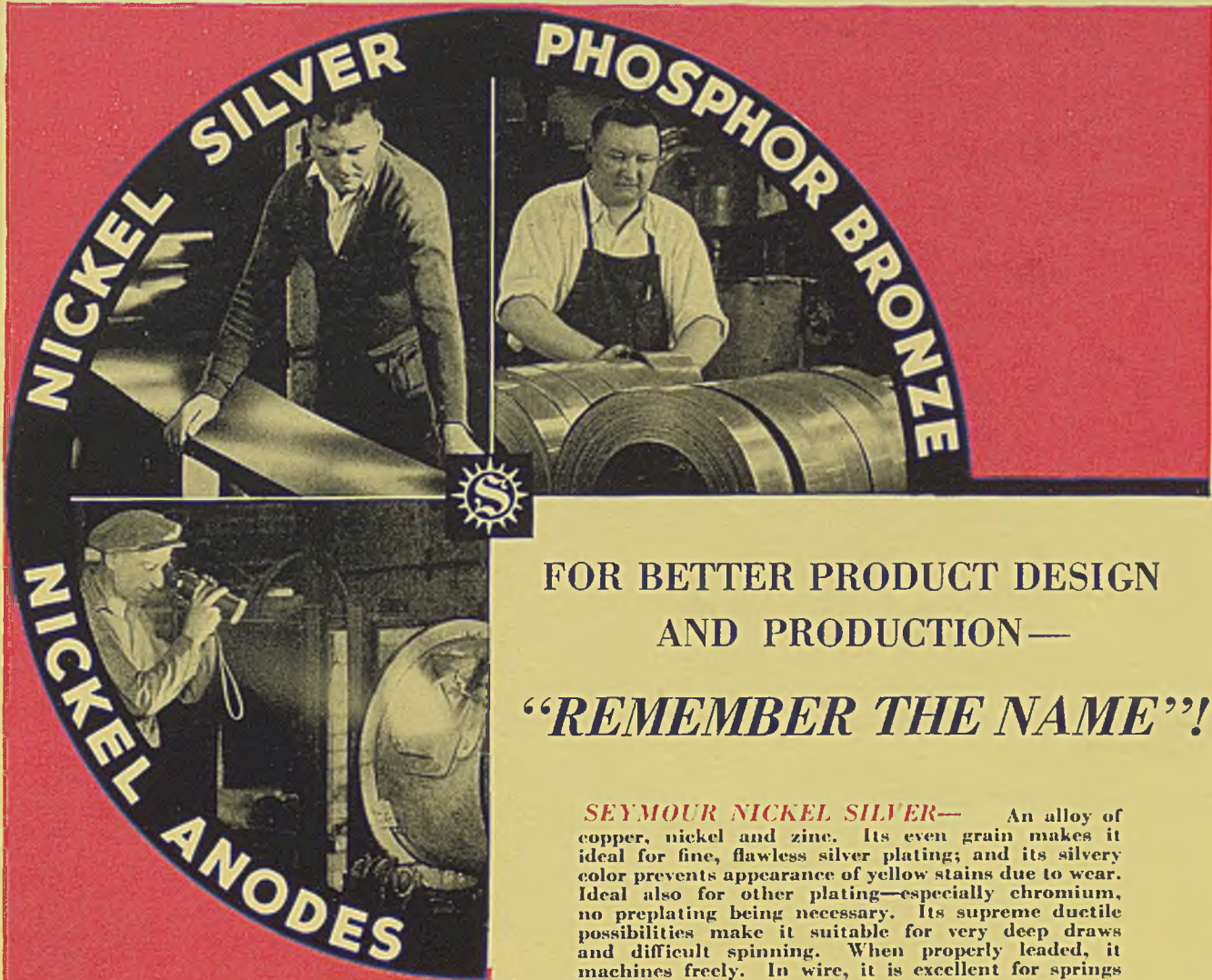
—Electro Metallurgical Co.

—American Brass Co.



PRACTICALLY all metal parts of the 52-foot Coast Guard motor life boat above are of Everdur, including bulkhead, pilot house and companionway housings, deck hardware, rudder and skegs, gasoline tanks and cradles, and even the galley sink

ALLOY steels ride the rails the length and breadth of the nation. At the left is shown the famous Burlington Zephyr, a streak of stainless steel as it weaves through Fisher canyon in Colorado



FOR BETTER PRODUCT DESIGN
AND PRODUCTION—

“REMEMBER THE NAME”!

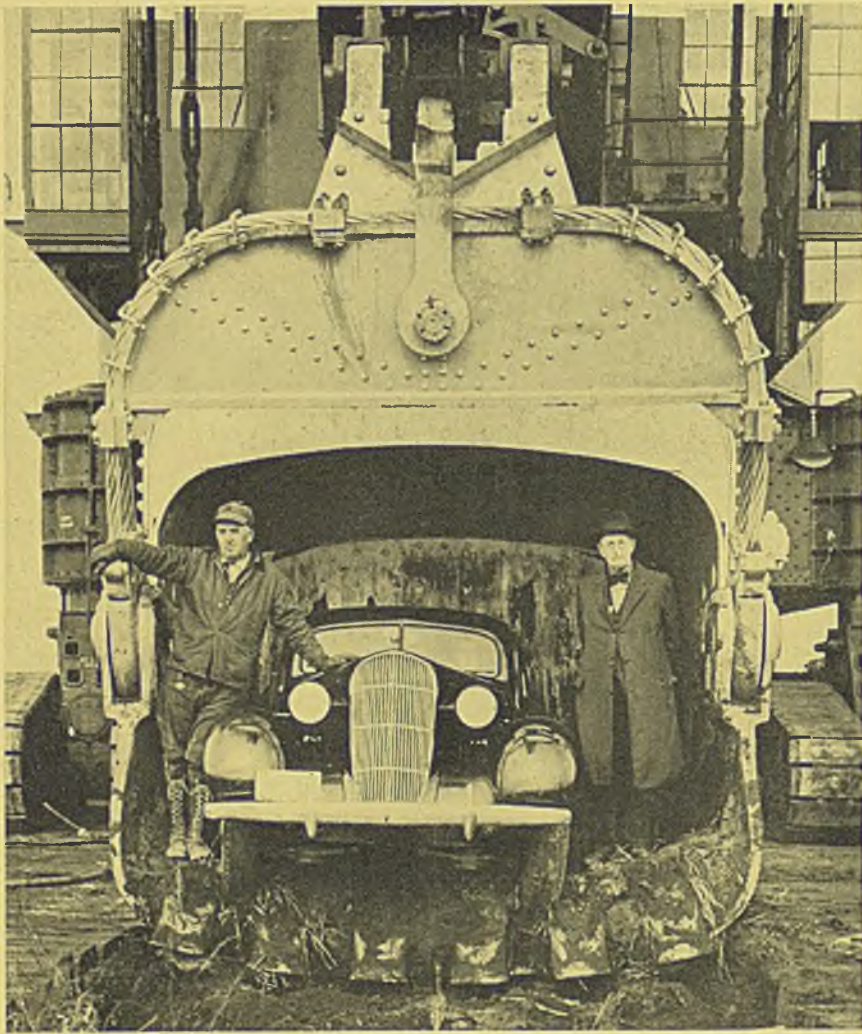
SEYMOUR NICKEL SILVER— An alloy of copper, nickel and zinc. Its even grain makes it ideal for fine, flawless silver plating; and its silvery color prevents appearance of yellow stains due to wear. Ideal also for other plating—especially chromium, no preplating being necessary. Its supreme ductile possibilities make it suitable for very deep draws and difficult spinning. When properly leaded, it machines freely. In wire, it is excellent for springs whether exposed to corroding conditions or not. Samples for test on request.

SEYMOUR PHOSPHOR BRONZE— An alloy of copper, tin and phosphorus. Highly resistant to corrosion. Indifferent to sudden thermal change. Has extreme resilience and ability to withstand friction and abrasion. Much used for flat and coiled springs, particularly in electrical service, and, when leaded, for screw machine parts. Samples and explanatory book on request.

SEYMOUR NICKEL ANODES— Made of virgin nickel, cast in a modern electric furnace, where grain structure is pyrometrically controlled. After pouring, samples of each melt are rigidly analyzed and only those samples which show a high degree of homogeneity pass inspection. Seymour Anodes are also made in copper, brass, bronze and zinc. Anode Book free.

THE SEYMOUR MANUFACTURING CO.,
51 FRANKLIN ST., SEYMOUR, CONN.

SEYMOUR

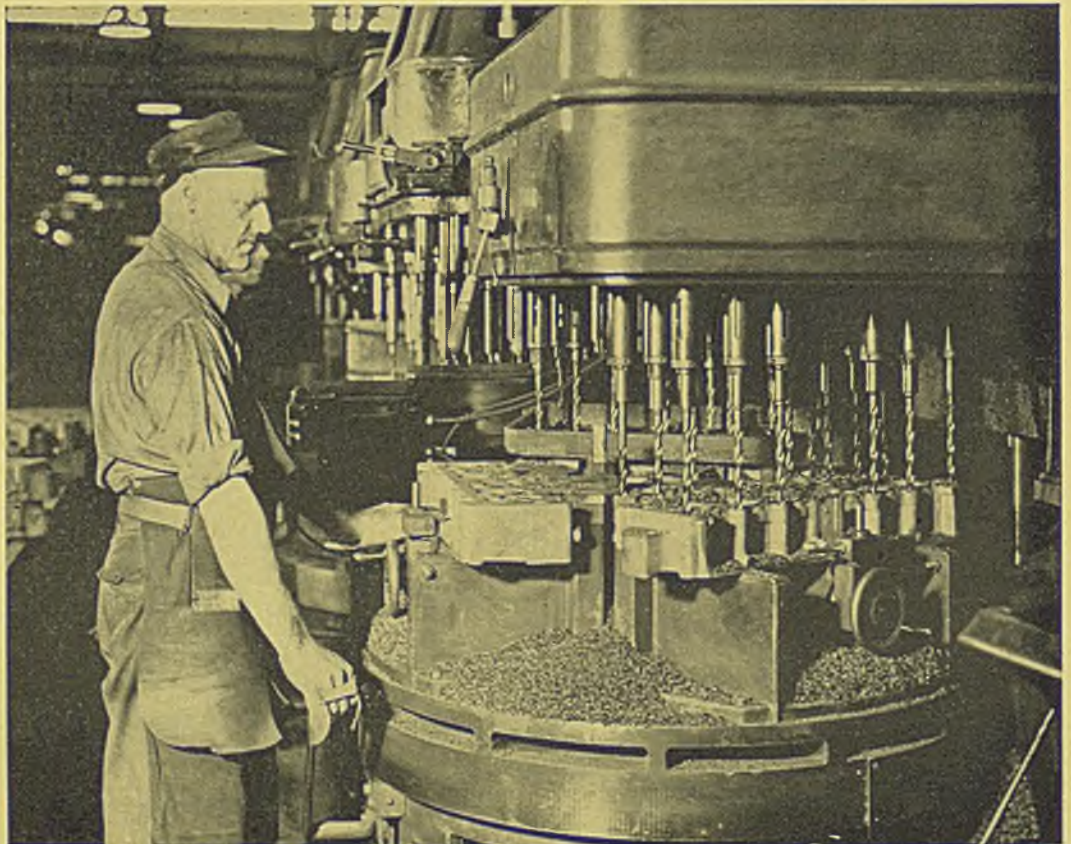


—Aluminum Co. of America

TWO men and a sedan comprise only a small mouthful for this 32-cubic yard shovel dipper, said to be the largest in existence, and now in service in open-pit coal mines of northern Illinois. Aluminum alloys reduce the dead weight without sacrifice of strength

NEW cutting alloys are permitting greater economies in machining and drilling operations. Below is shown gang drilling with twist drills of a recently developed molybdenum-tungsten high-speed tool steel

—Cleveland Twist Drill Co.



Better..because
THEY'RE
Stainless Steel

THROUGHOUT industry, thousands of products are *better because they're stainless steel*. Stainless steel is strong and tough. It does not rust and resists the attack of many corrosive chemicals even at high temperatures. Thus, use of stainless steel reduces weight, minimizes wear and corrosion, lowers maintenance, and adds years of useful, trouble-free life. You should investigate stainless steel for your equipment or product.

Electromet does not make stainless steel, but supplies the ferro-alloys that go into its making. For over 30 years, Electromet has cooperated with the steel industry in developing new alloy steels and irons and applying them to the requirements of modern industry. Backed by this experience, Electromet can give you unbiased help in applying stainless steel to your equipment or product. This service is available without obligation.

ELECTRO METALLURGICAL COMPANY

Unit of Union Carbide and Carbon Corporation



Carbide and Carbon Building
30 East 42nd St., New York, N. Y.

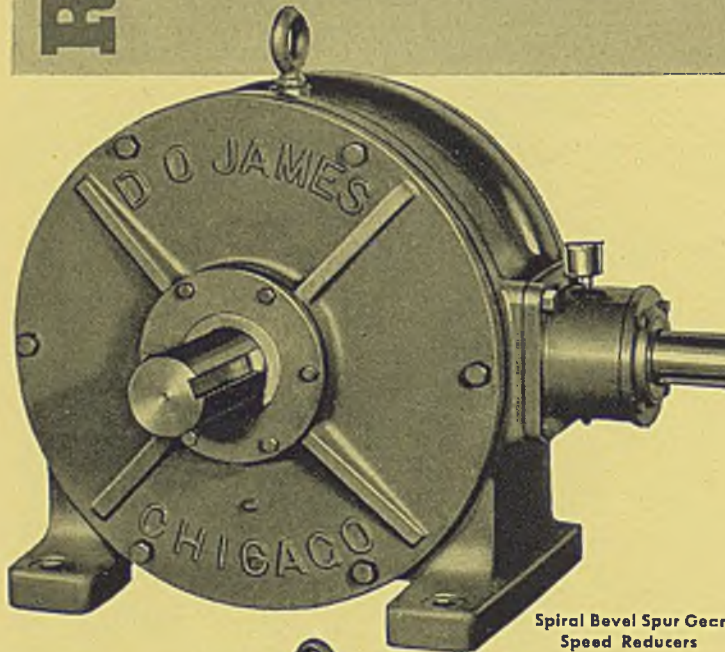


Electromet Ferro-Alloys & Metals

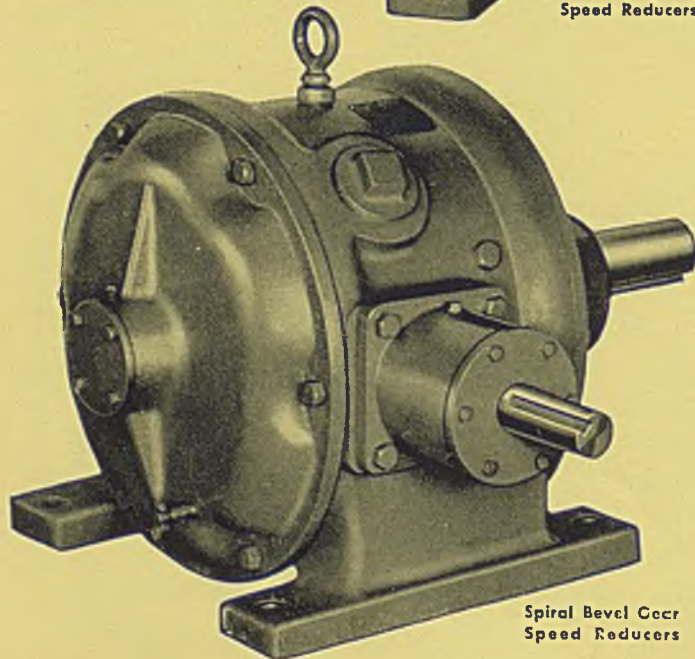
Your Opportunity: See the Electro Metallurgical Company exhibit of new stainless and other alloy steels and irons, Booth N-32, National Metal Exposition, Public Auditorium, Cleveland, Ohio, October 19-23, 1936.

RIGHT ANGLE

- SPIRAL BEVEL CONTINUOUS-TOOTH HERRINGBONE GEAR SPEED REDUCERS
- SPIRAL BEVEL GEAR SPEED REDUCERS
- SPIRAL BEVEL SPUR GEAR SPEED REDUCERS



Spiral Bevel Spur Gear Speed Reducers



Spiral Bevel Gear Speed Reducers

Spiral Bevel Continuous-Tooth Herringbone Gear Speed Reducers

Right angle type speed reducers have proven their soundness in the achieved success of their many and varied installations. Designed and engineered in three different gear styles, and will prove their adaptability on very difficult applications—and when a limited space is available.

Bulletins with complete engineering data are available on these three styles:

- **BULLETIN No. 11**—Right angle Spiral Bevel Gear Speed Reducers with ratios of 1 to 1 up to 6 to 1.
- **BULLETIN No. 16**—Right angle Spiral Bevel Continuous-tooth Herringbone Gear Speed Reducers with ratios of 6 to 1 up to 45 to 1.
- **CATALOG No. 141**—Right angle Spiral Bevel Spur Gear Speed Reducers with ratios of 8 to 1 up to 1200 to 1.

D. O. JAMES MANUFACTURING COMPANY
1114 WEST MONROE STREET • CHICAGO, ILLINOIS

D.O. JAMES

FOR ALMOST FIFTY YEARS MAKERS OF EVERY TYPE OF SPEED REDUCER AND CUT GEAR

COULD WE HOPE FOR *Greater* RECOGNITION?

THERE WERE FIVE
MULTIPLE STAND STEEL
STRIP MILLS WITH ROLLER
BEARINGS ON THE BACKING
ROLLS BUILT OR ORDERED
IN U. S. A. 1935-36

Bantam Taper Bearings are
being used on Roll Necks on
4 out of 5 or 80%
of these Mills!



3 of the 5 Mills have **100%**
Bantam Roll Neck Taper Bearings as
Original Equipment

Note the decided swing
to Bantam. We will send
the complete listings of
these and other BANTAM
equipped mills to any
inquirer.



THE BANTAM BALL BEARING CO.

(SUBSIDIARY OF THE TORRINGTON CO.)

SOUTH BEND, INDIANA

CHICAGO
PHILADELPHIA
TOLEDO

CLEVELAND
PITTSBURGH
WASHINGTON, D.C.

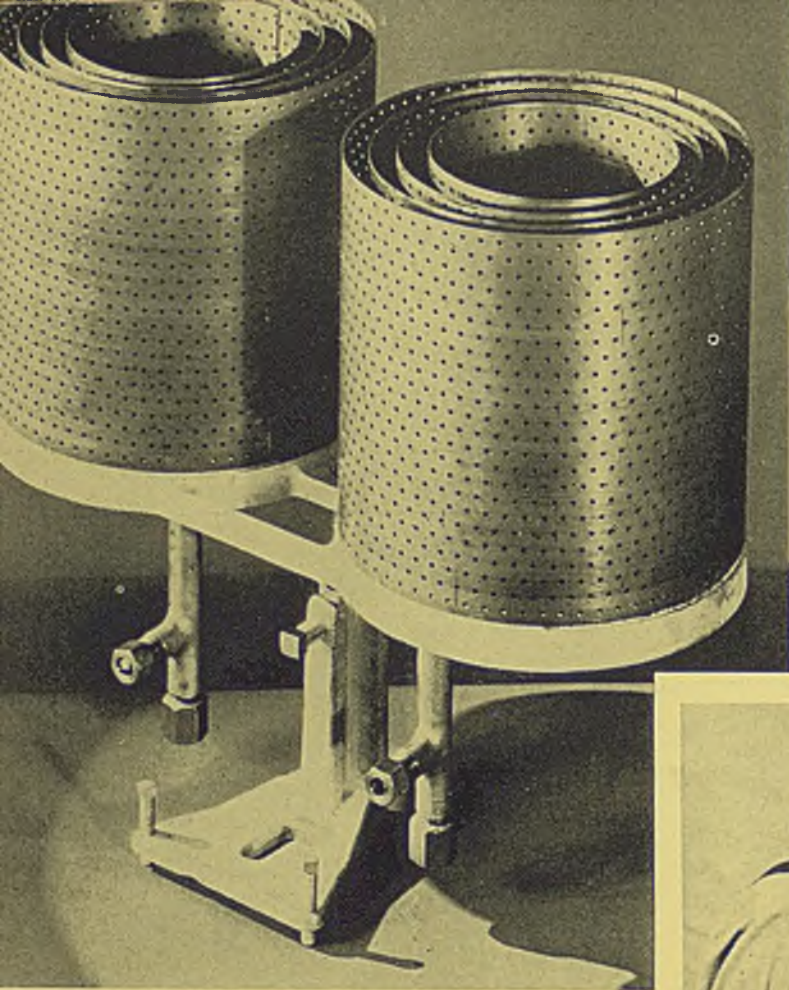
DETROIT
MILWAUKEE

NEW YORK
ROCHESTER, N.Y.
HARTFORD

NEW ORLEANS
SEATTLE
INDIANAPOLIS

In Canada DOMINION ENGINEERING WORKS, LIMITED, MONTREAL

TAKE YOUR TOUGHEST BEARING JOB TO BANTAM



—Ludlum Steel Co.

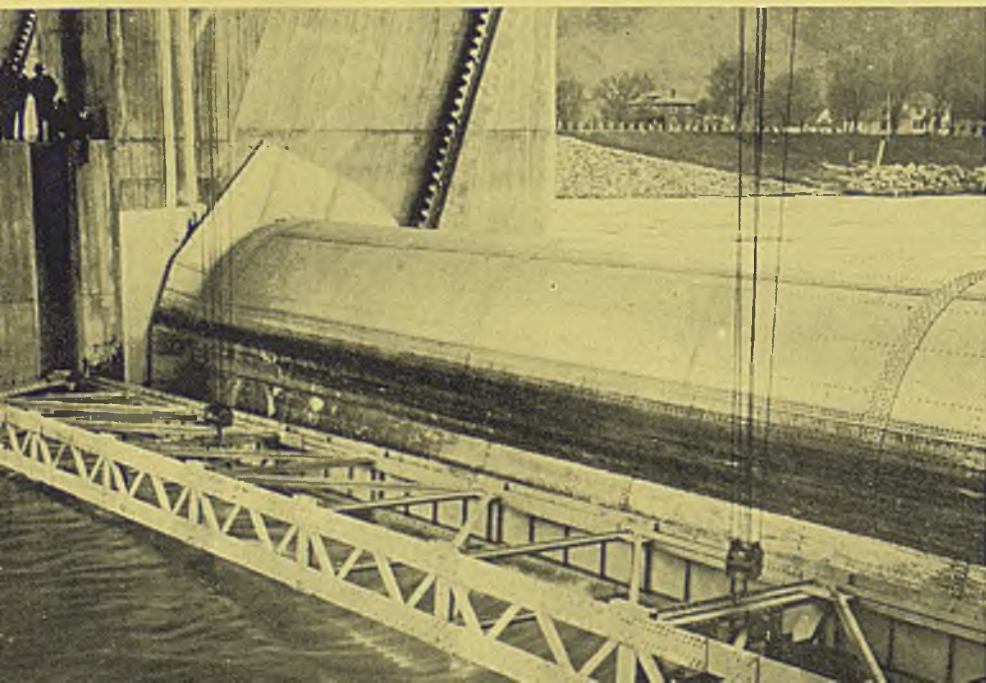
ARCH foes of heat are many of the newer alloy steels which put an end to burning, warping, scaling and breakage in parts such as the burners for an oil stove shown at the left, fabricated from a recently developed chromium-silicon steel. Hot oil and high-temperature steam subject seating surfaces of oil refinery valves to a severe test, but, as shown below, hard surfacing these valves with an alloy of cobalt, chromium and tungsten greatly prolongs their life



—Haynes Stellite Co.

HARNESSING an angry river is a job expressly cut out for alloy steels. Below is a nickel steel bulkhead being lowered into place on a new dam in the Kanawha river

—International Nickel Co.





ENGINEERS . . . to Create

EQUIPMENT . . . to Produce

PRESSED STEEL

● From oil pans to bread pans—from motor supports to adding machine cases—Transue's production records reveal an unusual number of intricate deep drawn stamping problems successfully solved

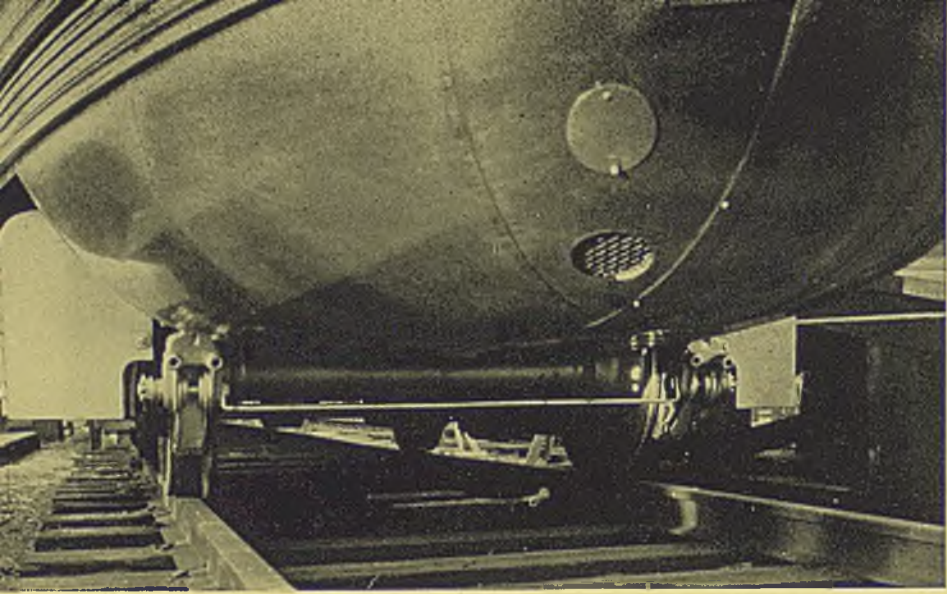
Due partly to a cheerful willingness to tackle any difficult stamping assignment—partly to the ability to follow through on both design and manufacture.

If your product presents pressed steel possibilities, get in touch immediately with the nearest Transue sales office and let experienced engineers work out the design, the costs and the savings.

TRANSUE & WILLIAMS
ALLIANCE, OHIO

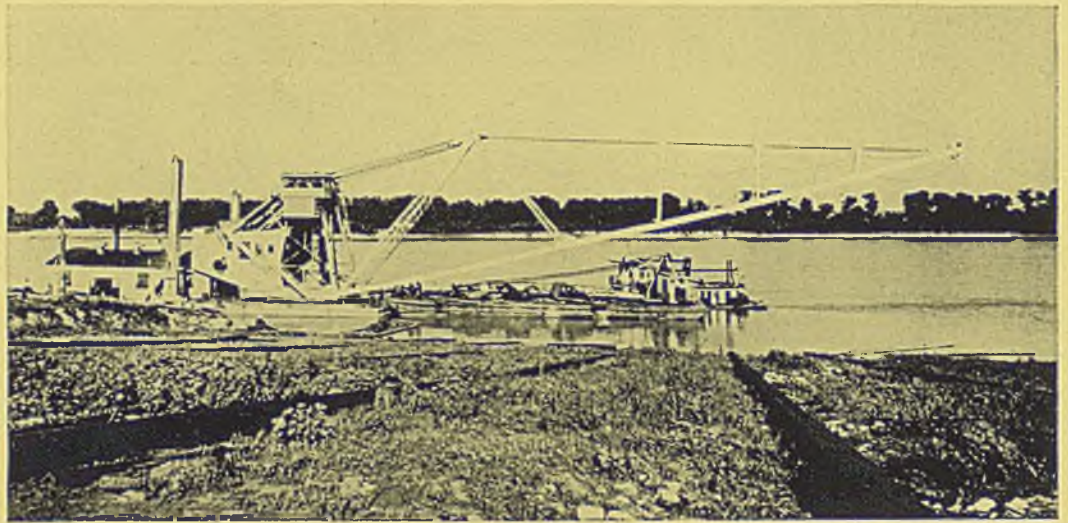
Designers and Makers of Deep Drawn Stampings

SALES OFFICES: NEW YORK - PHILADELPHIA - CHICAGO - DETROIT - INDIANAPOLIS - CLEVELAND



—Bethlehem Steel Co.

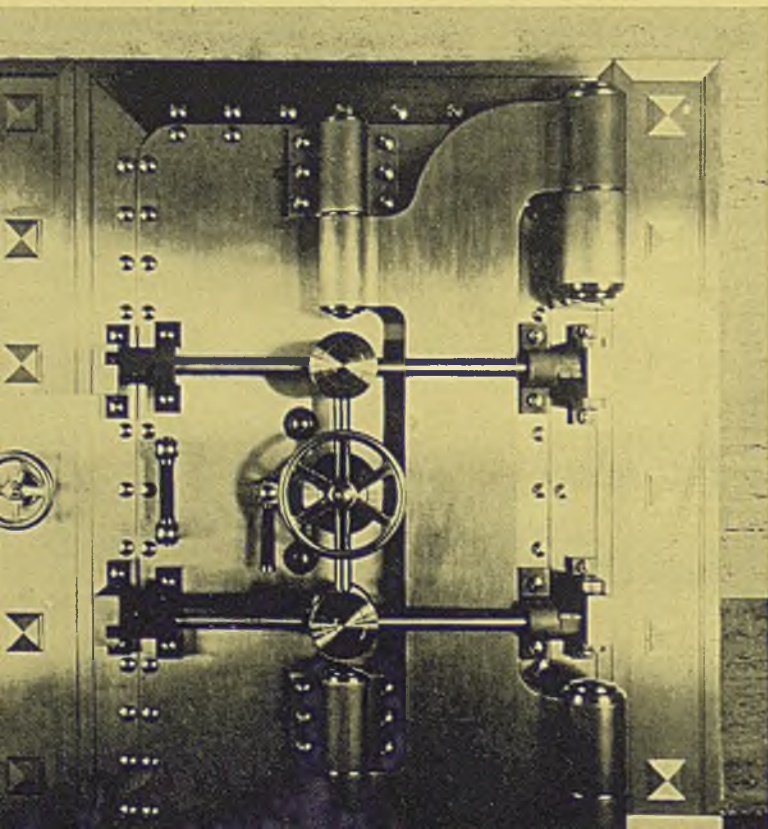
WORM'S-EYE view of the Burlington streamlined "Mark Twain" reveals the carbon-molybdenum steel wheels and axles which carry the smooth, lustrous stainless steel superstructure



—Aluminum Co. of America

—Republic Steel Corp.

STEEL and aluminum join hands in this 240-foot dredge boom in service on the Mississippi river. The first 150 feet of the boom from the pulley toward the dredge is of aluminum to lessen weight at the outer swing and thereby increase speed of operation



POTENTIAL safecrackers who approach this massive bank vault door will probably give up in dismay. Stainless steel lends the decorative touch, while tough, heat treated alloy steels provide the rigidity and high strength required in this equipment

SUPEREX - THE MOST EFFICIENT BLOCK INSULATION

actually costs LESS to install!



**HIGH INSULATING EFFICIENCY
— LESS THICKNESS REQUIRED**

Because of its remarkably low thermal conductivity, 3" of Superex is equal in insulating value to 4½" of many other insulating materials.

SUPEREX 3" THICK **OTHER INSULATING MATERIALS 4½" THICK**

These are the benefits of using J-M Superex Blocks:

High insulating value that permits less thickness to be used. Result—savings not only in the cost of insulation, but also, in many cases, additional savings in furnace-construction costs. Large . . . light . . . Superex Blocks go on quickly and smoothly (covering as much as three square feet at a time), send labor costs down and actually save money at installation!

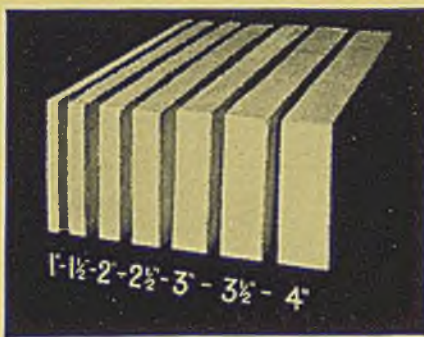
Hence . . . Superex has definitely proved itself the most efficient and economical block insulation for high-temperature industrial equipment. Safely withstanding all temperatures up to 1900° F., these blocks retain their high insulating effectiveness even under severe service conditions.

You will find Superex especially well adapted for the insulation of slab-heating, annealing and all types of controlled-atmosphere furnaces, producer-gas mains, hot-blast stoves, open hearths and regenerators, and soaking pits.

Engineering data sheets on Superex Blocks, Sil-O-Cel Brick and other Johns-Manville Insulations for high-temperature equipment may be had by addressing Johns-Manville, 22 E. 40th St., N. Y. C.



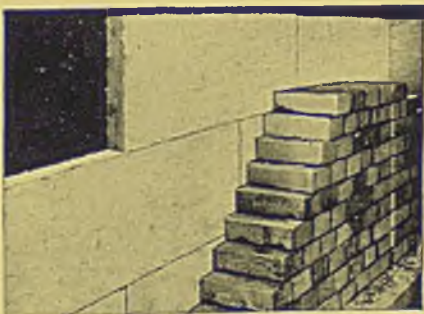
SAFE AT HIGH TEMPERATURES. Selected, calcined diatomaceous silica, blended and bonded with asbestos fibre, gives Superex unusual heat resistance. Safe at 1900° F. Stands up under severe service.



PICK YOUR THICKNESS. Superex is furnished not only in the thicknesses shown above, but also in any intermediate thickness desired. No waste; you buy only the thickness you need.



LOW INSTALLATION COST. Blocks are large (up to 12" x 36"); they are light (23 lb. per cu. ft.). Superex goes on quickly, economically—as much as 3 sq. ft. at a time—with savings in labor cost.




JOINT LOSSES MINIMIZED. Whatever insulation you use, however carefully you apply it, there will be heat leakage through joints. Superex's large-size units reduce such losses to a negligible degree.



J-M Insulations on display at Booth N-38, National Metal Exposition, Cleveland, October 19-23, 1936

**Johns-Manville
INDUSTRIAL
INSULATIONS**



**For every temperature
condition from 400° F. below
zero to 3000° F. above**

IS INDUSTRY PREPARED FOR ?? REAL RECOVERY ??? ???

In the iron, steel and metalworking industries, are the facilities of finance, organization, plant, equipment and personnel ready for sustained activity at high levels?

Has rehabilitation and modernization been carried forward sufficiently to make up for the neglect of the depression period?

Are proper precautions being taken to guard against serious shortages of skilled workmen?

Is capacity for production, finishing, processing, and manufacture being brought into balance, or is the industry still topheavy in productive capacity?

These and scores of other problems are vital in this recovery period. Preparedness for recovery is more important than preparedness for war.

STEEL's annual issue — the "Yearbook of Industry" number dated Jan. 4, 1937—will deal with these problems of preparedness. Every one of the more than 30 major articles will be pointed toward the single question "Is Industry Prepared?" By text, illustrations, statistics, tables and charts, STEEL will attempt to show wherein the industries it serves are weak or strong in their state of readiness for big business ahead.

To advertisers, the "Yearbook Issue" of STEEL for 1937 presents unusual opportunities. In it you can direct your appeal to important buyers whose minds are keyed to the urgency of preparedness.

For more detailed information write

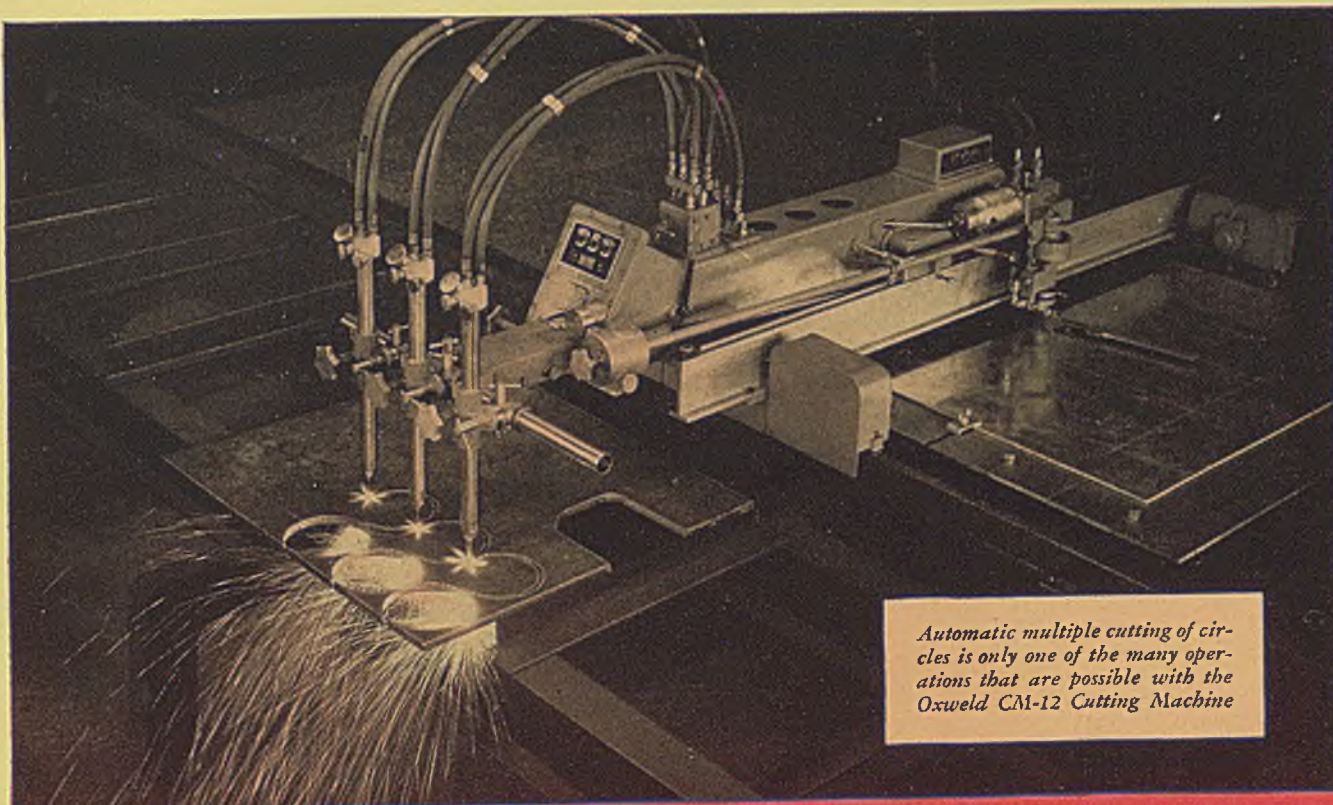
STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

For Forty-eight years—IRON TRADE REVIEW

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Automatic multiple cutting of circles is only one of the many operations that are possible with the Oxweld CM-12 Cutting Machine

Metal Working goes Modern with Oxy-Acetylene Machine Cutting

MODERN metal working demands a fast, flexible, accurate, and economical method for shaping metal parts. Oxy-acetylene shape cutting with new automatic machines developed by Linde is the answer.

For every cutting need, there is an Oxweld cutting machine... portable or stationary, partly or fully automatic, and of almost any desired capacity. These machines are precision production tools that cut intricate shapes with amazing accuracy.

The Oxweld CM-12 Cutting Machine illustrated is Linde's latest contribution to automatic precision shape cutting. Such features as rigid

crane-type construction... ready adaptability to hand tracing, templet tracing and radius cutting... unusual flexibility for automatic straight line, circle, bevel, and angle cutting... and fully automatic dual controls make this an ideal all-purpose machine.

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termine what oxy-acetylene machine cutting can do in your plant and which machine is best for your purpose. Address the Linde office near you. The Linde Air Products Company, Unit of Union Carbide and Carbon Corporation, New York and principal cities.

Your Opportunity

See the Oxweld CM-12 Cutting Machine in operation at the Linde exhibit, Booth 0-30, National Metal Exposition, Public Auditorium, Cleveland, Ohio, October 19-23, 1936.

Everything for Oxy-Acetylene Welding and Cutting

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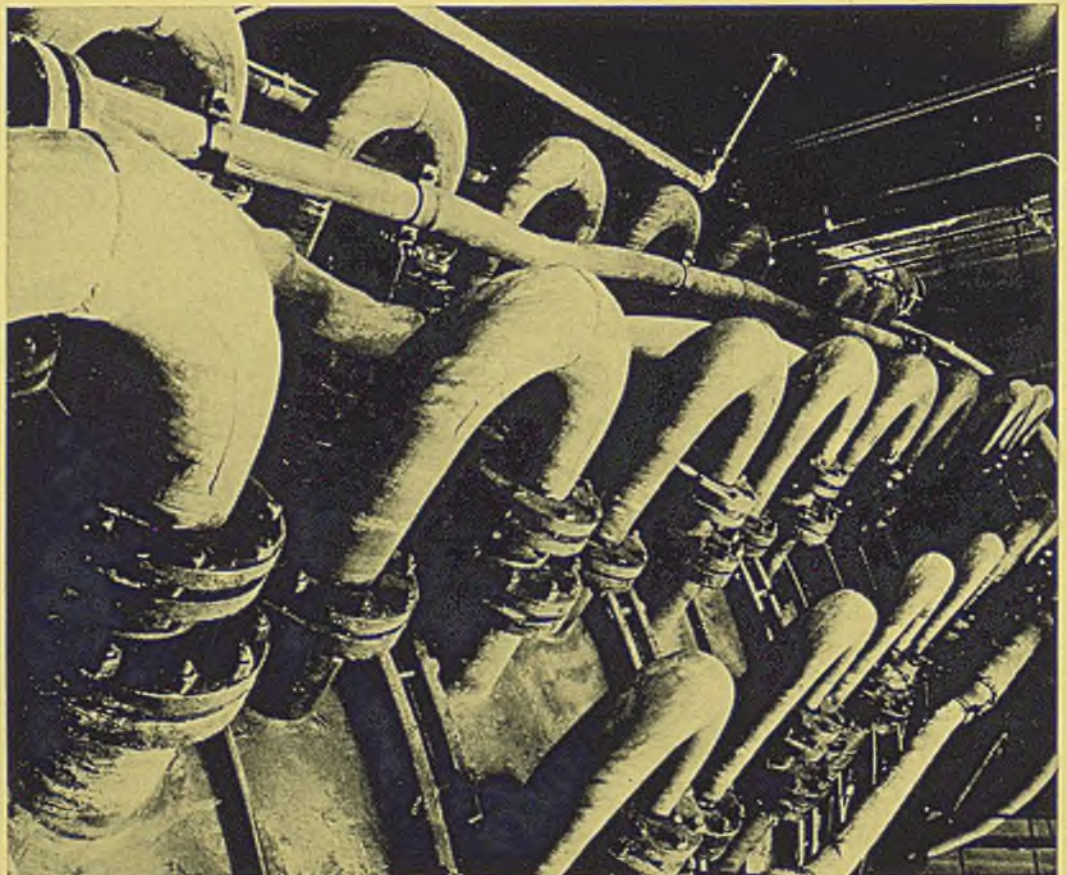


BRILLIANT example of stainless steel applied to interior building trim is seen in these two elevator entrances in which the etched door panels and fluted frame contrast strikingly with the dark wall background

—Republic Steel Corp.

HHEAT and corrosion-resisting alloy steels are doing yeoman service day in and day out in complex chemical plant equipment such as this large fractionating unit. Without the benefit of these modern materials, many of today's achievements in practical chemistry would have been impossible

—Electro Metallurgical Co.



Tuesday, Oct. 20

10:00 A. M.—STATLER HOTEL

Grain Size Session

- "Some Effects of Small Additions of Vanadium to Eutectoid Steel," by J. G. Zimmerman, R. H. Aborn and E. C. Bain, United States Steel Corp., Kearny, N. J.
- "Influence of Aluminum on the Normality of Steel," by G. R. Brophy and E. R. Parker, General Electric Co., Schenectady, N. Y.
- "A study of the Effect of the Aluminum Addition on the Structure of a Quenched Carbon Steel," by H. W. McQuaid, Republic Steel Corp., Massillon, O.

2:00 P. M.—PUBLIC AUDITORIUM

Physical Properties Session

- "Effect of Overload on the Fatigue Properties of Several Steels at Various Low Temperatures," by H. B. Wishart and S. W. Lyon, University of Illinois, Urbana, Ill.
- "Austenitic Stainless Alloys: Their Properties and Characteristics," by V. N. Krivobok, R. A. Lincoln and R. Patterson Jr., Allegheny Steel Co., Brackenridge, Pa.
- "Slip, Twinning and Cleavage in Iron and Silicon Ferrite," by C. S. Barrett, G. Ansel and R. F. Mehl, Carnegie Institute of Technology, Pittsburgh.
- "Dimension Changes of Tool Steels During Quenching and Tempering," by Ainar Ameen, Uddeholms A. B., Sweden.

4:30 P. M.—PUBLIC AUDITORIUM

Educational Lecture

- "Physical Testing of Metals and Interpretation of Test Results," lecture No. 2, by Prof. H. D. Churchill, Case School of Applied Science, Cleveland.

8:00 P. M.—PUBLIC AUDITORIUM

Educational Lecture

- "X-Ray Analysis," lecture No. 2, by Dr. K. R. Van Horn, Aluminum Co. of America, Cleveland.

Wednesday, Oct. 21

9:30 A. M.—STATLER HOTEL

Annual Meeting

- Reports of officers.
Election of officers.
Edward De Mille Campbell Memorial lecture, by J. P. Gill, Vanadium-Alloys Steel Co., Latrobe, Pa.



ROBERT S. ARCHER
President, American Society for Metals. Mr. Archer is chief metallurgist, Chicago district, Republic Steel Corp.

2:00 P. M.—PUBLIC AUDITORIUM

Melting Session

- "Magnetic Properties of a Series of Basic Open-Hearth Slag Samples," by B. A. Rogers and K. O. Stamm, United States bureau of mines, Pittsburgh.
- "Basic Open-Hearth Slag Control," by Earnshaw Cook, American Brake Shoe & Foundry Co., Mahwah, N. J.
- "A New Tool for the Control of Quality Steelmaking," by G. T. Motok, Republic Steel Corp., Cleveland.
- "Equilibrium in the Reaction of Hydrogen with Iron Sulphide in Liquid Iron and the Thermodynamics of Desulphurization," by John Chipman, American Rolling Mill Co., Middletown, O., and Ta Li, China.

4:30 P. M.—PUBLIC AUDITORIUM

Educational Lecture

- "Physical Testing of Metals and Interpretation of Test Results," lecture No. 3, by Prof. H. D. Churchill, Case School of Applied Science, Cleveland.

8:00 P. M.—PUBLIC AUDITORIUM

Educational Lecture

- "X-Ray Analysis," lecture No. 3, by Dr. K. R. Van Horn, Aluminum Co. of America, Cleveland.

Thursday, Oct. 22

10:00 A. M.—STATLER HOTEL

Symposium on Plastic Working of Metals

- "Laws and Fundamentals of Plastic Deformation," by A. V. deForest, Massachusetts Institute of Technology, Cambridge, Mass.
- "Metallic Single Crystals and Plastic Deformation," by S. L. Hoyt, A. O. Smith Corp., Milwaukee.
- "Creep Characteristics of Metals," by C. L. Clark and A. E. White, University of Michigan, Ann Arbor, Mich.
- "Interpretation and Use of Creep Results," by J. J. Kanter, Crane Co., Chicago.
- "Damping Capacity: Its Variation and Relation to Other Physical Properties," by G. R. Brophy and E. R. Parker, General Electric Co., Schenectady, N. Y.

10:00 A. M.—STATLER HOTEL

X-Ray Session

- "An X-Ray Study of Preferred Orientations in Pure Cold-Rolled Iron-Nickel Alloys," by D. McLachlan Jr., and W. P. Davey, Pennsylvania State College, State College, Pa.



EDGAR C. BAIN
Vice president, American Society for Metals. He is assistant to vice president, United States Steel Corp., New York



JAMES P. GILL

1936 Campbell Memorial Lecturer, American Society for Metals. He is metallurgist, Vanadium-Alloys Steel Co., Latrobe, Pa.



WILLIAM H. EISENMAN

Secretary, American Society for Metals, Cleveland. Mr. Eisenman is also general manager of the National Metal Exposition

"Application of X-Ray Diffraction to the Study of Fatigue in Metals," by C. S. Barrett, Carnegie Institute of Technology, Pittsburgh.

"X-Ray Diffraction Studies of Distortion in Metals," by G. L. Clark and M. M. Beckwith, University of Illinois, Urbana, Ill.

2:00 P. M.—PUBLIC AUDITORIUM

Symposium on Plastic Working of Metals (Continued)

"Elastic Properties and Their Relationship to Strain Hardening," by M. F. Sayre, Union college, Schenectady, N. Y.

"Effect of the Shape of the Test Piece Upon the Energy Needed to Deform Materials in the Single-Blow Drop Test," by O. W. Ellis, Ontario Research Foundation, Toronto, Ont.

"Hot Working, Cold Working and Re-Crystallization Structure," by N. P. Goss, Cold Metal Process Co., Youngstown, O.

"Factors Relating to the Production of Drop and Hammer Forgings," by Adam M. Steever, Columbia Tool Steel Co., Chicago Heights, Ill.

2:00 P. M.—PUBLIC AUDITORIUM

Research Session

"Further Study of a High-Carbon, High-Chromium Tool Steel," by W. H. Wills, Ludlum Steel Co., Dunkirk, N. Y.

"Importance of Boundary Attack in the Etching of Steel Specimens," by B. L. McCarthy, Wickwire, Spencer Steel Co., Buffalo.

"Recovery of Cold-Worked Nickel at Elevated Temperatures," by Erich Fetz, Wilbur B. Driver Co., Newark, N. J.

4:30 P. M.—PUBLIC AUDITORIUM

Educational Lecture

"Physical Testing of Metals and Interpretation of Test Results," lecture No. 4, by Prof. H. D. Churchill, Case School of Applied Science, Cleveland.

7:00 P. M.—STATLER HOTEL

Annual banquet.

Friday, Oct. 23

10:00 A. M.—STATLER HOTEL

Symposium on Plastic Forming of Metals (Continued)

"Hot Press and Upset Forging," by J. H. Friedman, National Machinery Co., Tiffin, O.

"Extrusion of Metals," by D. K. Crampton, Chase Brass & Copper Co., Waterbury, Conn.

"Cold Heading—Bolts, Rivets, Nails," by R. H. Smith, Lamson & Sessions Co., Kent, O.

"Cold Forming Processes—Drawing Rods and Bars," by J. E. Beck, Jones & Laughlin Steel Corp., Pittsburgh.

10:00 A. M.—STATLER HOTEL

Testing Session

"Conversion of Tensile Test Data from One Form of Test Piece to Another," by E. J. Janitzky, Carnegie-Illinois Steel Corp., Chicago.

"Behavior of Some Low-Alloy Steels in the Single-Blow Drop Test," by O. W. Ellis, Ontario Research Foundation, Toronto, Ont.

"Fracture of Carbon Steels at Elevated Temperatures," by A. E. White and C. L. Clark, University of Michigan, Ann Arbor, Mich., and R. L. Wilson, Timken Steel & Tube Co., Canton, O.

2:00 P. M.—PUBLIC AUDITORIUM

Symposium on Plastic Forming of Metals (Continued)

"Cold Drawing Processes: Making of Tubing," by Horace Knerr, consulting metallurgist, Philadelphia.

"Cold Rolling of Mild Steel Sheets and Strip," by Anson Hayes and R. S. Burns, American Rolling Mill Co., Middletown, O.

"Some Factors Affecting the Plastic Deformation of Sheet and Strip Steel and Their Relation to the Deep Drawing Properties," by Joseph Winlock and R. W. E. Leiter, Edward G. Budd Mfg. Co., Philadelphia.

2:00 P. M.—PUBLIC AUDITORIUM

Physical Properties Session

"Investigation of Fatigue Strength of Axles, Press Fits, Surface Rolling and Effect of Size," by T. V. Buckwalter and O. J. Horger, Timken Roller Bearing Co., Canton, O.

"Endurance of Gear Steels at 250 Degrees Fahr.," by A. L. Boegehold, General Motors Corp., Detroit.

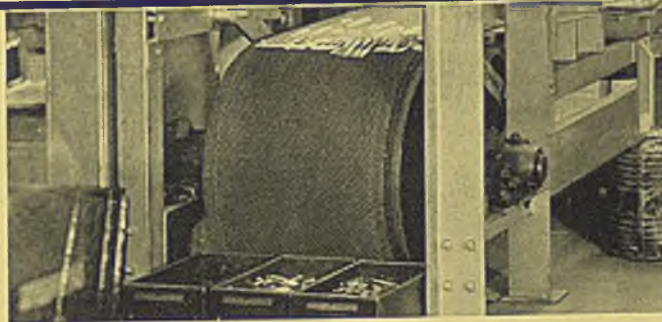
"Physical Properties of Axle Shafts," by H. B. Knowlton, International Harvester Co., Chicago.

4:30 P. M.—STATLER HOTEL

Educational Lecture

"Physical Testing of Metals and Interpretation of Test Results," lecture No. 5, by Prof. H. D. Churchill, Case School of Applied Science, Cleveland.

*This would be an
expensive belt
... if it did not
have a Duplex Selvage*



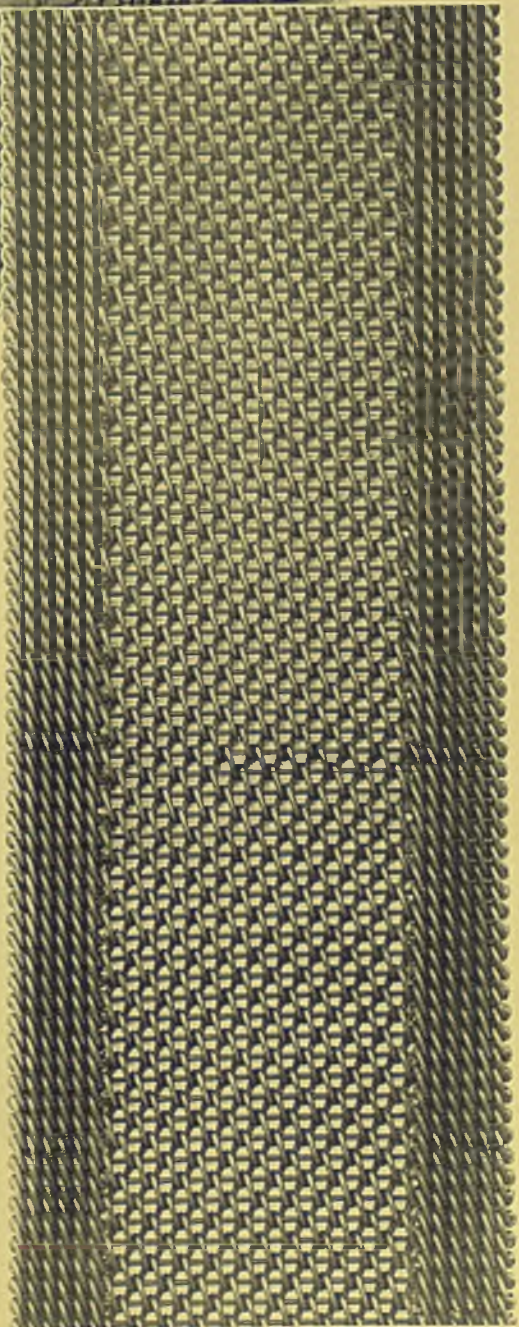
One of three Surface Combustion Corporation furnaces at Oneida, Ltd., Oneida, N. Y. equipped by Surface Combustion Corp. with Cambridge Duplex Selvage Woven Wire Belts.

Duplex Selvage is added strength where strains are greatest. A Cambridge Spiral Woven Wire Conveyor Belt with selvages reinforced with a true double weave—identical in every respect with the weave of the belt fabric itself—unaltered uniformity of belt structure—unimpaired flexibility—unchanged belt surface smoothness—results in operating freedom from edge wear and tear and consequent belt disruption.

There is also a hidden virtue in the Cambridge Duplex Selvage which is brought to light under elevated temperature belt applications. Here Duplex Selvage has proven to be more than merely belt edge protection, but an area within which the ever-present belt operating stresses are absorbed and arrested from developing further into the inner belt fabric as destructive belt strains, the cause of belt distortion, stretch and width contraction.

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Welding Society Program

Reviews Recent Progress

Monday, Oct. 19

9:45 A.M.—HOTEL CLEVELAND

Business Session

Report on society activities, by President J. J. Crowe, Air Reduction Sales Co., Jersey City, N. J.
Report on election of officers.
Award of Samuel Wylie Miller memorial medal.
Review of committee and section activities by chairmen.

2:00 P.M.—HOTEL CLEVELAND

Address of welcome.

"Fundamentals of Metallurgy of Welding," by E. S. Davenport and R. H. Aborn, research laboratories, United States Steel Corp., Kearny, N. J.

"Multilayer Oxyacetylene Pipe Welding," by R. M. Rooke, F. C. Saake and A. N. Kugler, Air Reduction Sales Co., New York.

High-speed motion pictures of various welding processes, by E. Vom Steeg, General Electric Co., Schenectady, N. Y., and Walter Richter, A. O. Smith Corp., Milwaukee.

6:30 P.M.—HOTEL CLEVELAND

Dinner meeting of board of directors.

Tuesday, Oct. 20

9:45 A.M.—HOTEL CLEVELAND

Fundamental Research in Welding

"Heating by the Proximity Effect," by Edward Bennett, University of Wisconsin, Madison, Wis.

"Impact Tests of Welds at Low Temperatures," by Otto Henry, Brooklyn Polytechnic institute, Brooklyn, N. Y.

"Characteristics of a Universal Welding Generator," by N. F. Ward, University of California, Berkeley, Calif.

2:00 P.M.—HOTEL CLEVELAND

Fundamental Research in Welding

"Welded Beam-Column Connections," by Inge Lyse and G. J. Gibson, Fritz engineering laboratory, Lehigh university, Bethlehem, Pa.

"Circuit Characteristics and Arc Stability," by S. C. Osborne, Wilson Welder & Metals Co. Inc., North Bergen, N. J.

"Welded Structural Brackets," by

C. D. Jensen, Lehigh university, Bethlehem, Pa.

7:30 P.M.—HOTEL CLEVELAND

Conference and meeting of fundamental research committee, Bureau of Welding Research and Engineering Foundation. Scheduled for benefit of university research workers in fundamentals of welding.

Wednesday, Oct. 21

9:45 A.M.—HOTEL CLEVELAND

"Braze with Silver Solders," by Robert H. Leach, Handy & Harman, Bridgeport, Conn.

"Importance of Design Control for Welded Piping Systems," by T. W. Greene, Linde Air Products Co., New York.

"Principles of Surfacing by Welding," by E. W. P. Smith, Lincoln Electric Co., Cleveland.

"Technique for Resistance Welding Ferrous and Nonferrous Sheet Metals," by E. I. Larsen, P. R. Mallory & Co., Indianapolis.

2:00 P. M.—HOTEL CLEVELAND

"Procedures for Control of Welding Parts," by G. H. Moore Jr., Newport News Shipbuilding & Dry Dock Co., Newport News, Va.

"Welding Copper and Its Alloys—

A Review of the Literature," by Ira T. Hook, American Brass Co., Ansonia, Conn.

"Resistance Welding of Dissimilar Metals," by R. T. Gillette, General Electric Co., Schenectady, N. Y.

"Thermit Welding," by J. H. Deppler, Metal & Thermit Corp., New York.

"An Exploration of a Modern Metallic Arc," by L. J. Larson, O. A. Smith Corp., Milwaukee.

10:00 P.M.—HOTEL CLEVELAND

Stag entertainment.

Thursday, Oct. 22

9:45 A. M.—HOTEL CLEVELAND

Joint Session with American Society of Mechanical Engineers

"Welding Design," by C. H. Jennings, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

"Alloy Steels and Their Weldability," by A. B. Kinzel, Union Carbide & Carbon Research Laboratories Inc., Long Island City, N.Y.

"Welding of Alloy Steels," by W. L. Warner, Watertown arsenal, Watertown, Mass.

2:00 P. M.—HOTEL CLEVELAND

Joint Session with American Society of Mechanical Engineers

"Rolled Steel in Machine Construction," by H. G. Marsh, Carnegie-Illinois Steel Corp., Pittsburgh.

"Welding Heavy Machinery and Equipment," by C. A. Wills and F. L. Lindemuth, William B. Pollock Co., Youngstown, O.

Discussions by E. E. Tross, United Engineering & Foundry Co., Youngstown, O., and F. O. Leitzell, Lewis Foundry & Machine Co., Pittsburgh.

"Modern Resistance Welding Development of Lighter Products, Including Automobiles and Refrigerators," by A. E. Hackett, Thomson-Gibb Electric Welding Co., Detroit.

7:00 P. M.—HOTEL CLEVELAND

Dinner and dance.

Friday, Oct. 23

American Welding Society Invited to Attend Two Sessions Arranged by American Society of Mechanical Engineers

For details of the program, see A.S.M.E. program, Page 173.



JOHN J. CROWE

President, American Welding Society. Mr. Crowe is engineer in charge, apparatus research and development department, Air Reduction Sales Co., Jersey City, N. J.

Two A. I. M. E. Divisions To Convene

Tuesday, Oct. 20

10:00 A. M.—STATLER HOTEL

Institute of Metals Division

Aging of Metals

"Aging Phenomena in Silver-Copper Alloys," by Morris Cohen.

"Age Hardening of Aluminum Alloys," by W. L. Fink and Dana Smith.

"Precipitation Hardening and Double Aging," by R. H. Harrington.

Iron and Steel Division

Blast Furnace Practice

"Recovery of Fine Flue Dust from Scrubber Water," by T. B. Counselman.

"Offsetting Increased Labor Cost in Southern Blast Furnace Operation," by J. M. Hassler.

"Blast Furnace Operation and Refractories," by R. A. Lindgren.

"Iron Ores of France," by Francois Clerf.

12:15 P. M.—STATLER HOTEL

Iron and Steel Division

Luncheon meeting of Open Hearth executive committee.

2:00 P. M.—STATLER HOTEL

Iron and Steel Division

Open-Hearth Steel Plant



S. M. WECKSTEIN

Chairman, Iron and Steel Division, American Society of Mechanical Engineers. Mr. Weckstein is industrial equipment engineer, Timken Roller Bearing Co., Canton, O.

"Factors Affecting Life of Ingot Molds," by W. J. Reagan.

"Speeding-Up Steel Refining," by B. A. Rogers.

"Resume of Reports of British Heterogeneity Committee," by R. C. Wood.

Wednesday, Oct. 21

12:15 P. M.—STATLER HOTEL

Institute of Metals Division

Luncheon meeting of executive committee.

2:00 P. M.—PUBLIC AUDITORIUM

Institute of Metals Division

Constitution of Alloy Systems

"Solid Solubility of the Elements of the Periodic Subgroup Vb in Copper," by J. C. Mertz and C. H. Mathewson.

"Equilibrium Relations in the Ni-Sn System," by William Mikulas, Lars Thomassen and Claire Upthegrove.

"Equilibrium Relations in Al-Mg-Zn System," by W. Fink and L. A. Willey.

"Note on Etching and Microscopic



CLYDE E. WILLIAMS

Chairman, Iron and Steel Division, American Institute of Mining and Metallurgical Engineers. Mr. Williams is director, Battelle Memorial Institute, Columbus, O.

Identification of Constituents of Cu-Zn Alloys," by J. L. Rodda.

2:00 P. M.—PUBLIC AUDITORIUM

Iron and Steel Division

X-Ray Metallography

"Preferred Orientations in Hot-Rolled Low-Carbon Steel," by M. Gensamer and P. A. Vukmanic.

"Preferred Orientations Produced by Recrystallizing Cold-Rolled Low-Carbon Sheet Steel," by M. Gensamer and B. Lustman.

"The Parameter of the Gamma Iron Lattice in the Stable and Metastable Solutions of Carbon at High Temperature," by C. Nusbaum and H. A. Schwartz.

"X-Ray Studies of Constitution of
(Please turn to Page 176)

Welding Symposium For A. S. M. E.

Thursday, Oct. 22

American Society of Mechanical Engineers Will Meet Jointly with American Welding Society in Two Sessions.

For details of the program, see A.W.S. program on Page 170.

Friday, Oct. 23

9:30 A. M.—HOTEL CLEVELAND

"Application of Copper Alloy Welding," by I. T. Hook, American Brass Co., Ansonia, Conn.

"Welding of Monel Metal and Pure Nickel," by F. A. Flocke and J. G. Schoener, International Nickel Inc., New York.

"Welding the Aluminum Alloys," by G. O. Hoglund, Aluminum Co. of America, New Kensington, Pa.

2:00 P. M.—HOTEL CLEVELAND

"Casting or Welding in Machine Design," by J. L. Brown, industrial motor department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

"Radiographic Inspection of Welded Refinery Equipment and Steel Plate Construction," by H. R. Isenburger, St. John X-Ray Service, Long Island City, N. Y.

"Use of Magnafux for Inspecting Welds," by Joseph W. Gant, engineering department, Standard Oil Co. of Indiana, Chicago.

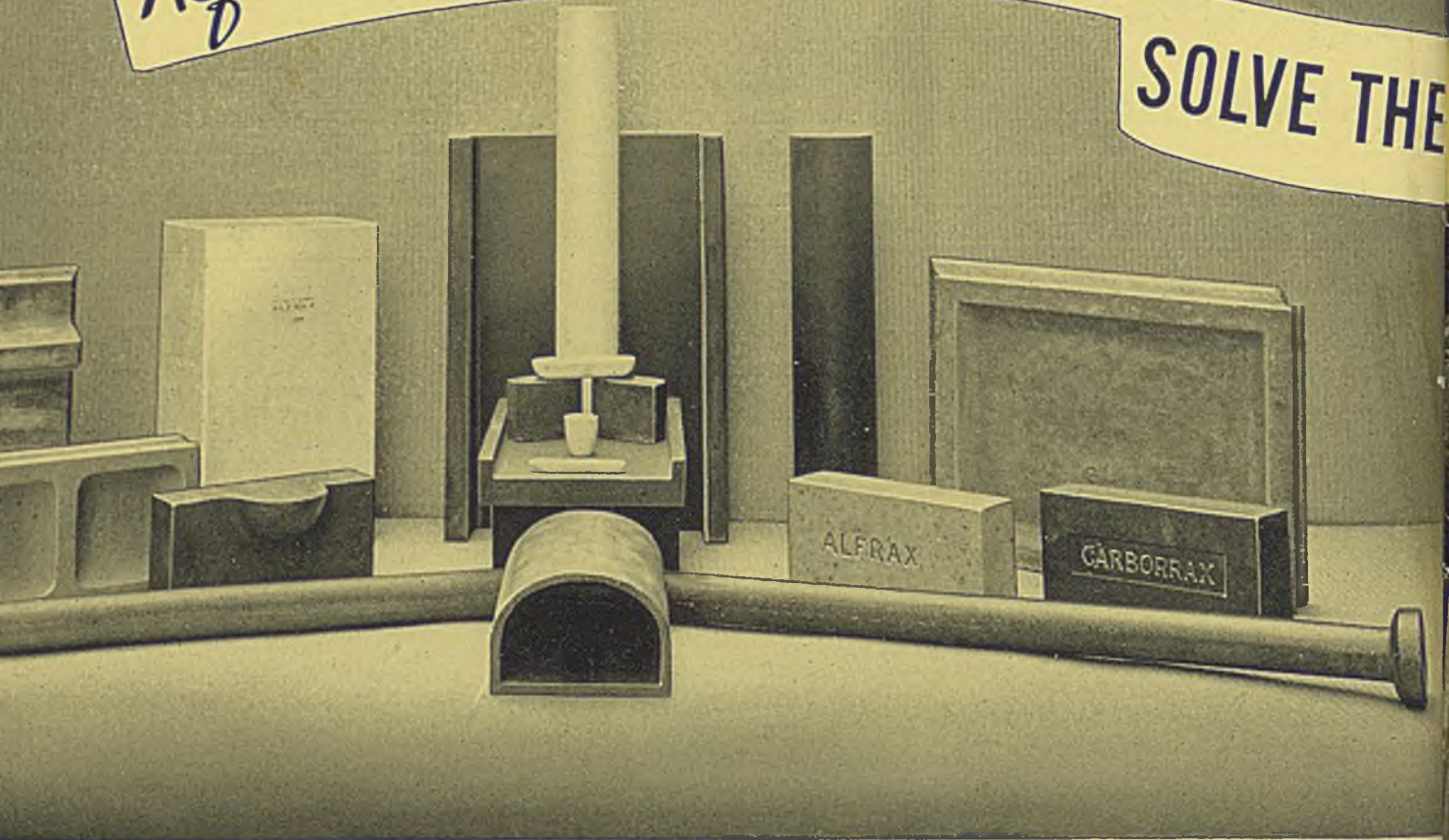


R. E. W. HARRISON

Chairman, Machine Shop Practice Division, American Society of Mechanical Engineers. Mr. Harrison is vice president, Chambersburg Engineering Co., Chambersburg, Pa.

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THE term "Refractories by Carborundum" covers a comprehensive group of super-refractory products for all conditions of use, manufactured by the world's largest organization devoted exclusively to the production of such materials.

"CARBOFRAX" (Silicon Carbide) refractories are notable for extremely high heat conductivity, great strength at high temperatures and maximum resistance to spalling and abrasion. They are used principally for muffles, hearths, supports and pyrometer tubes.

"ALFRAX" (Fused Alumina) refractories are characterized by high dielectric strength, high heat conductivity, high hot strength and resistance to abrasion. Their principle uses are for muffles in electri-

cally heated special atmosphere furnaces, and for supports.

"MULLFRAX" (Mullite) refractories are resistant to certain types of slags and molten metals, have comparatively low heat conductivity and are resistant to thermal shock. They are used principally for rammed and pre-burned linings in melting furnaces.

Various modifications of these refractories are available for special conditions.



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Columbia Chain

The activities of the engineering, research and production departments of the Refractory Division are concentrated on one central purpose—to produce a super-refractory ideally suited to the conditions of each particular installation.

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REFRACTORIES by Carborundum have solved many of the heat treating and heating problems of the metal industry. The many uses to which they have been put are too numerous for complete listing, but these are representative: *Stainless steel annealing furnaces . . . Tungsten and tungsten carbide heat treating and production furnaces . . . Special atmosphere furnaces for alloy steels . . . Forging furnace arches and walls . . . Drawing, tempering, hardening, and carburizing furnaces.* Refractories by Carborundum probably can reduce the costs, speed up the production or better the quality of your own product. Our representatives will be glad to discuss your particular heat treating problems with you.

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REFRACTORY DIVISION PERTH AMBOY, N. J.

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D U M C O M P A N Y

Wire Group To Discuss Many Topics

Monday, Oct. 19

MORNING—HOTEL CLEVELAND
Registration.

1:00 P. M.—HOTEL CLEVELAND
Meeting of board of directors.
Meeting of program committee.

3:30 P. M.—HOTEL CLEVELAND
Annual meeting of wire association.

Tuesday, Oct. 20

9:30 A. M.—HOTEL CLEVELAND
*Cleaning—Heat Treating—Material
Handling*

"Cleaning Houses in the Wire Industry," by A. F. Anjeskey, sales manager, Cleveland Tramrail Division, Cleveland Crane & Engineering Co., Wickliffe, O.

"Atmospheres and Furnaces in the



RALPH K. CLIFFORD
President, Wire Association.
Mr. Clifford is general superintendent, Continental Steel Corp., Kokomo, Ind.

Wire Industry," by H. M. Heyn, engineer, in charge of heat treating division, Surface Combustion Corp., Toledo, O.

2:00 P. M.—HOTEL CLEVELAND
Springs—Welding Wire

"Selection of Wire Spring Materials," by J. W. Rockefeller Jr., consulting engineer, New York.

"Steel for Arc Welding Electrodes," by R. Notvest, chief engineer,

welding division, J. D. Adams Co., Indianapolis.

"Manufacture of Enduro Stainless Steel," a sound motion picture by Republic Steel Corp., Cleveland.

Wednesday, Oct. 21

9:30 A. M.—HOTEL CLEVELAND
Research

"Research as Applied to Manufacturing," by C. W. Meyers, development engineer; American Steel & Wire Co., Cleveland.

"Development and Standardization of Types of Military Equipment," by Capt. Frank W. Bullock, signal corps, United States army.

"Signal Communications Within the Infantry Regiment," a sound motion picture.

2:00 P. M.—HOTEL CLEVELAND
Cold Working of Metal

"Plastic Deformation in Wire Drawing," by B. L. McCarthy, metallurgist, Wickwire Spencer Steel Co., Buffalo.

7:00 P. M.—MAYFAIR CASINO

Informal dinner of wire association. Ralph K. Clifford, general superintendent, Continental Steel Corp., Kokomo, Ind., and president of the association, toastmaster. Award of the Wire association medal.

Thursday, Oct. 22

9:30 A. M.—HOTEL CLEVELAND
Testing Copper Wire—Power Cable—Power Requirements for Drawing Copper

"Endurance Tests on Electrolytic Tough Pitch and Oxygen-Free Copper Wire," by J. N. Kenyon, testing engineer, instructor of civil engineering, Columbia university, New York.

"Vacuum Lead Sheath as Applied to Power Cable," by R. W. Atkinson, research laboratory, General Cable Corp., Perth Amboy, N. J.

"Power for Cascade Drawing of Copper," by Paul M. Mueller, mechanical engineer, Rome division, Revere Copper & Brass Inc., Rome, N. Y.

"Tactical Employment of the Anti-Aircraft Artillery Regiment," a sound motion picture.

2:00 P. M.—HOTEL CLEVELAND
Dies and Tools

"Tungsten Carbide and Its Applications to Dies and Tools," by A. R. Zapp, manager, Firthalloy division, Firth-Sterling Steel Co., McKeesport, Pa.

"A Method of Handling Tungsten Carbide Dies Within the Die Room," by K. R. Beardslee, general sales manager, Carboly Co. Inc., Detroit.

Two Divisions of A. I. M. E. To Convene

(Concluded from Page 173)

Fe-Si," by E. R. Jette and E. S. Greiner.

6:30 P. M.—STATLER HOTEL

**Institute of Metals and Iron
and Steel Divisions**

Annual dinner. Speaker: Albert Sauveur, Gordon McKay professor of metallurgy, Harvard university, Cambridge, Mass. Subject: "Metallurgical Reminiscences."

Thursday, Oct. 22

9:30 A. M.—STATLER HOTEL.

**Iron and Steel and Institute of
Metals Divisions**

*Roundtable Discussion of Physical
Tests and Their Significance
Tensile Testing*

"Stress-Strain Relations," by C. H. Gibbons.

"Yield-Tensile Ratio," by R. L. Templin, Jonathan Jones and Rudolph Bernhard.

"Poisson's Ratio," by Robert W. Vose.

"Fatigue," by H. F. Moore.

12:15 P. M.—STATLER HOTEL

Iron and Steel Division

Luncheon meeting of executive committee.

2:00 P. M.—STATLER HOTEL

**Institute of Metals and Iron
and Steel Divisions**

*Roundtable Discussion of Physical
Tests and Their Significance
(Continued)*

Impact Testing

"Transverse Notched Bar Test," by S. L. Hoyt.

"Tension Impact," by H. C. Mann.

Bend Testing

"General Discussion of Bend Tests," by J. R. Townsend.

"Bend Testing as Applied to Welds," by Wilber B. Miller.



E. H. DIX JR.

Chairman, Institute of Metals Division, American Institute of Mining and Metallurgical Engineers. He is metallurgist, Aluminum Research Laboratories, Aluminum Co. of America, New Kensington, Pa.

Exhibitors and Products

In Eighteenth Annual

National Metal Show

Public Auditorium, Cleveland, Oct. 19-23

Exposition Hours

Monday 12:00 m. to 10:00 p.m.
 Tuesday 12:00 m. to 10:00 p.m.

Wednesday 12:00 m. to 10:00 p.m.
 Thursday 12:00 m. to 6:00 p.m.
 Friday 12:00 m. to 10:00 p.m.

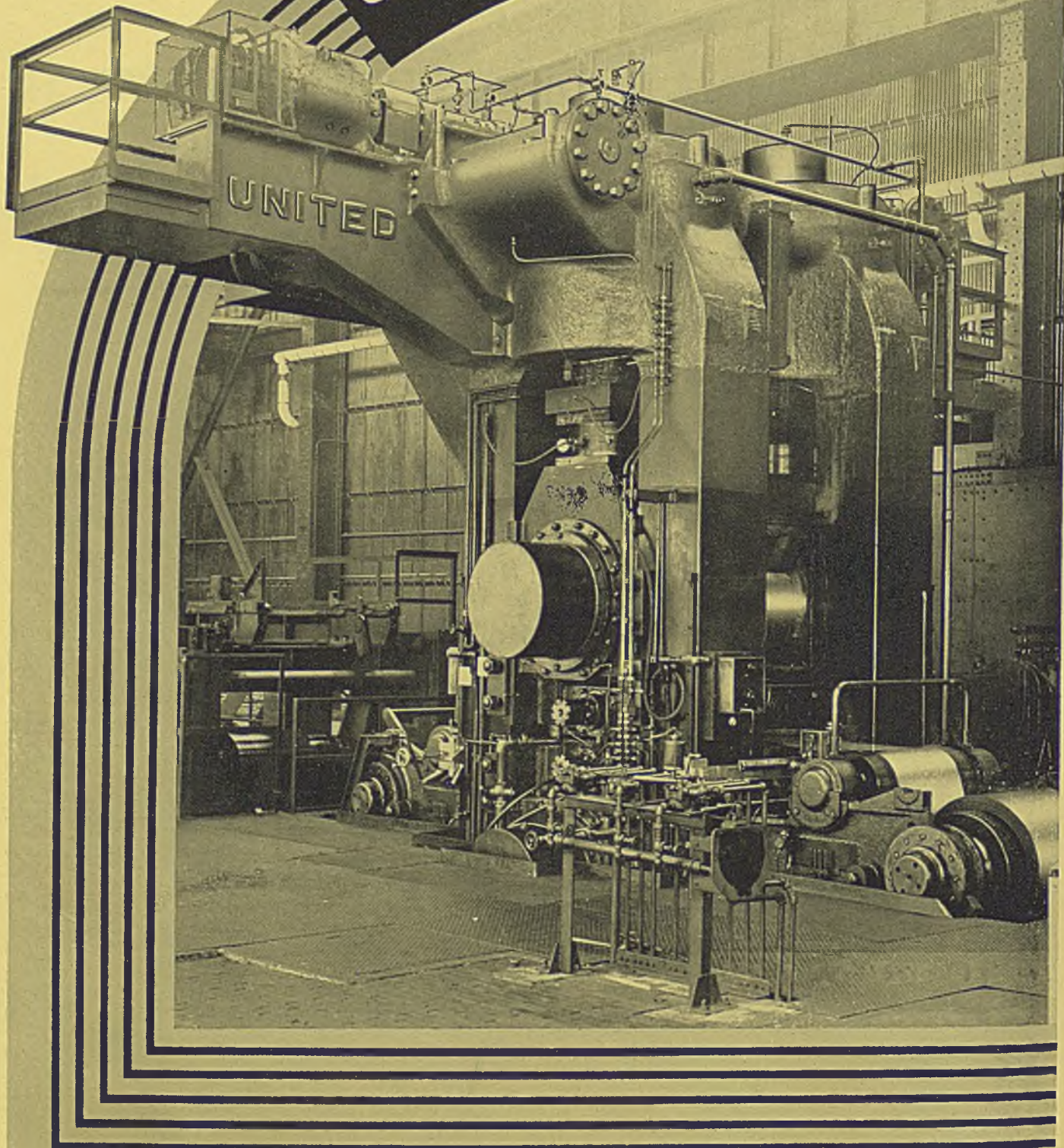
A

	<i>Space No.</i>
<i>ABRASIVE INDUSTRY</i> —Cleveland Publications and technical books.	Q-4
Acme Steel Co. , Chicago Colored cold-rolled strip steel.	M-9
Actna Gases Inc. , Detroit Gases.	N-46
Air Reduction Sales Co. , New York Welding and cutting apparatus; brazing and hard facing apparatus; oxygen and acetylene.	G-7
Ajax Electric Co. Inc. , Philadelphia Electric heat treating furnaces.	B-4
Ajax Electrothermic Corp. , Trenton, N. J. Electric induction heat treating equipment and melting furnaces.	A-3
Allegheny Steel Co. , Brackenridge, Pa. Stainless and heat-resisting steels.	C-22
Edgar Allen Steel Co. Inc. Tool steels; die steels.	D-22
Alox Corp. , Buffalo Rust preventatives.	N-6
Aluminum Co. of America , Pittsburgh Aluminum alloys.	I-23
American Brass Co. , Waterbury, Conn. Copper, brass and bronze; welding rods.	C-21
American Bridge Co. , Pittsburgh Steel building and bridge construction.	C-15
American Car & Foundry Co. , New York Electric bar, forging and rivet heaters.	E-32
American Crucible Co. , Shelton, Conn. Crucibles; retorts; graphite products.	O-15

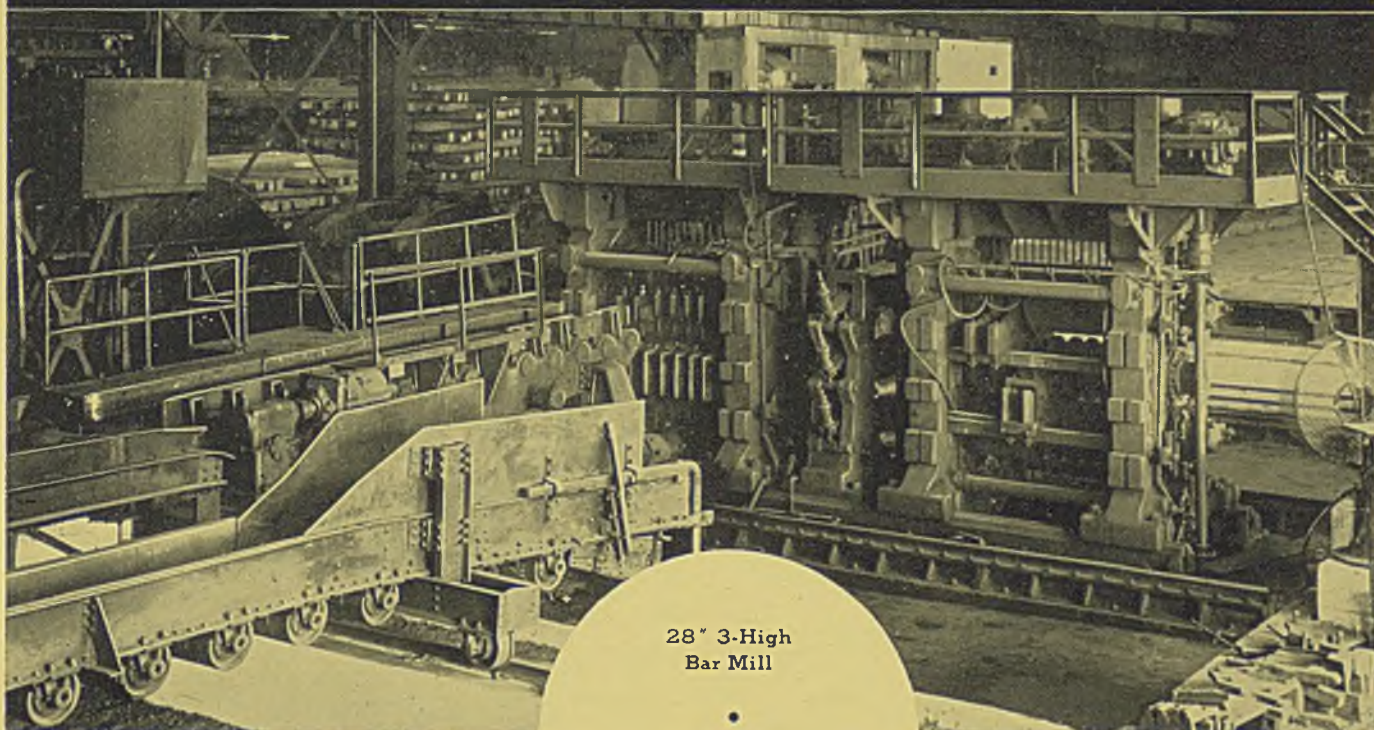
American Cyanamid & Chemical Corp. , New York Case hardening compounds; electroplating chemicals.	N-47
American Electric Furnace Co. , Boston Electric and gas heat treating furnaces.	I-4
American Foundry Equipment Co. , Mishawaka, Ind. Airless abrasive cleaning and descaling equipment.	M-48
American Gas Association , New York Industrial gas equipment.	Gas Section
American Gas Furnace Co. , Elizabeth, N. J. Gas heat treating furnaces; burners and accessories.	Gas Section
American Institute of Mining and Metallurgical Engineers , New York Educational exhibit.	P-19
American Machine & Foundry Co. , New York Machinery; cast products.	M-47
American Machine & Metals Mfg. Co. , New York Hardness testing machines.	B-19
American Rolling Mill Co. , Middletown, O. Stainless steel; enameling iron; sheets and strip.	L-59
American Sheet & Tin Plate Co. , Pittsburgh Carbon, alloy and stainless sheet steels.	C-15
American Society for Metals , Cleveland Educational exhibit.	P-7
American Steel & Wire Co. , Chicago Carbon, alloy and stainless steel wire, bars and strip; welding wire.	C-15
American Welding Society , New York Educational exhibit.	N-60
Ampeco Metal Inc. , Milwaukee High-strength nonferrous alloys.	A-19

(Please turn to Page 182)

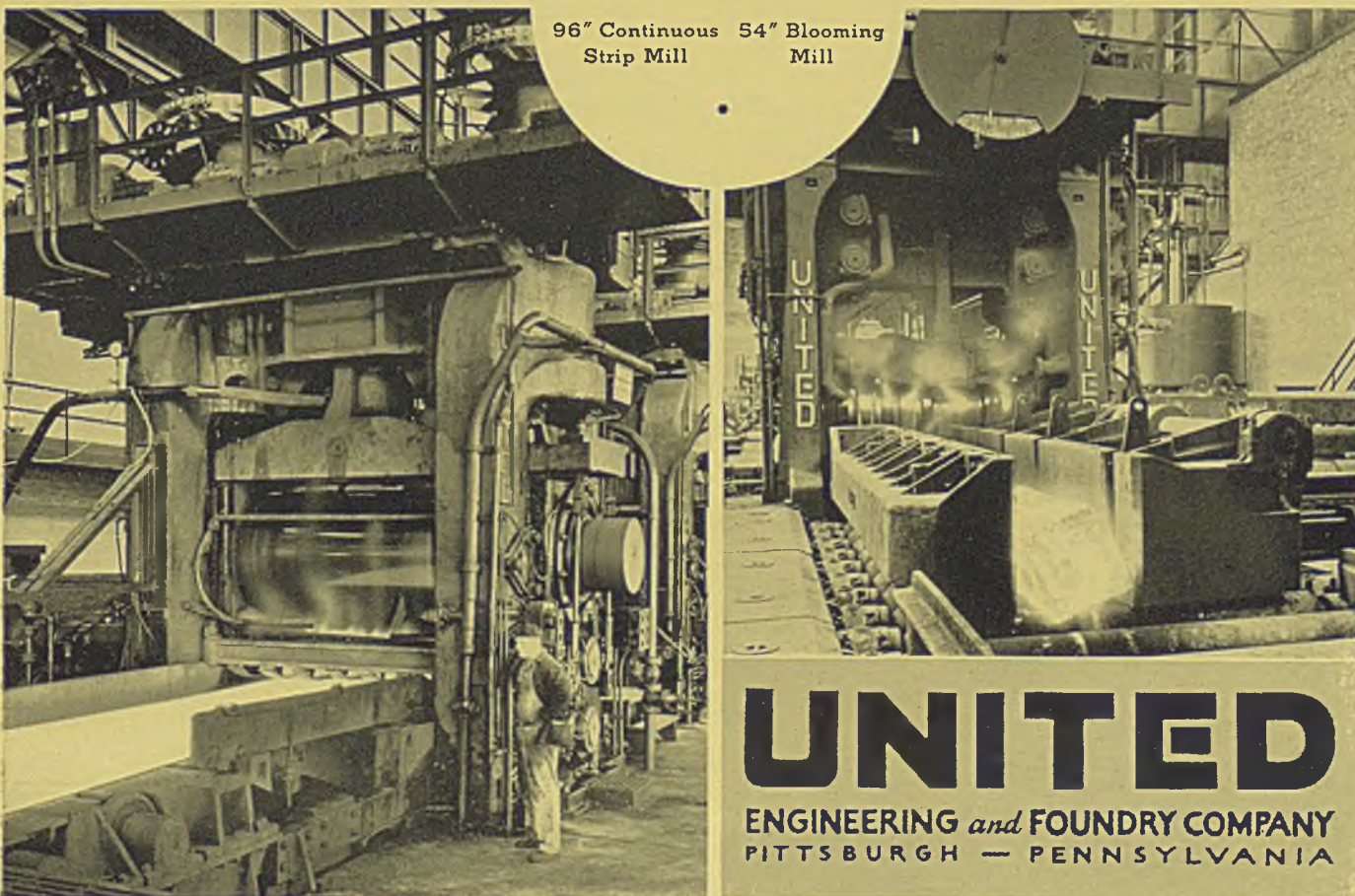
UNITED BUILDER



OF SUCCESSFUL PLANTS



28" 3-High
Bar Mill



96" Continuous Strip Mill 54" Blooming Mill

UNITED

ENGINEERING *and* FOUNDRY COMPANY
PITTSBURGH — PENNSYLVANIA

Exhibitors in National Metal Show (continued from page 179)

- Anderson & Sons, Springfield, MassN-51
Etched and lithographed metal products.
- Armstrong Blum Mfg. Co., ChicagoP-28
Metal sawing machines; hacksaws; tapping machines.
- Armstrong Cork Products Co., Lancaster, Pa.....L-11
Insulating materials.
- Automatic Temperature Control Co. Inc., Philadel-
phiaL-9
Temperature control equipment; control valves.

B

- Babcock & Wilcox Co., New YorkN-18
Refractories.
- Baldwin-Southwark Corp., PhiladelphiaP-15
Testing machines.
- Bartlett Hayward Co., BaltimoreN-2
Bronze products.
- Bastian-Blessing Co., ChicagoL-19
Oxyacetylene welding and cutting apparatus.
- Bausch & Lomb Optical Co., RochesterD-23
Optical instruments for metallography and spectro-
graphy.
- Bell & Gossett Co., ChicagoG-23
Case hardening compounds; heat treating supplies.
- Bethlehem Steel Co., Bethlehem, Pa.F-15
Carbon, alloy and corrosion-resisting steels.
- G. S. Blakeslee & Co., Cicero, Ill.L-51
Metal cleaning and degreasing equipment.
- Bliss & Laughlin Inc., Harvey, Ill.F-20
Cold-finished bar steels.
- Botfield Refractories Co., PhiladelphiaN-49
Refractories.
- Bristol Co., Waterbury, Conn.L-15
Pyrometers; temperature control equipment.
- Brown Instrument Co., PhiladelphiaN-22
Pyrometers; automatic control equipment.
- Adolph I. Buehler, ChicagoN-10
Metallographic equipment.
- Bullard Co., Bridgeport, Conn.M-54
Electrochemical metal descaling process.
- Burdett Mfg. Co., ChicagoGas Section
Gas burners; heating equipment.

C

- Calorizing Co., PittsburghL-18
Heat-resisting alloys and equipment.
- Carboly Co. Inc., DetroitA-20
Cemented carbide tools and dies.
- Carborundum Co., Niagara Falls, N. Y.O-36, O-38
Abrasives; grinding and cutting wheels; refractories;
nonmetallic electric heating elements.
- Carnegie-Illinois Steel Corp., PittsburghC-15
Carbon, alloy, high-tensile and stainless steels.
- Case Hardening Service Co., Cleveland.....G-23
Carburizing compounds; heat treating materials.
- Chapman Valve Mfg. Co., Indian Orchard, Mass....O-18
Surface hardening equipment; steel valves.
- Chemical Rubber Co., ClevelandM-51
Laboratory equipment.
- Climax Molybdenum Co., New YorkF-3
Molybdenum alloy steels and irons.
- Colmonoy Co., Los Nietos, Calif.N-46
Hard facing materials; cutting tools.
- Columbia Steel Co., San FranciscoC-15
Carbon, alloy, high-tensile and stainless steels.
- Columbia Tool Steel Co., Chicago Heights, Ill.....H-32
High speed and tool steels.
- Continental Industrial Engineers Inc., Chicago...
.....Gas Section
Heat treating systems.

- Continental Machine Specialties Inc., Minneapolis..P-11
Precision filing and sawing equipment.
- Crown Rheostat & Supply Co., Chicago.....L-46
Plating and polishing equipment.
- Cyclone Fence Co., Waukegan, Ill.C-15
Steel fence; wire products.

D

- DAILY METAL TRADE—ClevelandQ-4
Publications and technical books.
- Dayton Rogers Mfg. Co., Minneapolis, Minn.....E-3
Metal stampings.
- A. P. De Sanno & Son, PhiladelphiaL-5
Grinding wheels; cut-off machines.
- Despatch Oven Co., MinneapolisGas Section
Gas heat treating furnaces.
- Detroit Testing Machine Co., DetroitN-54
Physical testing apparatus.
- DeWalt Products Corp., Lancaster, Pa.L-53
Metal cutting machines.
- Joseph Dixon Crucible Co., Jersey City, N. J.I-24
Stoppers; nozzles; sleeves.
- Dow Chemical Co., Midland, Mich.C-27
Magnesium alloys.
- Driver-Harris Co., Harrison, N. J.G-21
Heat and corrosion-resisting alloys.
- E. I. du Pont de Nemours & Co.C-32
Heat treating salts; plating chemicals; metal cleaners.

E

- Eclipse Fuel Engineering Co., Rockford, Ill.. Gas Section
Gas heat treating equipment.
- Electric Furnace Co., Salem, O.L-21
Heat treating furnaces.
- Electro Alloys Co., Elyria, O.M-6
Heat and corrosion-resisting alloys.
- Electro Metallurgical Co., New York.....O-30
Alloying elements for iron and steel.
- Elevator Supplies Co. Inc., Hoboken, N. J.O-9
Wire drawing machines.
- Ensign-Reynolds Inc., New YorkGas Section
Gas burning equipment; melting furnaces.

F

- Firth-Sterling Steel Co., McKeesport, Pa.D-32
Cemented carbide tools and dies; stainless steels;
alloy steels.
- J. B. Ford Sales Co., Wyandotte, Mich.H-22
Metal cleaners; burnishing compounds.
- THE FOUNDRY—ClevelandQ-4
Publications and technical books.
- Cyril A. Fox, PittsburghH-2
Abrasive cut-off machines.
- Foxboro Co., Foxboro, Mass.L-1
Measuring and control instruments.
- Fulton Foundry & Machine Co. Inc., Cleveland....O-33
High-strength gray iron.

G

- Gas Machinery Co., ClevelandGas Section
Gas forge furnaces.
- Gas Products Co., ClevelandM-44
Acetylene; oxygen; gases.
- Gathmann Engineering Co., Baltimore.....C-6
Ingot molds.
- General Alloys Co., BostonP-8
Heat and corrosion-resisting alloys.
- General Electric Co., Schenectady, N. Y.....E-23
Electric furnaces; electric welding machines.
(Please turn to Page 185)

Exhibitors in National Metal Show (continued from page 182)

General Electric X-Ray Corp., Chicago.....E-21
X-ray inspection equipment.

Gogan Machine Co., ClevelandN-9
Hardness testing machines.

Claud S. Gordon Co., ChicagoB-18
Pyrometers and accessories.

Grasselli Chemical Co. Inc., Cleveland.....E-33
Pickling inhibitors; fluxes; acids; plating chemicals.

Great Lakes Steel Corp., DetroitP-16
Sheet and strip steel; alloy steels.

Grob Bros., West Allis, Wis.E-2
Die making equipment; saws; filing machines; brazing devices.

H

Hamilton Steel Co., ClevelandP-23
Carbon and alloy steels; tool steels.

Handy & Harman, New YorkD-27
Brazing alloys; silver solders.

Hardinge Bros. Inc., Elmira, N. Y.L-14
Lathes; screw machines; milling machines.

Harnischfeger Corp., MilwaukeeL-54
Electric arc welders; motors; hoists.

Hauck Mfg. Co., Brooklyn, N. Y.N-5
Oil and gas burners; regulating valves.

C. I. Hayes Inc., Providence, R. I.G-15
Electric heat treating furnaces.

Haynes Stellite Co., Kokomo, Ind.O-30
Cutting tools; corrosion-resistant castings.

Hevi Duty Electric Co., MilwaukeeG-25
Electric heat treating furnaces.

Hobart Bros., Troy, O.B-15
Electric arc welding equipment.

A. F. Holden Co., New Haven, Conn.....M-18
Heat treating baths.

Hollup Corp., ChicagoA-15
Electric arc welders; electrodes.

Charles A. Hones Inc., Baldwin, N. Y.Gas Section
Gas furnaces; gas burners.

Hoskins Mfg. Co., DetroitM-59
Heating element alloys.

E. F. Houghton & Co., PhiladelphiaI-3
Carburizing compounds; heat treating salts; industrial lubricants; cutting oils; leather belting and packing.

I

Illinois Testing Laboratories Inc., ChicagoN-26
Pyrometers; thermometers; meters.

Ingersoll-Rand Co., Phillipsburg, Pa.N-45
Blowers and compressors.

International Nickel Co. Inc., New York.....B-7
Nickel and nickel alloys.

J

C. O. Jelliff Mfg. Co., Southport, Conn.....N-11
Resistance wire; heat-resisting alloys.

Johns-Manville, New YorkN-38
Insulating and refractory materials.

Jones & Laughlin Steel Corp., PittsburghE-15
Hot and cold rolled steels; tin plate.

K

J. W. Kelley Co., ClevelandH-16
Heat treating products; industrial oils.

Kelly-Koett Mfg. Co., Covington, Ky.A-18
Industrial X-ray equipment.

C. M. Kemp Mfg. Co., BaltimoreGas Section
Gas premixers; gas producers.

G. N. Krouse, New Kensington, Pa.Q-20
Fatigue testing machines.

L

Lakeside Steel Improvement Co., ClevelandO-22
Heat treated products.

La Salle Steel Co., ChicagoN-50
Steels.

Leeds & Northrup Co., PhiladelphiaI-15
Heat treating furnaces; pyrometers; control instruments.

E. Leitz Inc., New YorkH-14
Photomicrographic apparatus.

Lewis Machine Co., ClevelandL-10
Wire drawing machines.

Lincoln Electric Co., ClevelandF-23
Electric arc welders; electrodes; welding supplies.

Lindberg Engineering Co., Chicago.....L-33
Gas and electric heat treating furnaces; control equipment.

Linde Air Products Co., New YorkO-30
Acetylene welding and cutting apparatus; oxygen and acetylene.

M

MACHINE DESIGN—ClevelandQ-4
Publications and technical books.

Macklin Co., Jackson, Mich.C-26
Grinding wheels; cut-off machines.

Magnaflux Corp., ChicagoN-15
Magnetic inspection method and equipment.

Magnetic Analysis Corp., Long Island City, N. Y....D-4
Magnetic analysis and inspection equipment.

Mahr Mfg. Co., MinneapolisN-44
Oil and gas furnaces; burners.

P. R. Mallory & Co. Inc., Indianapolis.....H-26
Welding electrode alloys.

Manhattan Rubber Mfg. Division, Raybestos-Manhattan Inc., Passaic, N. J.H-2
Abrasive cut-off wheels; finishing wheels.

John A. Manning Paper Co. Inc., Troy, N. Y.M-1
Rope papers; insulation; specialty papers.

Marburg Bros. Inc., New YorkL-50
Cutting tools; gages; pneumatic hammers.

Metal & Thermit Corp., New York.....H-27
Welding electrodes; thermit welding materials.

Metals Coating Co. of America, Philadelphia.....O-45
Metal spraying equipment.

Michiana Products Corp., Michigan City, Ind.N-14
Heat and corrosion-resistant alloy castings.

Michigan Steel Casting Co., DetroitI-14
Heat and corrosion-resistant castings.

Midvale Co., PhiladelphiaB-14
Carbon and alloy steels.

A. Milne & Co., New YorkD-22
Tool and die steels.

Minneapolis-Honeywell Regulator Co., Minneapolis N-22
Pyrometers; automatic control equipment.

Molybdenum Corp. of America, PittsburghO-24
Molybdenum and tungsten alloys.

Monarch Steel Corp., Indianapolis.....M-55
Cold-drawn steels; shafting.

Morse Magneto Clock Co., New YorkO-47
Time clocks.

Mullite Refractories Co., Shelton, Conn.O-15
Refractories.

N

National Cylinder Gas Co., ChicagoM-44
Oxyacetylene cutting machines.

National Tube Co., PittsburghC-15
Pipe and tubing.

New Jersey Zinc Co., New YorkD-21
Zinc alloys; die castings.

Exhibitors in National Metal Show

- Nickel & Chromium Products Co., New York**L-23
Electroplating equipment.
- North American Mfg. Co., Cleveland**M-45
and Gas Section
Gas burners; control equipment.
- Norton Co., Worcester Mass.**Q-12, Q-16
Grinding wheels; abrasives; refractories.

O

- Ohio Crankshaft Co., Cleveland**.....A-5, A-9, B-4
Electric induction hardened crankshafts.
- Tinius Olsen Testing Machine Co., Philadelphia**....B-8
Testing machines; testing equipment.
- Oster Mfg. Co., Cleveland**D-2
Pipe welder; pipe cutting torch; pipe and bolt thread-
ing machines.

P

- Page Steel & Wire Division, American Chain Co.,
Inc., Bridgeport, Conn.**C-23
Wire; welding wire.
- Pangborn Corp., Hagerstown, Md.**P-27
Blast cleaning and dust collecting equipment.
- Park Chemical Co., Detroit**M-11
Heat treating materials; buffing and polishing ma-
terials.
- Parker-Kalon Corp., New York**I-26
Screws and fastening devices; measuring instruments;
gage blocks.
- Partlow Corp., New Hartford, N. Y.**Gas Section
Temperature controls; gas valves; safety pilots.
- Henry Pels & Co., New York**Q-24
Cutting and fabricating machines.
- Philadelphia Drying Machinery Co., Philadelphia**..M-46
Heating furnaces; gas and oil burners.
- Pittsburgh Instrument & Machine Co., Pittsburgh**..G-34
Hardness testing machines.
- Production Machine Co., Greenfield, Mass.**.....Q-23
Polishing, finishing and buffing machines.
- Pyrometer Service & Supply Corp., Cleveland**B-18
Pyrometers and accessories.

Q

- Quigley Co. Inc., New York**L-37
Refractories.

R

- Republic Steel Corp., Cleveland**E-6
Alloy and stainless steels; sheets; bolts and nuts;
pig iron.
- John A. Roebling's Sons Co., Trenton, N. J.**.....O-12
Wire; wire rope.
- Rustless Iron & Steel Corp., Baltimore**L-43
Stainless steels.
- Joseph T. Ryerson & Son Inc., Chicago**.....I-22
Steel and allied products.

S

- Safety Gas Lighter Co., Lynn, Mass.**I-33
Gas lighters.
- Salem Engineering Co., Salem, O.**M-10
Heat treating furnaces.
- George Scherr Co. Inc., New York**D-26
Optical instruments; testing machines.
- Scully Steel Products Co., Chicago**C-15
Steels.
- Selas Co., Philadelphia**Gas Section
Gas premixers; burners; soldering systems.
- Sentry Co., Foxboro, Mass.**O-25
Hardening furnaces; high-temperature tube furnaces.
- Spencer Turbine Co., Hartford, Conn.**N-24

Turbocompressors; vacuum cleaners.

- STEEL, Cleveland**Q-4
Publications and technical books.
- Steel City Testing Laboratory, Detroit**M-5
Testing machines.
- Stoody Co., Whittier, Calif.**N-8
Hard facing materials; cutting tools.
- D. A. Stuart & Co., Chicago**L-25
Industrial oils and greases.
- Surface Combustion Corp., Toledo, O.**Gas Section
Heat treating furnaces; burners; accessories.
- Synero Machine Co., Newark, N. J.**N-1
Wire machinery.

T

- C. J. Tagliabue Mfg. Co., Brooklyn, N. Y.**M-15
Pyrometers; thermometers.
- Tennessee Coal, Iron & Railroad Co., Birmingham,
Ala.**C-15
Steels; bars; shapes.
- Timken Steel & Tube Co., Canton, O.**F-33
Alloy steels; tubing.
- Titanium Alloy Mfg. Co., Niagara Falls, N. Y.**.....M-50
Titanium alloys and compounds.

U

- Una Welding Inc., Cleveland**H-23
Arc welding machines.
- Union Carbide Co., New York**O-30
Welding and cutting equipment; ferroalloys; heat
and corrosion-resisting alloys.
- United States Steel Corp., Pittsburgh**.....C-15
Alloy steels; high-tensile and stainless steels.
- Universal-Cyclops Steel Corp., Bridgeville, Pa.**G-32
Tool steels; stainless steels; specialty steels.

V

- Vanadium-Alloys Steel Co., Latrobe, Pa.**Q-28
Cemented carbide tools and dies; tool steels.
- Vanadium Corp. of America, New York**G-2
Vanadium alloys and compounds.
- Victor Saw Works Inc., Middletown, N. Y.**F-2
Hacksaw blades; hacksaw machines.

W

- Weldit Acetylene Co., Detroit**M-16
Acetylene welding equipment.
- Wells Mfg. Corp., Three Rivers, Mich.**I-2
Metal cutting bandsaws.
- Wheelco Instruments Co., Chicago**I-32
Temperature control instruments.
- Wheelock, Lovejoy & Co. Inc., Cambridge, Mass.**..H-21
Alloy steels; tool steels; machinery steels.
- Williams & Co. Inc., Cleveland**.....O-39
Nonferrous alloys; welding electrodes.
- Wilson Mechanical Instrument Co. Inc., New York**..C-25
Hardness testing machines.
- Wilson Welder & Metals Inc., North Bergen, N. J.**...G-7
Electric welding machines.
- Wire Association, New York**.....N-3
Educational exhibit.

Y

- Youngstown Sheet & Tube Co., Youngstown, O.**....E-24
Alloy steels; sheets; bars; tubing.

Z

- Carl Zeiss Inc., New York**C-33
Microscopes and accessories.

Automotive Requirements Major Factor Again

Steelmaking Rate

Increases to 75

Under Strong Demand

STEADILY increasing automotive requirements have taken the spotlight again and augmented the steel industry's activity in many lines, resulting in an increase of ½-point in operations last week, bringing the national rate to 75 per cent, compared to 52 one year ago.

Sixteen automobile manufacturers are now turning out 1937 models, compared with only six two weeks ago. However, the nation's two largest manufacturers, Ford and Chevrolet, are just getting under way. The main assembly lines at the Chevrolet plant in Flint, Mich., already have been started, to stock 10,000 dealers before the Nov. 7 showing. At Ford, production of 1937 cars is expected to begin this week.

Total automobile production last week was estimated at 39,945 units, an increase of 17,145 compared to the preceding week.

Sheet mills, with deliveries far extended and no letup in demand, apparently will have all the tonnage they can handle during the balance of the year. Consumers have begun showing concern over their supplies. In the Chicago district some producers are reported unable to promise delivery during this quarter on new orders for hot-rolled annealed material.

Price Increase Considered

PIG iron producers are considering a price increase, and although no announcement has been made it is said by some interests that the increase is possible before the end of the year.

Pig iron deliveries are running ahead of September at present. Many consumers apparently are covered for the rest of the year. Production of automotive castings is on the increase again.

In tin plate, one leading canmaker has started to issue 1937 specifications, which would enable mills to begin rolling plate for shipment late this year.

Machine tool sales are recovering from the August lull and activity in other equipment markets has been better the last week or two.

Bar deliveries now range from four to six weeks. A new quantity bracket, for 300,000-pound lots and over has been established affecting cold-finished steel bars, giving the buyer 15 cents off for the large size order, compared with 12½ cents as the former maximum deduction, this being for 100,000-pound lots and

MARKET IN TABLOID

DEMAND *Strong.*
Sheet consumption particularly heavy.

PRICES *Steady.*

PRODUCTION . . . *National rate up ½ point.*

SHIPMENTS . . . *Heavy.*

over. Size extras on the smaller rounds of cold-drawn bars have been reduced.

Wiremakers are reported considering adopting quantity differentials for manufacturing wire with 1000 to 40,000-pound lots as base, making deductions for larger lots and extras for lots smaller than 1000 pounds.

Barge and Ship Work Active

TWENTY-FIVE coal barges of 850-ton capacity have been ordered by Carnegie-Illinois Steel Co. Plans for three passenger and cargo boats, each requiring 4000 tons of hull steel, for the Panama Railway Steamship Co. are nearing completion.

Consumption of scrap continues heavy, and prices are steady. STEEL's scrap index is at \$16.54 for the fourth consecutive week. The iron and steel composite is down 2 cents to \$34.60 on a minor readjustment, and the finished index is unchanged at \$53.90.

The principal rail award last week was the placing of 27,000 tons with accessories by the Louisville & Nashville. Pending locomotive orders include 50 for the New York Central and two for the Sante Fe. September car awards, 1750, brought the nine months' total to 37,433, compared to 7908 in the same period last year.

Shape awards held about even last week, while reinforcing bar awards totaled 6722 tons compared to 3258 in the preceding week. Steel pipe placed included 1225 tons of 24 and 40-inch for the Los Angeles water department.

Operations in the Pittsburgh district increased 2 points to 77 per cent; Chicago 1 to 75; Buffalo 3 to 84, and Cincinnati 6 to 90. Wheeling district was down 3 points to 92; New England 18 to 70, and Colorado 25 to 38. Others were unchanged.

Nine months' production of steel ingots, 33,605,304 gross tons, was a gain of 39.7 per cent compared to the same period last year, and puts 1936 output ahead of the 33,417,985-ton total for the entire year 1935.

COMPOSITE MARKET AVERAGES

	Oct. 10	Oct. 3	Sept. 26	One Month Ago Sept., 1936	Three Months Ago July, 1936	One Year Ago Oct., 1935	Five Years Ago Oct., 1931
Iron and Steel	\$34.60	\$34.62	\$34.19	\$34.15	\$33.49	\$32.84	\$30.30
Finished Steel	53.90	53.90	53.00	53.10	53.40	53.70	48.22
Steelworks Scrap..	16.54	16.54	16.54	16.18	12.89	12.72	8.50

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

	Oct. 10, 1936	Sept. 1936	July 1936	Oct. 1935		Oct. 10, 1936	Sept. 1936	July 1936	Oct. 1935
Finished Material					Pig Iron				
Steel bars, Pittsburgh	2.05c	1.95c	1.95c	1.85c	Bessemer, del. Pittsburgh	\$20.8132	20.8132	20.8132	19.81
Steel bars, Chicago	2.10	2.00	2.00	1.90	Basic, Valley	19.00	19.00	19.00	18.00
Steel bars, Philadelphia	2.36	2.26	2.26	2.16	Basic, eastern del. East. Pa.	20.8132	20.8132	20.8132	19.81
Iron bars, Terre Haute, Ind.	1.95	1.85	1.85	1.75	No. 2 fdy., del. Pittsburgh	20.3132	20.3132	20.3132	19.31
Shapes, Pittsburgh	1.90	1.90	1.90	1.80	No. 2 fry., Chicago	19.50	19.50	19.50	18.75
Shapes, Philadelphia	2.11½	2.11½	2.11½	2.01½	Southern No. 2, Birmingham	15.50	15.50	15.50	14.50
Shapes, Chicago	1.95	1.95	1.95	1.85	Southern No. 2, del. Cincinnati ..	19.44	19.44	20.2007	19.38
Tank plates, Pittsburgh	1.90	1.90	1.90	1.80	No. 1 2X eastern, del. Phila.	21.6882	21.6882	21.6882	20.68
Tank plates, Philadelphia	2.09	2.09	2.09	1.99	Malleable, Valley	19.50	19.50	19.50	18.50
Tank plates, Chicago	1.95	1.95	1.95	1.85	Malleable, Chicago	19.50	19.50	19.50	18.75
Sheets, No. 10, hot rolled, Pitts. .	1.95	1.95	1.95	1.85	Lake Sup., charcoal, del. Chicago .	25.7528	25.2528	25.2528	24.90
Sheets, No. 24, hot ann., Pitts. . .	2.60	2.50	2.50	2.40	Ferromanganese, del. Pitts.	80.13	80.13	80.13	90.13
Sheets, No. 24, galv., Pitts.	3.20	3.20	3.20	3.10	Gray forge, del. Pittsburgh	19.6741	19.6741	19.6741	18.67
Sheets, No. 10, hot rolled, Gary . .	2.05	2.05	2.05	1.95	Scrap				
Sheets, No. 24, hot anneal., Gary .	2.70	2.60	2.60	2.50	Heavy melting steel, Pittsburgh .	\$18.25	17.75	14.15	13.65
Sheets, No. 24, galvan., Gary	3.30	3.30	3.30	3.20	Heavy melt. steel, No. 2, east. Pa. .	14.25	14.00	11.50	11.00
Plain wire, Pittsburgh	2.50	2.40	2.40	2.30	Heavy melting steel, Chicago	16.25	16.15	13.25	12.50
Tin plate, per base box, Pitts.	5.25	5.25	5.25	5.25	Rail for rolling, Chicago	16.75	16.75	14.00	14.00
Wire nails, Pittsburgh	2.05	1.95	2.10	2.40	Railroad steel specialties, Chicago .	17.75	17.65	14.75	13.50
Semifinished Material					Coke				
Sheet bars, open-hearth, Youngs. .	\$32.00	30.00	30.00	28.00	Connellsville, furnace, ovens.	\$4.00	3.90	3.45	3.55
Sheet bars, open-hearth, Pitts. . .	32.00	30.00	30.00	28.00	Connellsville, foundry, ovens.	4.25	4.25	4.25	4.35
Billets, open-hearth, Pittsburgh . .	32.00	30.00	30.00	27.00	Chicago, by-product foundry, del. .	9.75	9.75	9.75	9.75
Wire rods, No. 5 to ½-inch, Pitts. .	40.00	38.00	38.00	38.00					

Steel, Iron, Raw Material, Fuel and Metals Prices

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

Sheet Steel	Tin Mill Black No. 28	Corrosion and Heat-Resistant Alloys	Structural Shapes
Prices Subject to Quantity Extras and Deductions (Except Galvanized)	Pittsburgh	Pittsburgh base, cents per lb.	Pittsburgh
Hot Rolled No. 10, 24-48 in.	Gary	Chrome-Nickel	Philadelphia, del. . .
Pittsburgh	St. Louis, delivered	No. 302 No. 304	New York, del.
Gary		Bars	Boston, delivered..
Chicago, delivered..	Cold Rolled No. 10	Plates	Bethlehem
Detroit, del.	Pittsburgh	Sheets	Chicago
New York, del.	Gary	Hot strip	Cleveland, del.
Philadelphia, del. .	Detroit, delivered..	Cold strip	Buffalo
Birmingham	Philadelphia, del. .		Gulf Ports
St. Louis, del.	New York, del.		Birmingham
Pacific ports, f.o.b. cars, dock	Pacific ports, f.o.b. cars, dock		Pacific ports, f.o.b. cars, dock
Hot Rolled Annealed No. 24	Cold Rolled No. 20	Straight Chromes	
Pittsburgh	Pittsburgh	No. No. No. No.	Bars
Gary	Gary	410 430 442 446	Soft Steel
Chicago, delivered..	Detroit, delivered..	Bars	(Base, 3 to 25 tons)
Detroit, delivered..	Philadelphia, del. .	Plates	Pittsburgh
New York, del.	New York, del.	Sheets	Chicago or Gary. . .
Philadelphia, del. .		Hot strip	Duluth
Birmingham	Enameling Sheets	Cold stp.	Birmingham
St. Louis, del.	Pittsburgh, No. 10.		Cleveland
Pacific ports, f.o.b. cars, dock	Pittsburgh, No. 20.		Buffalo
Galvanized No. 24	Gary, No. 10	Steel Plate	Detroit, delivered..
Pittsburgh	Gary, No. 20	Pittsburgh	Pacific ports, f.o.b. cars, dock
Gary		New York, del.	cars, dock
Chicago, delivered..	Tin and Terne Plate	Philadelphia, del. .	Philadelphia, del. . .
Philadelphia, del. .	Gary base, 10 cents higher.	Boston, delivered..	Boston, delivered..
New York, del.	Tin plate, coke base (box) Pittsburgh	Buffalo, delivered..	New York, del.
Birmingham	Do., waste-waste	Chicago or Gary . .	Pitts., forg. qual. . .
St. Louis, del.	Do., strips	Cleveland, del.	
Pacific ports, f.o.b. cars, dock	Long ternes, No. 24 unassorted, Pitts.	Birmingham	Rail Steel
	Do., Gary	Coatesville, base .	To Manufacturing Trade
		Sparrows Pt., base	Pittsburgh
		Pacific ports, f.o.b. cars, dock	Chicago or Gary. . .
		St. Louis, delivered	Moline, Ill.
			*Cleveland
			*Buffalo

Iron	
Terre Haute, Ind....	1.95c
Chicago	2.00c
Philadelphia	2.26c
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.	2.26c-2.36c
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.....	\$2.05
Cement coated nails.....	\$2.05
Galv. nails, 15 gage and finer	\$3.05
do. finer than 15 ga.....	\$4.55
(Per pound)	
Polished staples	2.75c
Galv. fence staples	3.00c
Barbed wire, galv.	2.55c
Annealed fence wire.....	2.80c
Galv. fence wire	3.15c
Woven wire fencing (base column, c. 1.)...	\$60.00
To Manufacturing Trade	
Plain wire, 6-9 ga.	2.50c
Anderson, Ind. (merchant products only) and Chicago up \$1; Duluth up \$2; Birmingham up \$3.	
Spring wire, Pitts. or Cleveland	3.15c
Do., Chicago up \$1, Worc. \$2.	

Cold-Finished Carbon Bars and Shafting

Base, Pitts., one size, shape, grade, shipment at one time to one destination	
10,000 to 19,999 lbs.	2.35c
20,000 to 59,999 lbs.	2.30c
60,000 to 99,999 lbs.	2.25c
100,000 to 299,999 lbs.	2.22½c
*300,000 lbs. and over.....	2.20c
Gary, Ind., Cleve., Chi., up 5c; Buffalo, up 10c; Detroit, up 15c; eastern Michigan, up 20c.	

Alloy Steel Bars (Hot)

(Base, 3 to 25 tons)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.55c
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
9200 spring flats	base
9200 spring rounds, squares	0.25

Piling

Pittsburgh	2.25c
Chicago, Buffalo	2.35c

Strip and Hoops

(Base, hot rolled, 25-1 ton)	
(Base, cold-rolled, 25-3 tons)	
Hot strip to 23½-in. Pittsburgh	1.95c
Chicago or Gary	2.05c
Birmingham base	2.10c
Detroit, del.	2.15c
Philadelphia, del.	2.26c
New York, del.	2.30c
Cooperage hoop, Pittsburgh	2.05c
Chicago	2.15c
Cold strip, 0.25 carbon and under, Pitts., Cleveland.	2.60c
Detroit, del.	2.81c
Worcester, Mass.	2.80c
Cleve- Worces- ter, Mass.	
Carbon	Pitts. 2.80c
0.26-0.50... ..	2.60c
0.51-0.75... ..	3.70c
0.76-1.00... ..	5.45c
Over 1.00... ..	7.50c

Rails, Track Material

(Gross Tons)

Standard rails, mill	\$36.37½
Relay rails, Pitts. 20-100 lbs.	25.50-28.00
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.	2.75c
Track bolts, base.	3.75c
Tie plates, base.	2.00c
Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up \$2; 16 and 20 lbs., up \$1; 12 lbs. up \$2; 8 and 10 lbs., up \$5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.	

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists:	
Carriage and Machine	
½ x 6 and smaller.	70-10 off
Do. larger,	70-5 off
Tire bolts	50 off
Plow Bolts	
All sizes	70-5 off
Stove Bolts	
In packages with nuts attached 75 off; in packages with nuts separate 75-5 off; in bulk 82½ off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.	
Step bolts	65 off
Elevator bolts	65 off
Nuts	
S. A. E. semifinished hex.: ½ to ¾-inch	60-20-15 off
Do., ½ to 1-inch. 60-20-15 off	
Do., over 1-inch. 60-20-15 off	
Hexagon Cap Screws	
Milled	80-10-10 off
Upset, 1-in., smaller	85 off
Square Head Set Screws	
Upset, 1-in., smaller	75 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c. 1., Pittsburgh, Cleveland	3.05c
Struc., c. 1., Chicago	3.15c
¾-in. and smaller, Pitts., Chi., Cleve.	70-5 off
Wrought washers, Pitts., Chi., Phila. to jobbers and large nut, bolt mfrs.	\$6.00 off

Cut Nails

Cut nails, Pitts.; (10% discount on size extras)	\$2.90
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Do. less carloads, 5 kegs or more, no discount on size extras... \$3.20
Do. under 5 kegs; no disc. on size extras... \$3.35

Pipe and Tubing

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

Welded Iron, Steel Pipe

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

Butt Weld Steel		
In.	Blk.	Galv.
¼ and ½	60	44 ½
¾	64 ½	55
1	67 ½	59
1-3	69 ½	61 ½
Iron		
¼	31 ½	15
½	36 ½	20 ½
1-1½	39 ½	25 ½
2	41 ½	26
Lap Weld Steel		
2	62	53 ½
2½-3	65	56 ½
3½-6	67	58 ½
7 and 8	66	56 ½
9 and 10	65 ½	56
Iron		
2	37	22 ½
2½-3½	38	25
4-8	40	28 ½
Line Pipe Steel		
¾, butt weld	56	
¾ and 1, butt weld....	59	
¾, butt weld	63 ½	
¾, butt weld	66 ½	
1 to 3, butt weld	68 ½	
2, lap weld	61	
2½ to 3, lap weld....	64	
3½ to 6, lap weld....	66	
7 and 8, lap weld....	65	
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.		

Boller Tubes			
C. L. Discounts, f.o.b. Pitts.			
Lap Weld Steel		Charcoal Iron	
2-2½	33	1 ¾	8
2½-2¾	40	2-2½	13
3	47	2½-2¾	16
3½-3¾	50	3	17
4	52	3¾-3¾	18
4½-5	42	4	20
		4	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 pts. under base.

Seamless Boller 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 being on lb. and 100 ft. basis.

Seamless Tubing

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

Cast Iron Water Pipe

Class B Pipe—Per Net Ton	
6-in. & over, Birm.	\$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. ftgts., Birm. base.	\$100.00

Semifinished Steel

Billets and Blooms	
4 x 4-inch base; gross ton	
Pitts., Chi., Cleve., Buffalo & Young.	\$32.00
Philadelphia	37.67
Duluth	34.00
Forging Billets	
6 x 6 to 9 x 9-in., base	
Pitts., Chi., Buff.	39.00
Forging, Duluth	41.00
Sheet Bars	
Pitts., Cleve., Young., Chi., Buff., Canton, Sparrows Pt.	32.00
Slabs	
*Pitts., Chi., Cleve., Young.	32.00
Wire Rods	
Pitts., Cleve., No. 5 to ½-inch incl.	40.00
Do., over ½ to ¾-inch incl.	42.00
Chicago up \$1; Worcester up \$2	
Skelp	
Pitts., Chi., Young., Buff., Coatesville, Sparrows Point.	1.80c

Coke

Price Per Net Ton	
Beehive Ovens	
Connellsville, fur.	\$3.75-4.00
Connellsville, fdy.	4.25-4.50
Connell. prem. fdy.	5.50
New River fdy.	6.00
Wise county fdy.	4.45-5.00
Wise county fur.	4.00-4.50
By-Product Foundry	
Newark, N. J., del.	10.20-10.65
Chi., ov., outside del.	9.00
Chicago, del.	9.75
New England, del.	11.50-12.00
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
Philade., del.	9.88

Coke By-Products

Spot gal. Producers' Plants Pure and 90% benzol.	16.00c
Toluol	30.00c
Solvent naphtha	30.00c
Industrial xylol	30.00c
Per lb. f.o.b. Frankford, Phenol (200 lb. drums).	15.50c
Do. (450 lbs.)	14.50c
Eastern Plants, per lb. Naphthalene flakes and balls, in bbls., to jobbers	7.25c
Per 100 lbs. Atlantic seaboard Sulphate of ammonia.	\$1.275
†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	19.00	20.50
Erle, 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	20.00
Jackson, O.	20.25	20.25	19.75	20.00
Neville Island, Pa.	19.50	19.50	19.00	20.00
Provo, Utah	17.50	17.50	17.00	18.00
Sharpsville, Pa.	19.50	19.50	19.00	20.00
Sparrows Point, Md.	20.50	20.50	20.00	21.50
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	21.08	19.96	21.08
Boston from Birmingham	20.62	20.62	20.50	21.08
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	23.43	23.43
Brooklyn, N. Y., from Bmghm.	22.55	22.55	22.55	22.55
Canton, O., from Cleveland	20.76	20.76	20.26	21.26
Chicago from Birmingham	19.72	19.72	19.60	20.00
Cincinnati from Hamilton, O.	19.82	20.58	20.08	20.08
Cincinnati from Birmingham	19.44	19.44	18.44	19.44
Cleveland from Birmingham	19.62	19.62	19.12	19.62
Indianapolis from Hamilton, O.	21.17	21.77	21.27	21.77
Mansfield, O., from Toledo, O.	21.26	21.26	20.76	21.76
Milwaukee from Chicago	20.57	20.57	20.27	21.07
Muskegon, Mich., from Chicago	22.60	22.60	22.10	23.10
Toledo or Detroit	21.61	21.61	21.61	21.61
Newark, N. J., from Birmingham	21.99	22.49	21.99	21.99
Newark, N. J., from Bethlehem	20.93	20.93	20.81	20.93
Philadelphia from Birmingham	21.31	21.81	20.81	21.31
Philadelphia from Swedeland, Pa.	21.31	21.81	20.81	21.31
Pittsburgh district from Neville Island	21.75	Neville base plus 67c, 81c and \$1.21 switching charges	21.75	21.75
Saginaw, Mich., from Detroit	20.00	20.00	19.50	20.00
St. Louis, northern	20.00	20.00	19.50	20.00

Delivered from Basing Points:	No. 2 Fdry.	Malle-able	Basic	Besse-mer
St. Louis from Birmingham	19.68	19.50	19.50	22.44
St. Paul from Duluth	21.94	21.94	21.94	22.44
Over 0.70 phos.				

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

Gray Forge	Charcoal
Valley furnace	19.00
Pitts. dist. fur.	19.00
Lake Superior fur.	\$22.50
Do., del. Chicago	25.75
Lylees, Tenn.	22.50

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

Bessemer Ferrosilicon†
Jackson county, O., base: Prices are the same as for silveries, plus \$1 a ton.
†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.
Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, \$1 per ton add. Each unit over 3%, add \$1 per ton.

Refractories

Per 1000 f.o.b. Works	
Fire Clay Brick	
Super Quality	
Pa., Mo., Ky.	\$55.00
First Quality	
Pa., Ill., Md., Mo., Ky.	\$45.00
Alabama, Georgia	\$38.00-45.00
Second Quality	
Pa., Ill., Ky., Md., Mo.	40.00
Georgia, Alabama	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
Ladle Brick (Dry Press)	
Pa., O., W. Va., Mo.	\$24.00
Do., wire cut	22.00
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 Baltimore bases (bags)	40.00
Domestic dead-burned gr. net ton f.o.b. Chewelah, Wash. (bulk)	22.00
Base Brick	
Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.	
Chrome brick	\$45.00
Chem. bonded chrome	45.00
Magnesite brick	65.00
Chem. bonded magnesite	55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	\$22.50
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	\$18.00
Do., for barge	\$19.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid	75.00
Do., Baltimore, base	75.00
Do., del. Pittsburgh	80.13
Splegeleisen, 19-20% dom. Palmerston, Pa., spot†	26.00
Do., New Orleans	26.00
Ferrosilicon, 50% freight allowed, c. l.	69.50
Do., less carload	77.00
Do., 75 per cent. 126-130.00	
Spot, \$5 a ton higher.	
Silicomane, 2% carbon	85.00
2% carbon, 90.00; 1%, 100.00	
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del.	10.00
Ferrotungsten, stand., lb. con. del.	1.30-1.40
Ferrovanadium, 35 to 40% lb., cont.	2.70-2.90
Ferrotitanium, c. l., prod. plant, frt. all, net ton	137.50
Spot, 1 ton, frt. allow., lb.	7.00
Do., under 1 ton	7.50
Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, \$3 unitage	58.50
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% \$3 unitage	75.00
Ferromolybdenum, stand. 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80
†Carloads. Quan. diff. apply.	

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

Copper			Stralts Tin		Lead		Zinc	Alumi-num	Antimony	Nickel	
Electro, del. Conn.	Lake, del. Midwest	Casting, refinery	Spot	Futures	N. Y.	East St. L.					St. L.	99%	Chinese Cath-odes
Oct. 3	9.75	9.87½	9.40	45.45	44.90	4.60	4.45	4.85	*19.00	12.50	35.00
Oct. 5	9.75	9.87½	9.40	45.62½	45.15	4.60	4.45	4.85	*19.00	12.50	35.00
Oct. 6	9.75	9.87½	9.40	45.25	44.80	4.60	4.45	4.85	*19.00	12.50	35.00
Oct. 7	9.75	9.87½	9.40	45.00	44.50	4.60	4.45	4.85	*19.00	12.50	35.00
Oct. 8	9.75	9.87½	9.40	45.20	44.70	4.60	4.45	4.85	*19.00	12.50	35.00
Oct. 9	9.75	9.87½	9.40	45.20	44.70	4.60	4.45	4.85	*19.00	12.50	35.00

*Nominal range 19.00 to 21.00c.

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 9.75c Conn. copper	
Sheets	
Yellow brass (high)	15.62½
Copper, hot rolled	17.50
Lead cut to jobbers	8.25
Zinc, 100-lb. base	9.50
Tubes	
High yellow brass	17.87½
Seamless copper	18.00
Rods	
High yellow brass	13.62½
Copper, hot rolled	14.25
Anodes	
Copper, untrimmed	15.00
Wire	
Yellow brass (high)	15.87½

OLD METALS

Deal. buying prices, cents lb.

No. 1 Composition Red Brass	
*New York	6.00-6.25
Cleveland	6.50-6.75
*Chicago	6.25-6.50
St. Louis	6.00-6.50
Heavy Copper and Wire	
New York, No. 1	7.87½-8.00
Chicago, No. 1	7.75-8.00
Cleveland, No. 1	7.50-8.00
St. Louis, No. 1	7.50-7.75
Composition Brass Borings	
*New York	5.87½-6.00
Light Copper	
*New York	6.37½-6.62½
Chicago	6.25-6.50
Cleveland	6.25-6.50
St. Louis	6.00-6.50

Light Brass

Chicago	3.75-4.00
Cleveland	3.50-3.75
St. Louis	3.50-4.00
Lead	
New York	3.75-4.00
Cleveland	3.75-3.85
Chicago	3.62½-3.87½
St. Louis	3.25-3.75
Zinc	
*New York	2.37½-2.62½
St. Louis	2.25-2.75
Cleveland	2.25-2.50
Aluminum	
Borings, Cleveland	9.50-10.00
Mixed, cast, Cleve.	13.00-13.37½
Mixed, cast, St. L.	13.00-13.50
Clips, soft, Cleve.	14.50-15.00
SECONDARY METALS	
Brass ingot, 85-5-5	9.75
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; † indicates brokers prices

<p>HEAVY MELTING STEEL Birmingham† 11.00-12.50 Bos. d'ck, No. 1, exp. †12.25 N. Eng. del. No. 1. 12.75 Buffalo, No. 1. 15.50-16.50 Buffalo, No. 2. 14.00-14.50 Chicago, No. 1. 16.00-16.50 Cleveland, No. 1. 15.50-16.00 Cleveland, No. 2. 15.00-15.50 Detroit, No. 1. 14.50-15.00 Eastern Pa., No. 1. 15.50-16.00 Eastern Pa., No. 2. 14.00-14.50 Federal, Ill. 12.75-13.25 Granite City, R. R. 14.25-14.75 Granite City, No. 2. 12.75-13.25 New York, No. 1. †11.75-12.25 N. Y. d'ck, No. 1, exp. †12.00-12.25 Pitts., No. 1 (R. R.) 19.00-19.50 Pitts., No. 1 (dir.) 18.00-18.50 Pittsburgh, No. 2. 16.00-16.50 St. Louis, R. R. 14.25-14.75 St. Louis, No. 2. 14.50-15.00 Toronto, dealers 7.50 Valleys, No. 1. 16.75-17.25</p> <p>COMPRESSED SHEETS Buffalo dealers 14.00-14.50 Chicago, factory 15.00-15.50 Chicago, dealer 14.00-14.50 Cleveland 15.00-15.50 Detroit 14.50-15.00 E. Pa., new mat. 15.00-15.50 E. Pa., old mat. 12.50-13.00 Pittsburgh 18.00-18.50 St. Louis 11.50-12.00 Valleys 16.50-16.75</p> <p>BUNDLED SHEETS Buffalo 12.00-12.50 Cincinnati, del. 9.50-10.00 Cleveland 12.50-13.00 Pittsburgh 16.00-16.50 St. Louis 10.00-10.50 Toronto, dealers 4.50</p> <p>SHEET CLIPPINGS, LOOSE Chicago 10.00-10.50 Cincinnati 8.50-9.00 Detroit 11.00-11.50 St. Louis 8.00-8.50</p> <p>STEEL RAILS, SHORT Birmingham 13.00-15.00 Buffalo 17.00-17.50 Chicago (3 ft.) 17.25-17.75 Chicago (2 ft.) 18.50-19.00 Cincinnati, del. 16.50-17.00 Detroit 16.50-17.00 Pitts., open-hearth, 3 ft. and less 20.00-20.50 St. Louis, 2 ft. & less 16.00-16.50</p> <p>STEEL RAILS, SCRAP Boston district †11.50-11.75 Buffalo 15.50-16.00 Chicago 16.00-16.50 Pittsburgh 18.50-19.00 St. Louis 15.00-15.50 Toronto, dealers 8.50</p> <p>STOVE PLATE Birmingham 8.00-9.00 Boston, district †7.00-7.50 Buffalo 10.00-10.50 Chicago 9.00-9.50 Cincinnati, dealers 9.50-10.00 Detroit, net 9.00-9.50 Eastern Pa. 12.50-12.75 New York, fdry. †10.00 St. Louis 8.50-9.00 Toronto, dealers, net 5.50</p>	<p>COUPLERS, SPRINGS Buffalo 16.00-17.00 Chicago, springs 18.25-18.75 Eastern Pa. 19.00-19.50 Pittsburgh 20.50-21.00 St. Louis 15.50-16.00</p> <p>ANGLE BARS—STEEL Chicago 18.00-18.50 St. Louis 15.50-16.00 Buffalo 14.50-15.00</p> <p>RAILROAD SPECIALTIES Chicago 18.00-18.50</p> <p>LOW PHOSPHORUS Buffalo, billet and bloom crops 16.50-17.50 Cleveland, billet, bloom crops 19.00-19.50 Eastern Pa., crops 17.50-18.00 Pittsburgh, billet, bloom crops 20.50-21.00 Pittsburgh, sheet bar crops 19.50-20.00</p> <p>FROGS, SWITCHES Chicago 16.00-16.50 St. Louis, cut 15.00-15.50</p> <p>SHOVELING STEEL Chicago 16.00-16.50 Federal, Ill. 13.00-13.50 Granite City, Ill. 12.75-13.25 Toronto, dealers 6.50</p> <p>RAILROAD WROUGHT Birmingham 8.00-9.00 Boston, district †8.00-8.25 Buffalo, No. 1 14.00-14.50 Buffalo, No. 2 15.50-16.50 Chicago, No. 1, net 14.00-14.50 Chicago, No. 2 16.00-16.50 Cincinnati, No. 2 14.00-14.50 Eastern Pa. 16.00 St. Louis, No. 1 13.00-13.50 St. Louis, No. 2 14.50-15.00 Toronto, No. 1 dir. 7.00</p> <p>SPECIFICATION PIPE Eastern Pa. 14.00-14.50 New York 10.00-10.50</p> <p>BUSHELING Buffalo, No. 1 14.00-14.50 Chicago, No. 1 14.75-15.25 Cincin., No. 1, deal. 11.00-11.50 Cincinnati, No. 2 6.50-7.00 Cleveland, No. 2 10.50-11.00 Detroit, No. 1, new 14.00-14.50 Valleys, new, No. 1 16.50-16.75 Toronto, dealers 6.00</p> <p>MACHINE TURNINGS Birmingham 6.00-6.50 Buffalo 8.00-8.50 Chicago 8.50-9.00 Cincinnati, dealers 7.50-8.00 Cleveland 10.00-10.50 Detroit 9.00-9.50 Eastern Pa. 10.50 New York †6.00-6.50 Pittsburgh 12.50-13.00 St. Louis 6.00-6.50 Toronto, dealers 4.00 Valleys 10.75-11.25</p> <p>BORINGS AND TURNINGS For Blast Furnace Use Boston district †5.25-5.50</p>	<p>Buffalo 9.25-9.75 Cincinnati, dealers 6.50-7.00 Cleveland 10.50-11.00 Detroit 9.00-9.50 Eastern Pa. 9.00 New York †4.75-5.00 Pittsburgh 11.50-12.00 Toronto, dealers 4.00</p> <p>CAST IRON BORINGS Birmingham 6.00-6.50 Boston dist. chem. †6.25-6.75 Boston dist. for mills 16.00-6.25 Buffalo 9.50-10.00 Chicago, dealers 9.25-9.75 Cincinnati, dealers 6.50-7.00 Cleveland 10.50-11.00 Detroit 9.00-9.50 E. Pa., chemical 10.00-13.00 New York †6.00-6.50 St. Louis 5.50-6.00 Toronto, dealers 5.00</p> <p>PIPE AND FLUES Cincinnati, dealers 9.00-9.50 Chicago, net 8.00-8.50</p> <p>RAILROAD GRATE BARS Buffalo 11.00-11.50 Chicago, net 10.00-10.50 Cincinnati 9.00-9.50 Eastern Pa. 12.50 New York †8.00-8.50 St. Louis 10.50-11.00</p> <p>FORGE FLASHINGS Boston district †9.75-10.00 Buffalo 14.00-14.50 Cleveland 14.50-15.00 Detroit 13.00-13.50 Pittsburgh 16.00-16.50</p> <p>FORGE SCRAP Boston district †6.50-7.00 Chicago, heavy 18.00-18.50 Eastern Pa. 15.00-15.50</p> <p>ARCH BARS, TRANSOMS St. Louis 16.50-17.00</p> <p>AXLE TURNINGS Boston district †7.25-7.50 Buffalo 12.00-12.50 Chicago, elec. fur. 16.00-16.50 Eastern Pa. 13.00-14.00 St. Louis 10.50-11.00 Toronto 4.50</p> <p>STEEL CAR AXLES Birmingham 13.00-14.00 Boston district †14.50-15.00 Buffalo 16.50-17.50 Chicago, net 18.00-18.50 Eastern Pa. 21.50 St. Louis 16.50-17.00 Toronto 8.50</p> <p>SHAFTING Boston district †16.00-16.25 Eastern Pa. 21.00-21.50 New York †16.50-17.00 St. Louis 15.00-15.50</p> <p>CAR WHEELS Birmingham 12.50-13.50 Boston dist. iron †11.00-11.50 Buffalo, iron 15.00-15.50 Buffalo, steel 16.50-17.50 Chicago, iron 16.50-17.00 Chicago, rolled steel 18.00-18.50</p>	<p>Cincinnati, iron 13.00-13.50 Eastern Pa., iron 17.00 Eastern Pa., steel 19.00-19.50 Pittsburgh, iron 18.00-18.50 Pittsburgh, steel 20.50-21.00 St. Louis, iron 14.00-14.50 St. Louis, steel 16.00-16.50 Toronto, net 8.50</p> <p>NO. 1 CAST SCRAP Birmingham 11.50-12.50 Bos. dis. No. 1 mch. †10.75-11.00 N. Eng., del. No. 2 †9.00-9.25 N. Eng., del. textile 12.00-12.50 Buffalo, cupola 13.50-14.00 Buffalo, mach. 15.00-15.50 Chicago, agri. net 12.00-12.50 Chicago, auto 12.50-13.00 Chicago, mach. net 14.00-14.50 Chicago, rail'd net 13.00-13.50 Cincin., mach. cup. 13.50-14.00 Cleveland, mach. 16.25-16.75 Eastern Pa., cupola 16.50-17.00 E. Pa., mixed yard 14.00-14.50 Pittsburgh, cupola 17.00-17.50 San Francisco, del. 13.50-14.00 Seattle 10.00-11.00 St. Louis, No. 1 12.50-13.00 St. L. No. 1, mach. 13.00-13.50 Toronto, No. 1, mach., net 9.00</p> <p>HEAVY CAST Boston dist. break 10.25-10.50 New England del. 11.00-11.50 Buffalo, break 12.50-13.00 Cleveland, break 13.00-13.50 Detroit, No. 1 mach. net 13.50-14.00 Detroit, break 11.50-12.00 Detroit, auto net 13.50-14.00 Eastern Pa. 15.50-16.00 New York breakable †11.25-11.75 Pittsburgh 15.00-15.50</p> <p>MALLEABLE Birmingham, R. R. 12.00-13.00 New England, del. †16.25-17.50 Buffalo 16.00-16.50 Chicago, R. R. 18.50-19.00 Cincin., agri. del. 14.00-14.50 Cleveland, rail 17.50-18.00 Detroit, auto, net 14.50-15.00 Eastern Pa., R. R. 17.50 Pittsburgh, rail 17.50-18.00 St. Louis, R. R. 15.50-16.00 Toronto, net 7.00</p> <p>RAILS FOR ROLLING 5 feet and over Birmingham 13.00-14.00 Birmingham †11.00-11.50 Buffalo 15.50-16.50 Chicago 16.50-17.00 Eastern Pa. 16.00 New York †12.00-12.50 St. Louis 16.00-16.50</p> <p>LOCOMOTIVE TIRES Chicago (cut) 17.50-18.00 St. Louis, No. 1 13.50-14.00</p> <p>LOW PHOS. PUNCHINGS Buffalo 16.50-17.50 Chicago 18.50-19.00 Eastern Pa. 18.00-18.50 Pittsburgh (heavy) 19.50-20.00 Pittsburgh (light) 18.50-19.00</p>
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Iron Ore

Lake Superior Ore	
Gross ton, 51 1/2%	
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	
Cents, unit, del. E. Pa.	
Foundry and basic	
56-63% con. (nom.)	8.50-9.00
Cop.-free low phos.	
58-60% (nom.)	10.00-10.50
Foreign Ore	
Cents per unit, f.a.s. Atlantic ports (nominal)	
Foreign manganiferous ore, 45.55%	

iron, 6-10% man.	11.00
No. Afr. low phos.	11.00
Swedish basic, 65%	9.50
Swedish low phos.	10.50
Spanish No. Africa basic, 50 to 60%	nom.
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.	19.50-19.75

Manganese Ore

(Nominal)

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52%	27.00
So. African, 50-52%	27.00
Indian, 50-52%	26.00

Bars

Bar Prices, Page 190

Pittsburgh—A fairly sizable test of the advanced market of 2.05c, f.o.b. Pittsburgh, for merchant steel bars, took place through last week as users failed to contest the advanced market in view of their desire to get deliveries. Most of the bar business entered before Oct. 1 promises to be shipped by no later than the third or fourth week of this month. Considerable improvement in orders for alloy bars has occurred. Specifications in aggregate last week were almost double the week preceding, due largely to orders for automotive parts, chief among which are springs.

Cleveland — New business, while still active, has declined slightly in contrast to the last two weeks in September. Some consumers have contracted well ahead at the old prices, while those who are now just coming into the market, find deliveries so far extended, that it has become a serious problem for them to get the steel in time to satisfy their requirements. Auto parts-makers and steel forging concerns have shown a marked increase in activity since the first of the month. This has also resulted in a mild spurt in requirements for alloy steel bars.

Chicago—Steel bar deliveries have been extended to an average of four to five weeks, as a result of heavy sales before Oct. 1. Shipments to automotive and farm equipment interests are increasing. Consumers still are seeking prompt delivery against current specifications, indicating that material is moving quickly into use. Only a brief lag in sales is expected as a result of buying during September in anticipation of higher fourth quarter prices.

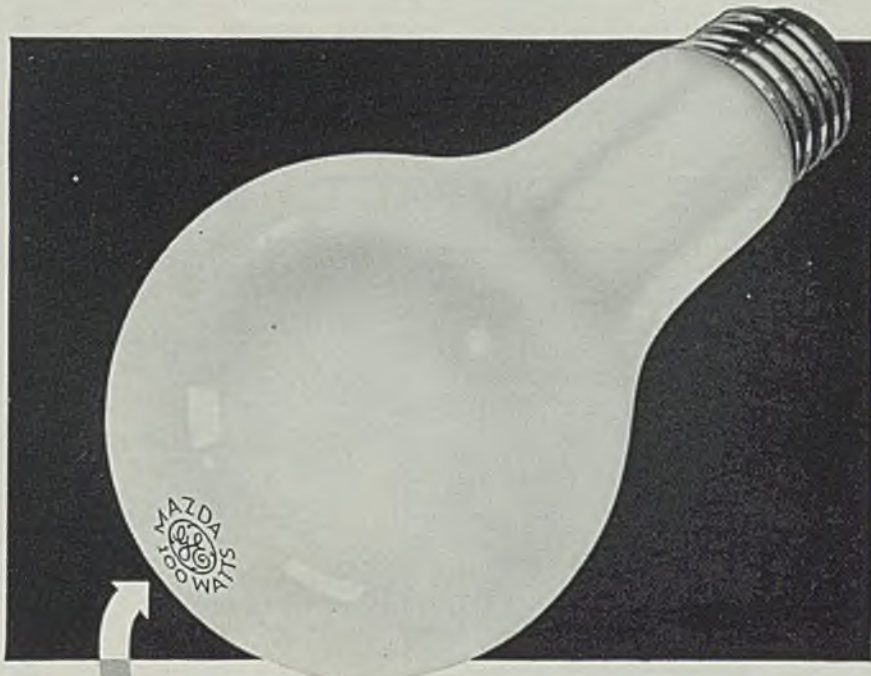
Philadelphia — Commercial steel bar deliveries are beginning to show some improvement, and new tonnage is less active. This was to be expected, in view of substantial protective covering in commercial bars and cold-drawn carbon bars Oct. 1. Business is still far from dull, however.

Plates


Plate Prices, Page 190

Pittsburgh—Carnegie-Illinois Steel Corp. has placed an order with the Ambridge, Pa., yards of American Bridge Co. to build 25 standard steel coal barges, which will require the fabrication of about 3750 tons of plates. American Bridge Co. has also formally entered a 440-ton or-

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GENERAL ELECTRIC MAZDA LAMPS

der for three dump scows for the Louisville, Ky., engineers on which it was announced low bidder several weeks ago. Twenty of the 29 standard coal barges ordered by the Hatfield Campbell Creek Coal Co., Cincinnati, from Bethlehem Steel Co. last June have been completed at the Bethlehem company's shops in the Pittsburgh district. Dravo Contracting Co. at its Wilmington, Del., shipyards is building a coal barge of 1400-ton capacity for the M. & J. Tracy Co., New York. Bethlehem Steel Co. has been awarded a 350-

ton standpipe at Charleston, W. Va., for the West Virginia Water Service Co.

Cleveland — Railroad buying has been at a standstill for over a month but there is a feeling that a considerable amount of locomotive buying is in prospect. Demand for lighter gages continues active, causing backlogs to mount steadily. Mills are operating at 60 to 70 per cent of capacity. Prices remain firm.

Chicago—Plate mills still are pressed for delivery by railroad

shops and freight car builders. Structural fabricators also are taking steady shipments, though backlogs are lighter. With few exceptions, new plate business consists of small individual lots, though heavier orders are in prospect for railroad equipment. Plate mills continue well engaged, with deliveries of three to four weeks frequently necessary.

New York—Buying of steel plates is slightly improved but no important orders have been booked. Early action is expected in placing 50 locomotives for the New York Central, requiring 2000 to 2500 tons of plates. Plans are nearing completion for three cargo ships for the Panama Railway Steamship Co. with specifications for figuring possible by December. Each will require 4000 tons of hull steel. Some eastern mills are able to ship in a week to 10 days but others in less favorable position are losing some business.

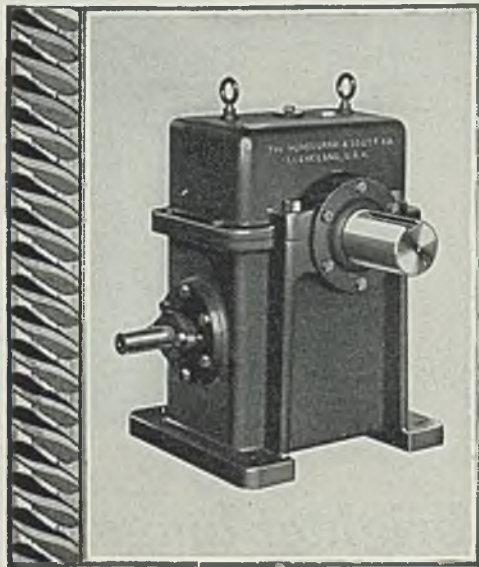
Philadelphia—Plate business still lags. Small miscellaneous tonnage is holding up fairly well but there is absence of large contracts. The Reading Co. has not as yet purchased steel, so far as can be learned, for construction of 200 gondolas and repair of 200 box cars in its own shops. Baldwin Locomotive Works has a moderate tonnage to place for locomotives recently booked and the Western Maryland is reported here as contemplating the purchase of 500 box cars. The Pennsylvania railroad will open bids Oct. 13 on one to three car floats, for delivery to Hoboken, N. J. These car floats will require 600 tons of steel each, of which approximately 335 tons will be plates. United Refining Co. has a \$69,000 oil terminal development proposed for a site on the Cape Fear river, south of Wilmington, Del. Plate prices are firm, with deliveries easier, within a week to 10 days at most eastern plants.

Seattle—Inquiry is active and several important projects are listed for the immediate future. Shops generally are busy.

Contracts Placed

- 3750 tons, 25 standard coal barges, each 175 x 26 x 11 feet of 850-ton capacity, for Carnegie-Illinois Steel Corp., to American Bridge Co., Pittsburgh.
- 969 tons, Hayfield pumping plant, metropolitan water district, Los Angeles, to Consolidated Steel Corp., Los Angeles.
- 500 tons, 24-inch welded steel pipe, water and power department, Los Angeles, to Southwest Welding & Mfg. Co., Los Angeles.
- 440 tons, three dump scows, for Louisville, Ky., engineers, to American Bridge Co., Pittsburgh.
- 435 tons, 1,000,000-gallon elevated water tank, for Rockland, Mass., to Chicago Bridge & Iron Works, Chicago.
- 350 tons, standpipe, Charleston, W. Va., for West Virginia Water Service Co.,

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—The Market Week—

to Bethlehem Steel Co., Bethlehem, Pa. 150 tons, Conchas dam, Tucuman, N. Mex., to unnamed interest.

Contracts Pending

Unstated, 31-inch welded pipe for Ogden Canyon siphon; bids to bureau of reclamation, Denver, Oct. 20.

Unstated, 2400 feet, 70-inch siphons, for irrigation project; bids soon to N. W. Blindauer, engineer, Hamilton, Mont.

Sheets

Sheet Prices, Page 190

Pittsburgh—A fair test of the higher base price of 2.60c, f.o.b. Pittsburgh, on No. 24 hot-rolled annealed sheets has developed although shipments against the former 2.40c market are still proceeding and promise to do so over the remainder of October. The final record of September's sheet bookings finds mills here having booked 75 to 85 per cent more tonnage during the month than in August, with the question of obtaining satisfactory deliveries now uppermost in the minds of sheet users.

Cleveland—New business continues to come steadily from stove, refrigerator, and farm equipment producers, however, auto builders are now becoming the heaviest individual consumers. Demand for galvanized sheets for construction purposes and stainless sheets from miscellaneous buyers continue to show moderate gains. No improvement is noted in deliveries, even though mills have been operating at capacity for some time. Fear of shortage of sheets is expressed by some buyers who are placing orders for definite rolling dates as far ahead as December.

Chicago—Deliveries of practically all grades of sheets have lengthened during the past 30 days and some mills are able to accept little additional business in hot-rolled annealed sheets for delivery before the end of the year. New business has declined since Oct. 1, but capacity production is in prospect for the quarter as a result of substantial backlogs.

New York—Sheet sellers are confronted by continued strong demand, customers being concerned over extended shipments now offered by mills. Users are anticipating requirements in an effort to gain place on mill books. Some sellers find a slight recession from the buying rate of a week or two ago.

Philadelphia—Sheet demand continues strong, with deliveries showing little improvement and in some instances becoming even more extended, due to heavy specifications from the automotive trade in the Middle West. This situation has

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angle. The most satisfactory way to get at the truth about lubrication in your plant is to make use of the services of the Standard Oil (Ind.) lubrication engineer. If your plant is located in the Middlewest call your nearest Standard Oil office. Ask for recommendations that will cut your total lubrication and maintenance costs or suggestions for the solution of any specific problem involving the use of petroleum products. There is no obligation for this Standard Oil Service . . . it's yours for the asking.

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CORRECT LUBRICATION

made eastern buyers intent upon getting orders on mill books as soon as possible, even though they have to anticipate requirements to a considerable extent. With prices fully stabilized at new levels, delivery is the matter of prime importance. In fact, it is the only consideration in many cases. The two leading auto-body makers here continue to specify heavily, and stovemakers are doing likewise, with orders from the latter heavier than normal for this season of the year in view of the number of new models now being de-

veloped. Radio manufacturers are less active as their holiday stocks become more fully rounded out.

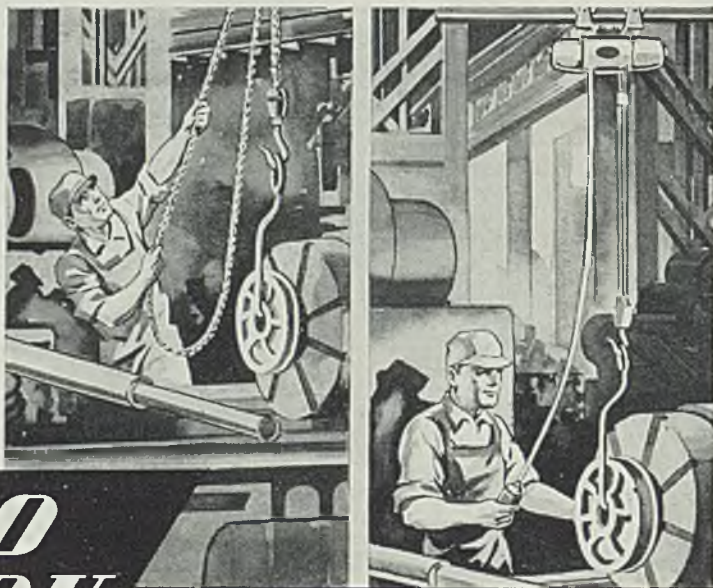
Cincinnati—Delivery dates on sheets are being extended as backlogs of mills expand under capacity-plus ordering. Miscellaneous users are represented chiefly, anticipating needs in consideration of the seasonal increase in demands of automobile manufacturers. Rolling schedules are at capacity.

St. Louis—Producers and distributors report September shipments of sheets slightly above the August

total, and the largest for September since 1930. New buying continues active and backlogs are still large. Miscellaneous requirements lead in latest orders booked.

Buffalo—Sheet bookings are heavy with production of local mills close to capacity. Solid runs are the rule and fourth quarter production promises to remain at high levels.

Birmingham, Ala.—Sheet mills are keeping steady pace and are shipping as quickly as they are producing.



Pipe

Pipe Prices, Page 191

Pittsburgh—Moderately good specifications for standard pipe were being supplemented last week by a steady call for oil country goods, although prospects for the construction of new pipe lines over the balance of the year are not bright. Automotive buying of seamless mechanical tubing has been steadily increasing. I. C. Little, Dallas, Tex., has been awarded general contract to build the new 92-mile 14-inch pipe line from northern Pennsylvania natural gas fields to Rochester, N. Y., for the Godfrey Cabot Gas Corp., Boston.

Cleveland—According to the rate of turnover of jobber stocks, standard pipe for domestic requirements showed improvement last month, while industrial demand continued active. Deliveries on cast pipe are normal but considerable backlogs have accumulated in fittings and specials. Among jobs recently let was 100 tons for Morristown, Belmont county, Ohio, and another 100 tons for sewage disposal contract 15, at Columbus, O. Tonnage let during September fell slightly below August.

Chicago—Cast pipe orders continue small individually, but shipments are holding fairly well. Backlogs will permit a continuation of moderately heavy deliveries into November, with a seasonal decrease anticipated thereafter in northern states. About 150 tons, mostly fittings, is pending for the Chicago sanitary district. Prices are steady.

New York—For the third consecutive week the cast iron pipe market is quiet, with no large tonnages being booked, nor new inquiries coming out. Nevertheless, shops are fairly busy turning out old orders.

San Francisco—Some improvement in demand for cast pipe is noted and a large tonnage is expected to be released for figures soon. Los Angeles will take bids Oct. 19 for 100 tons of 20-inch.

Seattle—Cast pipe demand continues to lag. Little business is pend-

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—The Market Week—

ing. Stevensville, Mont., opened bids Oct. 10 for a water system, and 30,000 feet of 4 to 12-inch cast pipe. D. Coluccio, Seattle, has the contract for a water system at Genesee, Idaho. Pacific States Cast Iron Pipe Co., Provo, Utah, has been awarded contract to furnish 39,400 feet of pipe for Yellowstone county, Mont. Aberdeen, Wash., opened bids for a \$325,000 water system improvement, specifying wood pipe.

Cast Pipe Placed

100 tons, 4 and 6-inch, Manhattan Beach, Calif., to unnamed interest.

Steel Pipe Placed

1225 tons, 24 and 40-inch, department of water and power, Los Angeles, to Southwest Welding Co., Los Angeles. 400 tons, 24 and 40-inch, department of water and power, Los Angeles, to Emsco Derrick & Equipment Co., Los Angeles.

260 tons, Milwaukee, to Western Gas Construction Co.

Cast Pipe Pending

400 tons, 6 and 8-inch, Walnut Creek, Calif.; bids opened.

150 tons, fittings, Chicago sanitary district.

100 tons, 4 and 6-inch, La Mesa, Lemon Grove and Spring Valley irrigation district, La Mesa, Calif.; bids Oct. 19.

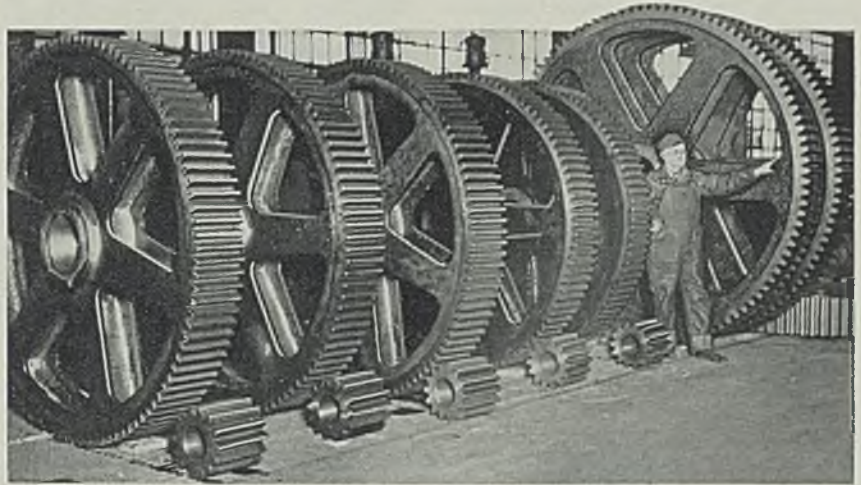
Cold Finished

Cold Finished Prices, Page 191

Pittsburgh—Effective Oct. 7, extras for smaller sizes of cold-finished carbon steel rounds have been reduced from 5 cents to \$1.70 per 100 pounds. Revised size extras now name ¼ to 5/32-inch, \$1.30, compared with \$3 formerly; 3/16 to 7/32-inch, \$1.10, compared with \$2 formerly; ¼-inch, \$1, against \$1.25 formerly; 5/16-inch, 90 cents, compared with \$1; ¾ to 7/16-inch, 85 cents, compared with 90 cents formerly, and ½ to 9/16-inch, 80 cents, as against a former 85-cent extra. No changes in size extras have been made for hexagons, squares or flats. At the same time a new quantity deduction bracket has been established at 300,000 pounds and over, for which 15 cents off base will be allowed where the quantity is of a size, shape, grade, chemistry and finish released for shipment at one time for one destination. Previously the largest deduction from base had been 12½ cents for lots of 100,000 to 299,999 pounds.

Colorado Fuel & Iron Corp., Denver, has taken over the Colorado Supply Co., the mercantile department of the old Colorado Fuel & Iron Co., and will operate it as the supply division for the reorganized firm.

RELIANCE SOUND STEEL CASTINGS



Gears in a customer's shop cut from steel castings poured in the Reliance foundry. A few of many gears cast from these patterns—each sound and solid throughout, and all homogeneous.

Gear blanks, the most explored of all castings by machining, are a specialty with Reliance.

In the ordinary types of castings, shrinkage cavities may be undiscovered, but never in gears. Gears must be solid. No short-cuts of any kind may be safely used in their production.

As casting specialists for 38 years, we have put into Reliance gears superior physical properties. Uniform ease of machining is a recognized Reliance quality.

This experience or "know-how" demanded by this type of production certifies that all other Reliance castings are equally sound.

We recommend that you order Reliance "sound" castings. They mean freedom from rejections, lower production costs in your shop, and uniform heat treating quality.

RELIANCE Steel Casting Co.

27th to 28th & Smallman Sts.
PITTSBURGH, PA.

Since 1898

Transportation

Track Material Prices, Page 191

Advance from the present price of standard steel rails of \$36.375 per gross ton for first quarter of 1937 is expected, but through last week producers had taken no action, although they state the present market is good only for specifications entered before Oct. 31. Rumors are that an extension of three months from May 1 may be given.

Donora Southern railway, operated

for freight traffic only at Donora, Pa., and connecting with the Pennsylvania and Pittsburgh & West Virginia, is inquiring for 20 air dump cars. Cambria & Indiana, Philadelphia, is inquiring for 300 hopper cars. New York Central railroad has asked bids on 50 Hudson-type passenger locomotives for the New York Central and 25 eight-wheel switching engines for the Pittsburgh & Lake Erie, the largest request for bids on steam motive power since 1930. In 1934, however, the Pennsylvania railroad ordered 57 electric engines. Chicago,

Rock Island & Pacific is taking bids on six streamlined passenger trains of three or four cars each, the largest individual inquiry to date for such type of equipment. Atchison, Topeka & Santa Fe has awarded two steam passenger locomotives to Baldwin Locomotive Co.

Akron, Canton & Youngstown is inquiring for 10 to 30 covered 70-ton hoppers. Baltimore & Ohio will repair 100 freight locomotives in several of its shops.

Seattle plans rehabilitation of municipal street car line under refinancing arrangements and has called bids Oct. 13 for 240 trackless trolleys and 120 gas motor buses, 100 and 50, respectively, to be delivered within a year.

Domestic freight car awards in September involved 1750 cars, against 225 in August (a correction in this latter figure) and brought the total for the first nine months up to 37,433 cars. Outstanding in last month's awards were 750 for the Boston & Maine and 500 for the Maine Central.

Comparisons follow:

	1936	1935	1934	1933
Jan.	2,050	24	152	3
Feb.	6,900	806	19,725	0
March	632	0	30	5
April	4,427	350	800	50
May	8,900	2	717	8
June	5,220	5,151	1,835	500
July	7,229	500	19	306
Aug	225	200	105	202
Sept.	1,750	875	7	23
9 mos. ...	37,433	7,908	23,390	1,031
Oct.		1,250	75	514
Nov.		100	254	533
Dec.		10,050	110	316
Total ...		19,308	23,829	2,460

Car Orders Placed

Wabash, 400 hopper cars, to own shops to be built under the name of Wabash Car & Equipment Co.

Locomotives Placed

Atchison, Topeka & Santa Fe, two steam passenger locomotives to Baldwin Locomotive Co., Philadelphia.

Rail Orders Placed

Louisville & Nashville, 27,000 tons rails, with accessories, to Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

Car Orders Pending

Gulf, Mobile & Northern, 100 50-ton composite flat bottom gondolas and 150 50-ton, 40-foot 6-inch, steel frame single sheathed (wood) box cars, with two alternates on the latter, one calling for 400 of the same type and the other calling for 200 50-foot box cars and 150 with double doors 40 feet 6 inches in length and 50 50-foot box cars with single doors; bids to be opened Oct. 15.

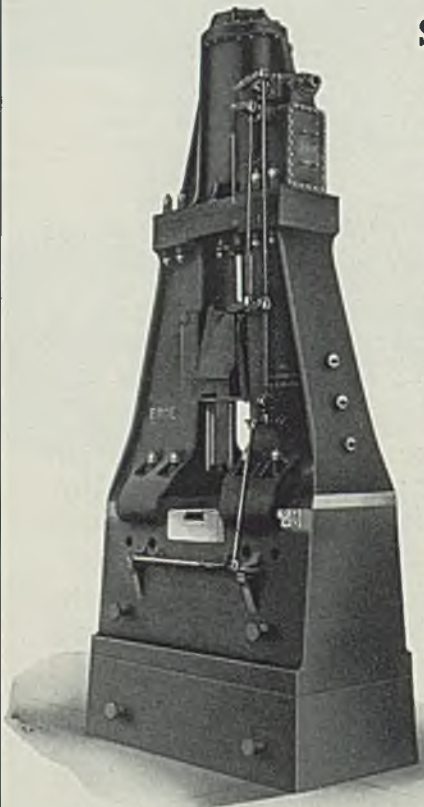
Cambria & Indiana, 300 hopper cars. Donora Southern railroad, 20 air dump hoppers.

Chesapeake & Ohio, three combination passenger and baggage cars.

For Cranks

on the Subject of Cranks— ERIE

Steam Drop Hammers



In the shops that turn out more crank shafts in a day than most shops do in a month, Erie Steam Drop Hammers, like the one illustrated, do the work. All of the "Big Three"—volume producers of automobiles—use Erie steam drops. All of them who forge crank shafts use hammers of this particular type, with rigid extended frame construction, heavy forged tie plate, quadruple-ported-valve cylinder. The hammers that have proven best for this tough job are best for your work.

A 12,000 lb. Erie steam drop recently installed by a prominent automobile manufacturer for forging six-throw crank shafts is shown in the illustration.

ERIE FOUNDRY COMPANY ERIE, PENNA., U. S. A.

Detroit
335 Curtis Bldg.

Chicago
549 Washington Bldg.

Indianapolis
335 Postal Station Bldg.

Paris, France
8 Rue de Roeroy



Chicago, Rock Island & Pacific, six streamlined passenger trains.

Locomotives Pending

New York Central, 25 Hudson-type passenger locomotives and 25 eight-wheel switching engines, latter for Pittsburgh & Lake Erie railroad division.

Strip

Strip Prices, Page 191

Pittsburgh—Improvement in specifications for both hot and cold-rolled strip steel occurred again last week, as many buyers bought more heavily. Many producers have thus become well sold out for six to eight weeks, and confidently foresee the quarter establishing a 1936 record. Not only is the automotive industry buying heavily, but also manufacturers of small farm tools, jobbers, and makers of many miscellaneous products.

Cleveland—Strip mills continue to operate close to capacity, in view of the sustained demand from miscellaneous consumers. These buyers have shown a marked change in purchasing methods, for many are estimating their needs much further in advance, in an effort to get a preferred delivery position on mill books. Auto partsmakers, electrical and air conditioning equipment manufacturers have shown constant increase in activity, with no letup anticipated in the near future. Backlogs on cold-rolled range from four to six weeks.

Chicago—Strip production is steady at a relatively high level and deliveries have been extended moderately. With consumption expanding in some directions, production is expected to be well sustained through most of this quarter. Automotive requirements are increasing, while demand from miscellaneous consumers continues heavy. Strip prices generally are firm.

Wire

Wire Prices, Page 191

Pittsburgh—Quantity differentials on wire products are being adopted, naming 40,000 pounds to 1000 pounds as base on manufacturers' wire, with the following deductions applicable: 5 cents for 20 to 40 tons; 10 cents for 40 to 60 tons, 12½ cents for 60 to 100 tons, and 15 cents for 100-ton lots and over. Extras above base are 25 cents for to and including 500 pounds, 50 cents up for 300 to 500-pound lots, 75 cents for 200 to 300 pounds, \$1 for 100 to 200 pounds, and \$3 up for less than 100 pounds. On merchant wire

products the straight or mixed carload base remains at 40,000 pounds, with 20 cents higher for 10,000 to 40,000 pounds, 30 cents for 5000 to 10,000 pounds and 40 cents up for less than 5000 pounds. A change has been made in the former classification for pool carloads in merchant wire products, which formerly had been priced on the less-carload basing point quotation plus carload freight and stop-over charge and which now are classified with joint carloads.

Cleveland—Some wire producers find they have oversold at the old

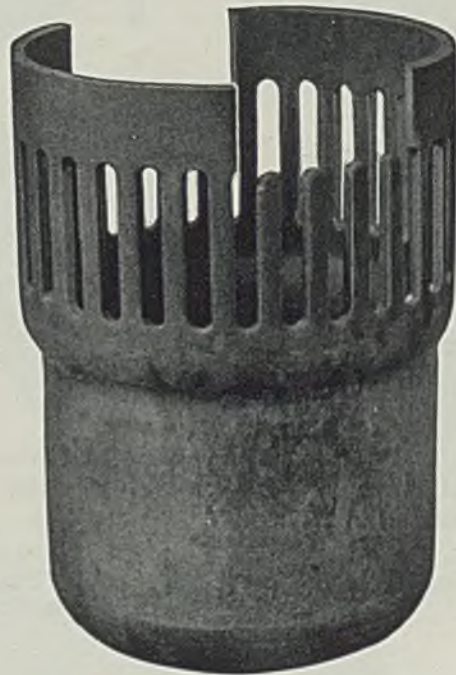
prices, for now there is some doubt that delivery on orders, especially for nails, can be made before the Oct. 15 deadline. Prices remain firm at the advanced figures, as shown by the extent new business is coming in. Inventory conditions of manufacturing wire consumers is apparently none too good, for many complain of the inability to get deliveries soon enough.

Chicago—Shipments of wire and wire products remain fairly heavy, deliveries being influenced by business placed before the Oct. 1 advances. At the same time, consump-

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tion of manufacturers' wire is increasing, partly as a result of better automotive operations. Demand for merchant wire products remains moderately active in farm districts. While new business lately has been curtailed somewhat by earlier purchases at lower prices, this is regarded as only temporary. On new business wire nails are \$2.10 per keg, Chicago, with plain wire 2.55c and wire rods \$41 to \$43.

Philadelphia—Lacking important test, wire nail prices appear to be holding at the recent advance of \$3 a ton. However, the trade is inclined

to go slowly in prediction of firmness. Importations of foreign nails, which have had a particularly unsettling influence on domestic prices over past months, are still coming in at the eastern seaboard, particularly the southeastern portion, it is pointed out. Whether domestic mills will be able to ignore this competition, remains a question.

Steel Co. of Canada, Ltd., Hamilton, Ont., will build a new 150-ton open-hearth furnace at its plant, to replace old units.

Shapes

Structural Shape Prices, Page 190

Pittsburgh—Bids closed on two important local projects; one, 3000 tons of structural material for the new Wheeling Steel Corp. mill building at Yorkville, O., and a similar amount of structural piling and reinforcing steel for the Emsworth, Pa., dam. Rust Engineering Co. has been given the contract for all foundation work in connection with the new Wheeling Steel Corp. mill. The Rock Island engineers' office will take bids Nov. 5 on 4320 tons for roller-top dam No. 14 on the Mississippi river near LeClaire, Iowa.

Cleveland—Some mills are operating at capacity, thus relieving the delivery situation somewhat. Most jobs are under 100 tons. Fort Pitt Bridge Works, Pittsburgh, has booked a factory extension for the Worthington Pump & Machinery Co. at Buffalo, involving 240 tons; and a factory and office building for Herron-Zimmers Moulding Co., Detroit, 400 tons. Bids went in Oct. 9 on the state highway garage, this city, involving 150 tons.

Chicago—Shipments of plain structural material are steady and operations of fabricating shops are well maintained, but backlogs still are declining and fabricators are less busy in estimating new work. New inquiries consist almost entirely of bridges. A fairly large tonnage of new work, however, is made up of small miscellaneous lots for private construction.

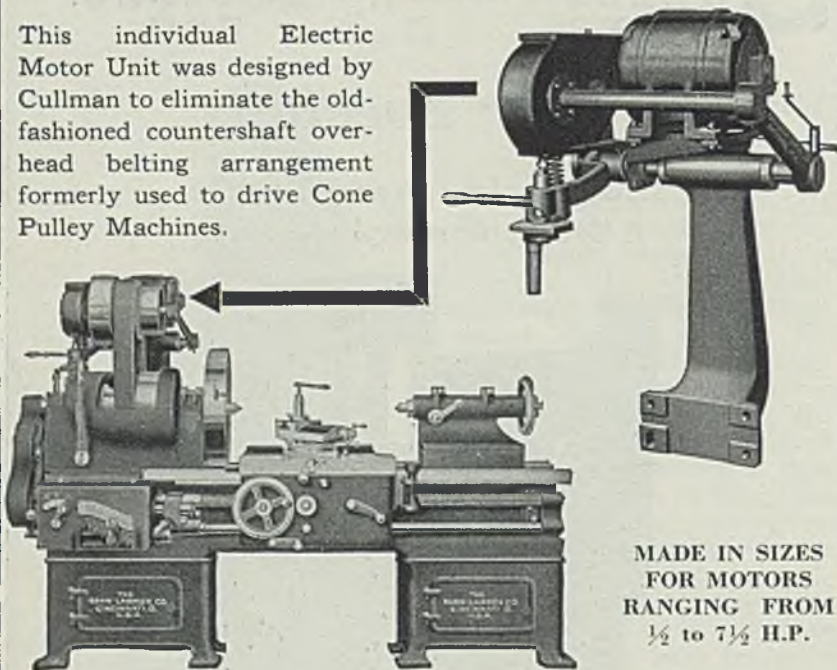
New York—Inquiries were fewer than previously, and lettings also were slow. The department of construction and maintenance, board of education, has plans for approximately 30 school buildings, which will be out for bids whenever the PWA and WPA officials indicate that funds will be available. Two of these schools, expected to come out in October, will require about 2500 tons of structural shapes each. In

Shape Awards Compared

	Tons
Week ended Oct. 9	20,455
Week ended Oct. 2	19,345
Week ended Sept. 25	12,626
This week, 1935	26,170
Weekly average, 1935	17,081
Weekly average, 1936	22,715
Weekly average, September	19,999
Total to date, 1935	679,325
Total to date, 1936	931,334

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- Increased Efficiency
- Smooth Operation
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some instances, prices on erected steel have been advanced somewhat.

Philadelphia—Bridge work continues to be the center of attention. Approximately 1000 tons for two state bridges have been placed with an eastern Pennsylvania fabricator and close to 2000 tons of miscellaneous state bridge work are up for figures Oct. 17. Moreover, with bids now being taken on the concrete substructure, specifications are regarded as not far off for the superstructure of the toll bridge between Easton, Pa., and Phillipsburg, N. J., requiring approximately 4600 tons. Fabricated material prices are more steady than they were during the depth of the building depression, but are still far from firm. Shapes are steady at 2.00c. Bethlehem, Pa., or 2.115c, Philadelphia.

San Francisco—A fair tonnage of awards was placed, aggregating 2057 tons. Consolidated Steel Corp. was awarded 550 tons for the Hayfield pumping plant for the metropolitan water district, Los Angeles. Bids have again been postponed on the Federal building, Los Angeles, and will now be opened Oct. 22. Approximately 12,000 tons are involved.

Seattle—Generally, shops are well supplied with work but few new projects have developed and business pending is of small proportion.

Shape Contracts Placed

- 4000 tons, Mississippi river dam No. 22, Saverton, Mo., to Hunter Steel Co., Pittsburgh.
- 1250 tons, gymnasium, West Point, N. Y., to Bethlehem Steel Co., Bethlehem, Pa., through C. T. Wills Inc., New York.
- 1180 tons, two viaducts, Fremont, Nebr., to American Bridge Co., Pittsburgh.
- 800 tons, state bridge, route 193, Juniata county, Pennsylvania, through Wittaker & Diehl, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.; 100 tons reinforcing bars included.
- 760 tons, bridge, for New York, New Haven & Hartford railroad, Hartford, Conn., to American Bridge Co., Pittsburgh.
- 685 tons, Kedzie avenue viaduct, Chicago, to R. C. Mahon Co., Detroit.
- 650 tons, building, Gordon Baking Co., Long Island City, N. Y., to Jones & Laughlin Steel Service Inc., New York, through H. D. McCaffrey, New York, general contractor.
- 550 tons, Hayfield pumping plant, metropolitan water district, Los Angeles, to Consolidated Steel Corp., Los Angeles.
- 550 tons, bridge overpass, Raritan river, South Amboy, N. J., to Bethlehem Steel Co., Bethlehem, Pa., through Franklin Contracting Co., Jersey City, N. J.
- 540 tons, state highway bridge, 36-1 Delaware county, New York, to American Bridge Co., Pittsburgh.
- 525 tons, Queens construction shaft, Midtown tunnel, New York, to Jones & Laughlin Steel Corp., Pittsburgh.
- 500 tons, office and factory, Cincinnati, to L. Schreiber Sons Co., Norwood, O.
- 495 tons, viaduct, North Platte, Nebr., to Omaha Steel Works, Omaha, Nebr.
- 460 tons, public school No. 162, Queens,

N. Y., to Harris Structural Steel Co., New York.

460 tons, freight shed, Mobile, Ala., to Ingalls Iron Works Co., Birmingham, Ala.

455 tons, public school 162, Rosewood, Long Island, N. Y., to Dreier Iron Works Inc., New York.

445 tons, factory extension, American Blower Corp., Dearborn, Mich., to R. C. Mahon Co., Detroit.

440 tons, 100 pot shells, Aluminum Co. of America, for Massena, N. Y., to Blaw-Knox Steel Co., Pittsburgh.

400 tons, two buildings, Chester Crest apartment for Mt. Vernon, N. Y., to Schacht Steel Construction Co. Inc., Bronx, N. Y.

400 tons, factory and office building, Heron-Zimmers Moulding Co., Detroit, to Fort Pitt Bridge Works, Pittsburgh.

395 tons, viaduct, Nebraska City, Nebr., to Omaha Steel Works, Omaha, Nebr.

330 tons, police court building, Washington, to Fort Pitt Bridge Works, Pittsburgh.

325 tons, columns and slabs for Commonwealth Edison Co., Chicago, to American Bridge Co., Pittsburgh.

320 tons, bridge No. 160-D, Stone county, Mississippi, to Nashville Bridge Co., Nashville, Tenn.

305 tons, three trestles, Port Birmingham, Ala., to Virginia Bridge & Iron Co., Roanoke, Va.

300 tons, highway bridges, routes 260 and 333, New Cumberland, Pa., to

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Bethlehem Steel Corp., Bethlehem, Pa.
270 tons, Jackson street and Glenoaks
boulevard, bridges for United States
engineer office, Los Angeles, to Con-
solidated Steel Corp., Los Angeles.
265 tons, passageway and canopy, Tri-
boro bridge, contract 70, Triboro au-
thority, to Lynn Construction Co., New
York.
250 tons, bridge P-473 for Long Island
railroad, Smithtown, N. Y., to Amer-
ican Bridge Co., Pittsburgh.
240 tons, middle bridge over Eastern
river, Dresden, Me., to Pittsburgh-Des
Moines Steel Co., Neville Island, Pitts-
burgh.
220 tons, paper storage building for
McCall Co., Dayton, O., to Pittsburgh
Bridge & Iron Works, Pittsburgh.
215 tons, addition, bottling house, Du-

quesne Brewing Co., Pittsburgh, to
Pittsburgh Bridge & Iron Works,
Rochester, Pa.
200 tons, state bridge, route 05088, Bed-
ford county, Pennsylvania, to Bethle-
hem Steel Co., Bethlehem, Pa.
195 tons, state highway bridge, WPFR
No. 16, New Hariford, Conn., to Amer-
ican Bridge Co., Pittsburgh.
150 tons, Our Lady of Mercy church,
Forest Hills, N. Y., to Belmont Iron
Works, Philadelphia.
150 tons, hangar, Bakersfield, Calif.,
U. S. Treasury department, to Golden
Gate Iron Works, San Francisco.
130 tons, warehouse, Manayunk, Pa., to
Morris Wheeler.
120 tons, addition, fermenting cellars,
Duquesne Brewing Co., Pittsburgh, to
Pittsburgh Bridge & Iron Works,

Rochester, Pa.
120 tons, high school, Hollidaysburg,
Pa., to Griffith-Custer Steel Co.,
Johnstown, Pa.
110 tons, state highway bridge, 1955,
Montgomery county, New York, to
R. S. McMannus Steel Construction
Inc., Buffalo.
100 tons, addition to Pittsburgh Plate
Glass Co. plant, Los Angeles, to Beth-
lehem Steel Co., Bethlehem, Pa.
100 tons, bridge for the Imperial dam,
California, to unnamed interest.
100 tons, Los Angeles junior college, Los
Angeles, to Modern Iron Works, Los
Angeles.

Shape Contracts Pending

12,000 tons, federal building, Los An-
geles; bids postponed again until Oct.
22.
4320 tons, roller dam No. 14, upper Mis-
sissippi river near LeClaire, Iowa; bids
to Rock Island, Ill., engineers, Nov. 5.
2500 tons, bridge, Atchison, Kans.
1790 tons, sheet piling and shapes, Ma-
rine park, Staten Island, N. Y.; bids
Oct. 19.
1400 tons, Belleville turnpike bridge,
Kearny, N. J.; P. T. Cox Contracting
Co., New York, low.
1200 tons, material for bridges 2, 3, 4
and 5, Monroe county, Florida.
1000 tons, distillate plant for E. I. du
Pont de Nemours & Co. Inc., Wilming-
ton, Del., for erection at Baton Rouge,
La.; project previously noted as con-
templated. Bids now being asked.
975 tons, extension for Shillito Depart-
ment Stores, Cincinnati.
950 tons, state bridges, Wisconsin.
900 tons, bridge over Wisconsin river,
Boscobel, Wis.
875 tons, bridges, various locations, North
Carolina.
800 tons, bridge, Oakford, Ill.
800 tons, Hill street bridge, Houston,
Tex.
770 tons, overpass, Butler county, Penn-
sylvania; bids to state highway de-
partment, Harrisburg, Pa., Oct. 23.
700 tons, apartment for Silk & Hitler,
Brooklyn, N. Y.
576 tons, bridge, Fayetteville, N. C.
400 tons, steel boxes for Solvay Process
Co., Solvay, N. Y.
400 tons, through truss bridge, Cambria
county, Pennsylvania; bids to state
highway department, Harrisburg, Pa.,
Oct. 23.
350 tons, manufacturing and office build-
ing for Herron-Zimmers Moulding Co.,
Detroit.
300 tons, loading platform for Atlantic
Refining Co., Philadelphia.
240 tons, rebuilding piers Nos. 1, 2 and
3, for United States naval station, Key
West, Fla.
225 tons, intake gates, Pickwick Landing
project for Tennessee Valley authority,
Sheffield, Ala.
203 tons, through truss bridge, Tioga
county, Pennsylvania; bids to state
highway department, Harrisburg, Pa.,
Oct. 23.
200 tons, highway bridge over Catawba
river, Morgantown, N. C.
150 tons, state highway garage, Cleve-
land; bids Oct. 9.
150 tons, addition to Gulf Refining Co.
research laboratories, Harmarville,
Pa.
150 tons, post office and court house,
Canandalgua, N. Y.; John Cowper Co.
Inc., Buffalo, low.
150 tons, post office, Auburn, N. Y.; Ross
Engineering Co., Washington, low.
100 tons, piling, White Cap canal diver-
sion dam for Denver; bids opened.
100 tons, store, Montgomery Ward & Co.,
Royal Oak, Mich.

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100 tons or more, state undercrossing, Sweet Grass county, Montana; James Crick, Spokane, general contractor. 100 tons or more, bureau of roads span, St. Regis river, Montana; Triangel Construction Co., Spokane, low. Unstated tonnage, shapes and other items, Ogden project, Utah, and gates for Grand Coulee dam; bids to bureau of reclamation, Denver, Oct. 20 and Nov. 2, respectively. Unstated tonnage, propane-butane rectification plant, Tide Water Oil Co., Chicago, for Bayonne, N. J.; Arthur G. McKea Co., Cleveland, general contractor.

Reinforcing

Reinforcing Bar Prices, Page 191

New York—Lettings aggregated a little more than 1300 tons, and about that amount was added to the active pending lists. Considerable tonnage is expected to emanate from New Jersey soon, although the individual tonnages involved in most cases will be less than 100 tons. Heavy price cutting noted during the previous week apparently was not carried over.

Cleveland — Orders for reinforcing steel bars continue to come in for tonnages of 25 to 75 tons. Jobbers' stocks remain normal. Prices have shown little weakness. However, other than a sewage disposal contract and the Fairchild Milling company's projects, there has been little opportunity for testing prices here.

Chicago—Distributors are rushed to make shipments against contracts. While new business lacks large individual lots, there is a fairly steady flow of small tonnages which serves to support backlogs.

Philadelphia—Continued dullness prevails with business since the first of the month the least active in considerable time, according to some sellers. By far the outstanding project is the proposed warehouse for the North American Warehousing Co., this city, requiring 800 to 1000 tons. Doubt is expressed in some trade quarters as to whether this project will go ahead. A project of considerable interest not only

to reinforcing bar sellers, but to structural fabricators, is the proposed 12-story, 60 by 60-foot Payne-Shoemaker office building, Harrisburg, Pa. According to tentative plans, this structure will be of reinforced concrete.

Seattle—Local mills are working on backlogs augmented by an increased number of small jobs involving less than 100 tons each. The week's lettings approximated 800 tons.

San Francisco—The market continues active, 7190 tons being booked. Bids on 6000 tons for the Federal

building, Los Angeles, have again been postponed to Oct. 22.

Reinforcing Steel Awards

1205 tons, Conchas dam, Tucumcarl, New Mex., to unnamed interest. 682 tons, hospital, Northport, N. Y., to Jones & Laughlin Steel Corp., Pittsburgh, through White Construction Co., New York. 660 tons, Los Angeles junior college, Los Angeles, to Consolidated Steel Corp., Los Angeles. 659 tons, highway work in Washington and Bonner counties, Idaho, for United State bureau public roads, to unnamed interest. 359 tons, Treasury department, to W.

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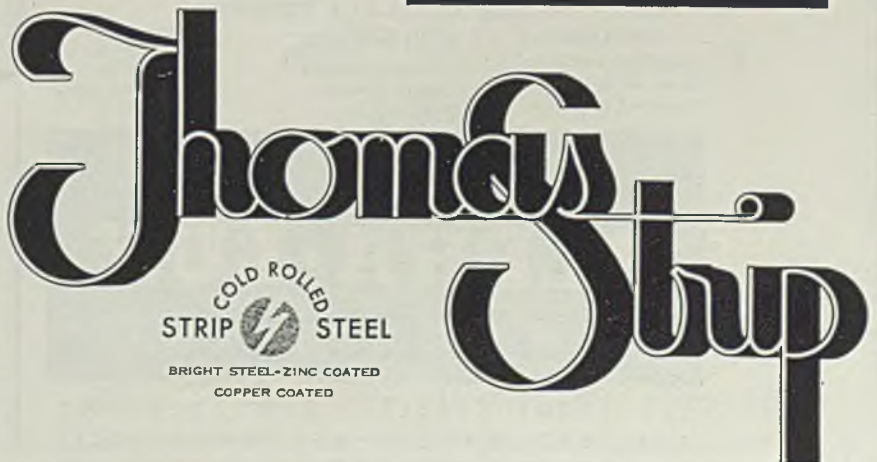
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Specialized Producers of Cold Rolled Strip Steel



Concrete Awards Compared

	Tons
Week ended Oct. 9	6,722
Week ended Oct. 2	3,258
Week ended Sept. 25	11,353
This week, 1935	11,675
Weekly average, 1935	6,862
Weekly average, 1936	6,703
Weekly average, September	6,987
Total to date, 1935	281,676
Total to date, 1936	274,824



Ames & Co., Jersey City, N. J.
 300 tons, Union avenue state crossing, Tacoma, Wash., to Truscon Steel Co., Youngstown, O.
 228 tons, bureau of reclamation, invitation A 38,304-A, Odair, Wash., to Northwest Steel Rolling Mills, Seattle.
 215 tons, bridge, South Amboy, N. J., to Igoe Bros. Inc., Newark, N. J., through Franklin Contracting Co., Jersey City, N. J.
 200 tons, alter Roosevelt high school, Los Angeles, to unnamed interest.
 200 tons, store, 428 South Hill street, Los Angeles, to unnamed interest.
 200 tons, grain elevators, Fairchild Milling Co., Cleveland, to Truscon Steel Co., Youngstown, O.
 188 tons, Rio Honda bridge at Rosemead avenue, Los Angeles, to unnamed interest.

156 tons, Santa Ana state river bridge at Ocean avenue, Orange county, California, to unnamed interest.
 155 tons, highway projects, Washington and Alaska, to Northwest Steel Rolling Mills, Seattle.
 140 tons, bureau of reclamation, invitation 42,595-A, Mesa, Ariz., to Bethlehem Steel Co., Bethlehem, Pa.
 130 tons, alter Carvanza school, Los Angeles, to Blue Diamond Corp., Los Angeles.
 125 tons, Washington Co-operative Egg Plant building, Seattle, to unnamed interest.
 110 tons, Latona avenue school, Los Angeles, to Consolidated Steel Corp., Los Angeles.
 110 tons, Amelia avenue school, Los Angeles, to Concrete Engineering Co., Los Angeles.

100 tons, bureau of reclamation, invitation 42,611-A, Globe, Ariz., to unnamed interest.
 100 tons, Third and Fairfax street school, Los Angeles, to Consolidated Steel Corp., Los Angeles.
 100 tons, Hobart street school, Los Angeles, to unnamed interest.
 100 tons, post office, Flagstaff, Ariz., to unnamed interest.
 100 tons, state bridge, route 193, Juniata county, Pennsylvania, through Wittaker & Diehl, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.
 100 tons, gymnasium, West Point, N. Y., to Bethlehem Steel Co., Bethlehem, Pa. through C. T. Wills, Inc., New York.
 100 tons, addition to Retsil, Wash., soldiers' home, to Truscon Steel Co., Youngstown, O.

Reinforcing Steel Pending

6000 tons, Federal building, Los Angeles; bids postponed again until Oct. 22.
 850 tons, grade crossing elimination, Belleville turnpike, New Jersey; P. T. Cox Contracting Co., New York, low.
 750 tons, addition to Jane Addams housing project, Chicago; John Griffith & Son Co., Chicago, low for general contract.
 660 tons, City-County building, San Diego, Calif.; bids opened.
 465 tons, bureau of reclamation, invitation A 42,106-A, Knob, Calif.; bids opened.
 400 tons, bridge, Port Arthur, Tex. Taylor-Fichter Steel Construction Co., New York, general contractor; to be let about Oct. 15.
 400 tons, Bellingham, Wash., high school; Hendrickson-Ahlstrom Co., Seattle, general contractor.
 400 tons, buildings for Lincoln park district high school, Los Angeles; bids opened.
 398 tons, paving work, Butler county, Pennsylvania; bids to state highway department, Harrisburg, Pa., Oct. 23.
 178 tons, Broadway low level tunnel, Oakland, Calif.; new bids Oct. 16.
 143 tons, bureau of reclamation, invitation 47,520-A, Burnt River, Ore.; bids opened.
 140 tons, substructure for toll bridge between Easton, Pa., and Phillipsburg, N. J.; bids to be opened Oct. 16. Plans for superstructure requiring approximately 4600 tons of shapes expected out shortly.
 139 tons, Treasury department, invitation 2581, San Francisco; bids opened.
 125 tons, addition to Washington Co-operative Poultry association, Seattle; P. P. Gjarde, Seattle, general contractor.
 114 tons, state highway work in Riverside county, California; bids opened.
 100 tons or more, Bremerton, Wash., pumphouse; Lidral Construction Co., Seattle, general contractor.
 100 tons or more, bureau of roads span, Yakima county, Washington; Elliott & Co., Seattle, low.
 100 tons or more, bureau of roads span, Yakima county, Washington; Williams & Douglas, Kallispell, Mont., low.
 Unstated tonnage, superstructure of the Brand Whitlock homes slum elimination project, Toledo, O.; Ring Construction Co., Minneapolis, general contractor at \$1,284,000.
 Unstated tonnage, 12-story 60 by 60-foot Payne-Shoemaker office building, Harrisburg, Pa.; tentatively contemplated.
 Unstated tonnage, plant building, Kraft-Phenix Cheese Corp., Chicago; Mundle, Jensen, Bourke & Havens, Chicago, architect and engineer.



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● Ladles lined the ordinary way, with a two-inch lining of clay and fire sand, hold 15% less metal than those lined the modern LUXIT way. This modern, many-purpose refractory gives you a ladle lining only three-quarters of an inch thick, but it holds heat longer than the ordinary lining.

In other words, eleven LUXIT-lined ladles hold more metal than thirteen old-fashioned ladles. You save two ladles with LUXIT,—and eliminate the man power required to push them. But this saving is only half the story.

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- Line or patch cupolas and furnaces,
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<p>LIQUITOL</p> <p>For alloy steel, cast iron, straight carbon steel, tool steel.</p>	<p>LUX</p> <p>Parting powder (non-silicious.)</p>	<p>"SPEEDY" MOISTURE TESTER</p> <p>For testing sand, etc.</p>
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THE
ALPHA-LUX
COMPANY, INC.

192 FRONT STREET • NEW YORK CITY
BRANCHES • CHICAGO AND PHILADELPHIA

Pig Iron

Pig Iron Prices, Page 102

Pittsburgh—Several market factors last week strongly favored an early advance to be named in pig iron prices. Such an advance would obviously carry little effect until early 1937 but would have the advantage over the last increase in prices Dec. 1, 1935, in that its effectiveness would come earlier in the succeeding quarter. Struthers Iron & Steel Co. plans to resume blast either the latter part of this week or the early part of next.

Cleveland — Auto, machine tool and farm equipment foundries have shown gradual increase in activity since the first of the month, and no letup is anticipated. Some consumers have placed orders for enough iron for the remainder of the year. While this condition is not prevalent, most miscellaneous consumers have changed their buying habits, and are accumulating some stocks.

Chicago—Additional pig iron business is being booked, and fourth quarter shipments appear assured of being the heaviest for any three months' period this year. Deliveries show improvement over September, as foundry schedules are increasing. Production of automotive castings is expanding, while requirements of railroad equipment builders and repair shops continue substantial. High scrap prices are proving a stimulus to iron consumption.

New York—Pig iron orders are less numerous, although specifications are well maintained. With Nov. 1 less than three weeks off, speculation increases as to possibility of announcement of a price increase around that time.

Philadelphia—Pig iron specifications do not appear to have quite the zest of recent weeks. Nevertheless, volume is proving satisfactory to sellers. Business reflects little let-up in consumption and as the time approaches when there may be an announcement of an advance there may be a pick up in orders. In some quarters there is the opinion that an increase before next year is less likely than appeared a fortnight ago.

Cincinnati—Pig iron shipments were increased this month, partly on account of heavier melt on automotive parts. Contracting, although freer and heavier than last quarter, does not show speculation in the face of price increase possibilities.

St. Louis—Continued heavy consumption of iron and steel products is reflected in an active demand and very firm tone for pig iron. Rate of new purchasing and shipments thus

far in October has maintained the high level which obtained through September. Stove foundries, a large majority of which are operating six days per week, are principal consumers. Large tonnages are also being accounted for by steel casting plants, which have added to their order books through work from the railroads and freight car business.

Birmingham, Ala.—Spot orders are the rule in the pig iron market, with the total still satisfactory. Production is being kept at the steady level, ten blast furnaces producing. This district has produced more iron this

year than through the entire year of 1935, and the nine months' total exceeds each year since 1931. For the first nine months production totaled 1,424,127 tons, against 1,297,960 tons in the entire year of 1935.

Toronto, Ont.—New business is appearing in better volume in the iron and steel markets and is having stimulating effect on merchant pig iron sales. Total awards for the past week exceeded 900 tons. Dominion Steel & Coal Corp. has received an order for 25,000 tons of steel rails which will be reflected in increased pig iron production.

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Fostoria, Ohio

Representatives and Warehouses in practically all principal cities

Scrap

Scrap Prices, Page 193

Pittsburgh—As more indications appeared last week that \$18.50 on No. 1 heavy melting steel locally had brought out supplies and checked the upward movement, the market became quieter. Most consuming mills, seeing the heavier supplies available, have adopted a waiting attitude, although brokers are unwilling to sell at less than \$18. Price changes have been few

and affected only borings and turnings and machine shop turnings.

Cleveland—New buying of iron and steel scrap largely is confined to railroad offerings in the heavier grades, and some miscellaneous purchases of lighter grades. Considerable tonnages of old materials continue to arrive by water from upper lake ports. Meanwhile, quotations both in Cleveland and valley markets are steady.

Chicago—The easier tone in scrap prices has not been reflected in mill purchases below the recent market. No. 1 heavy melting steel nom-

inally continues \$16 to \$16.50, with dealers able to pick up some material at the lower end of this range. Railroad offerings, however, still bring around \$16.50. While scrap is available in somewhat larger lots, there are no surpluses and heavy consumption tends to support the outlook for a fairly steady market in the immediate future. Quotations generally are firm.

Boston—Scrap prices were readjusted last week, up 25 cents a ton for mixed shafting, and down 25 to 50 cents a ton for No. 1 heavy melting steel. No. 1 steel for export has been lowered to \$12.25, and No. 2 or auto steel, correspondingly, to \$11.25. Stove plate also is down 25 cents to \$7.00-7.50.

New York—While mill stove plate which is enjoying an unusually heavy demand, last week was boosted 75 cents a ton to \$10 flat, five other scrap prices were being readjusted downward from 25 to 50 cents a ton. This breathing spell, which follows what has been a very active market during the past several months, is expected to continue until it is decided whether any further increases in prices would bring out any larger offerings of old metal.

Philadelphia—Scrap prices again are relatively steady. Some variations are reported, but on most principal grades prices are unchanged. There appears to be a slightly easier tendency, with supplies somewhat freer, yet there is still a strong underlying tone of strength.

Buffalo—Scrap is being negotiated in numerous deals here and in nearby territory. It is reported on apparently good authority \$16 has been paid locally for No. 1 heavy melting steel with \$16.50 outside. Dealers who are paying \$14 or slightly more for tonnages of No. 2 heavy melting steel may have taken tonnage at higher prices.

Detroit—A stronger undertone is apparent and although forecasting a higher market did not record any change from the present local level. Although local scrap consumption continues heavy, automotive lists are beginning to appear in more volume and point to the heaviest fourth-quarter industrial scrap production here in many years.

Cincinnati—The iron and steel scrap market, with prices unchanged, discloses greater strength than a week ago after renewed interest by consumers. Belief in a continued heavy demand bolsters dealer sentiment, during a buying lull, and shading on offerings was rare.

St. Louis—Activities in iron and steel scrap are confined largely to dealers, many of whom have still to cover on contracts. Melters, particularly the large mills, are apparently provided for immediate requirements, and are disposed to await de-



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Cleveland

Rooms from \$2.50
for one, \$4 for two

velopments before making further commitments.

Birmingham, Ala.—Small quantity of scrap iron and steel is moving in the Birmingham district and the market is in good shape with prices holding firmly. The larger consumer on the open market has a splendid tonnage on hand but is watching closely.

Seattle—The foreign market has weakened, due to international complications and decline of the yen. Japanese buyers cannot meet asked prices and little business is being closed. The Orient is making inquiries for future delivery. Domestic prices are steady, due to continued buying. Tidewater stocks are small and dealers are interested in all offers. Dulien Steel Products Inc., Seattle, has purchased 5000 tons of rail and miscellaneous steel from the Alaska railroad, for shipment direct from Seward, Alaska, to Japan.

Toronto, Ont.—Iron and steel scrap prices are under revision and new quotations will be available soon. It is understood that dealers are advancing their buying prices. Demand for scrap has shown improvement and most grades now are active. Mills continue to show interest in steel grades and some large shipments have been made recently against contract in addition to the regular flow of small tonnage spot sales.

Warehouse

Warehouse Prices, Page 194

Pittsburgh—Warehouse interests here have advanced black wire to 2.95c and galvanized wire to 3.30c for city shipment from stock.

Cleveland—New business continues to come in at the rate set during the last two weeks in September. While prices have been advanced to correspond with mill increases, buyers are more interested in prompt deliveries, than a slight advance in prices. Delivery conditions have added much to stimulate this. Both industrial and building requirements have shared alike in the increasing demands.

Chicago—Sales are holding recent gains and further improvement is anticipated. In addition to higher prices announced recently, warehouses have advanced nails 15 cents per keg.

Philadelphia—October, normally one of the best months of the last half in warehouse trading, is living up to its reputation. Jobbers report business as quite satisfactory and very likely to exceed September tonnage. No price revisions have been

noted since the first of the month.

Detroit—Jobbers find daily average so far in October equal to the rate of the last two months, although some decline is imminent, due to completion of automobile rehabilitation work.

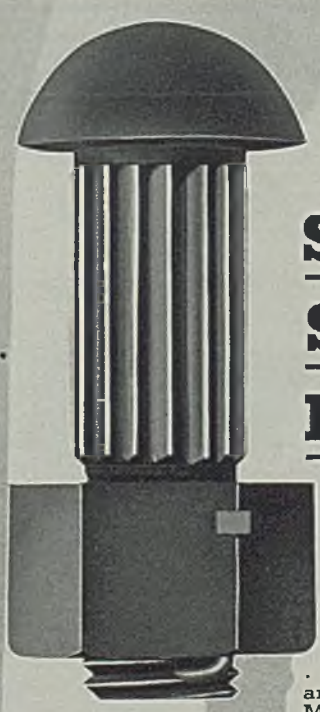
Cincinnati—Warehouse sales are showing satisfactory increase. Industrial and mine demands are up, with building materials lagging behind the peaks of this year. New prices are firm.

St. Louis—New prices on warehouse products have met with no resistance from buyers. Business is

holding up well. Purchasing is well diversified, and in larger single lots than has been the case during recent weeks.

Baltimore—Effective Oct. 12 warehouse prices on commercial bars, cold drawn bars and black sheets are advanced \$2 a ton to 3.20c, 3.98c and 3.90c, respectively. Business is well sustained.

San Francisco—Distributors in this section have been contending lately with the problem of meeting low priced foreign steel products. Business, generally, however, is far ahead of what it was a year ago and



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AUTOMATIC NUT CO INC

LEBANON WILLOW ST. PLANT PENNSYLVANIA

the outlook for the balance of the year is encouraging.

Seattle—Effective Oct. 8, local jobbers increased the price of bars, small shapes, cold-rolled steel and hot-rolled annealed 10 cents to meet higher mill schedules. Business is active, September volume exceeding that of September, 1935.

Nonferrous Metals

Nonferrous Metal Prices, Page 192

New York—Sentiment in domestic nonferrous metals markets con-

tinued buoyant last week despite unsettlement abroad resulting from foreign monetary exchange adjustments. While pound sterling prices of metals held fairly steady, prices in equivalents of cents per pound weakened slightly.

Copper—Independent fabricator buying continued in fair volume, bringing total sales for October through Saturday to over 7000 tons. Sellers consider this a satisfactory rate in view of heavy buying earlier in the year when an average of 64,490 tons per month for the first nine months was established. Some mar-

ket observers look for a possible price advance by the end of this month. All first hands quoted electrolytic firm last week at 9.75c, Connecticut.

Lead—Demand was fairly active with the undertone of the market strong. All leading sellers quoted unchanged levels on the basis of 4.45c, East St. Louis.

Zinc—Prices held firm at 4.85c, East St. Louis, despite light buying here and levels in London which were under New York parity. The market was supported by the unfavorable September statistical report showing a cut in total stocks of 9564 tons and the highest shipment rate since August, 1929.

Tin—Buying in the domestic market was dull as consumers awaited future developments in the foreign exchange market and in negotiations for removal of the international tin control plan. The outcome of the latter is still in doubt with some observers not expecting final action until after the first of the year. Straits spot closed around 45.25c.

Antimony—American spot and futures and Chinese futures prices declined ¼-cent Thursday on advices of a weaker market in China. The market here closed at 12.00c for American spot and nominally 12.50c, duty paid New York, for Chinese spot. Buying picked up slightly during the latter part of the week.

Behind the Scenes with STEEL

Colossal, Stupendous, Etc.

BY THE time you have reached this page you will have traversed most of STEEL's annual Metal Show issue which, we believe, is bigger and better than ever before. Comprising as it does the first comprehensive preview of the National Metal Congress and Exposition which opens in Cleveland a week hence, it should set the stage for a gala metal week. We'll be seeing you at Booth Q-4.

Things To Come

BROTHER STARKEY, apparently keeper of the House of the Lord in Norfolk, Va., assures us by postcard that Roosevelt's re-election is assured. Specifically he says: "My wife stood N, Y Paer in center my room. With full front page Cartoon Republican Elephant, Roosevelt stood at his rear left side, resting the barrel of a very long revolver against his side pointing forward. It seemed certain the Republicans would win, my Wife favored this, when Suddenly Roosevelt fired this big gun and that Elephant was filled with fear, began to Quiver and shake all over untill he completely shOOK him self away, and was not seen any more at all.

"The Split reveals in this ROOSEVELTS RE-ELECTION. Then COMMUNIST will upset it all, A WOMAN COME IN HIS STEAD. THEN THE BRITISH AFTER WHICH COMPLETE DESOLATION. every man will return to his own Country.

"Get the BLOOD of Jesus, with Holy Ghost Tongues."

That seems to settle the matter pretty well, and it looks as though we were in for some high times in the next few years. Here come the British, bang! bang!

Bouquets

NATURALLY we think STEEL is one of the better business publications, but we hesitate to hore anyone by too frequent repetition of this opinion. Besides, it would be just small potatoes compared with our contemporary *The Flower Grower* which, according to a letter from Editor Madison Cooper, "is probably the best-balanced collection of worthwhile reading matter that there is available in mag-

azine form." You can't go much beyond that.

Furthermore, *The Flower Grower* "leads the world in circulation and influence in the field of

INQUISITIVE CAMERA DEPT. XVIII



READING from left to right, R. L. Hartford and Jno. H. Caldwell, active representatives of the collegiate set, currently learning the business as junior editors of STEEL.

flowers, gardening, horticulture and outdoor subjects."

Beside such all-embracing claims, we become mute and curled up, like a piece of over-fried bacon.

Editorial office of the above "monthly magazine for flower lovers" is, strangely enough, in Calcium, N. Y. Always in the spotlight, those babies.

Abreast of the Times

IT HAD to come; the only surprising thing is that it took so long. Taking their cue from metal fabricators, the Formfit Co., Chicago, proudly announce their New Thrill Brassiere with the intriguing slogan, "Streamline Your Bustline."

In short, it appears that any member of the fair sex who doesn't fall in with this new trend to streamlining is going to be distinctly *gauche*. According to advance reports the New Thrill has just about everything. "Rejuvenates, Elevates and Separates," shout its makers. Look out, Mae West! Look out, Jean Harlow!

—SHRDLU

Steel in Europe

Foreign Steel Prices, Page 194

London—(By Cable) — Pig iron production in Great Britain has been sold for several months ahead and consumers are being rationed. Some contracts have been placed for February at current prices but producers refuse later commitments. Exports of foundry iron have been practically stopped but some hematite has been sold abroad. All departments of the steel industry are working at capacity but foreign iron quotas are to be increased to meet domestic demand.

The Continent reports export markets are fairly active, subject to currency adjustments. German foreign trade is brisk.

Metallurgical Coke

Coke Prices, Page 191

Absence of available beehive furnace coke supplies has grown more acute in the western Pennsylvania district. The district is flooded with inquiries on which coke producers and brokers are unwilling to quote, although a market of \$3.75 to \$4 per

ton, f.o.b. Connellsville, Pa., is indicated. Typical of inquiries was one last week from Republic Steel Corp. for 10,000 tons to be used for fill-in purposes in its Youngstown, O., blast furnaces, and in fact, the situation has grown to the point where some coke sellers themselves have begun inquiring for supplies against their short orders.

By-product foundry coke shows moderate increase in demand and shipments are at a satisfactory rate with prices for the most part at third quarter level.

Iron Ore

Iron Ore Prices, Page 193

Cleveland — Total shipments of iron ore from the upper lakes during the month of September were 7,481,071 tons, against 7,444,444 tons in August of this year and 4,817,614 tons in September, 1935. This represents an increase of 2,663,457 tons or 55 per cent over September last year. The amount carried this year up to Oct. 1, was 33,762,588 tons against 22,204,213 tons in 1935, an increase of 52 per cent.

Shipments from upper lake ports for the season to Oct. 1, follow:

Port and Dock	To Oct. 1 1935	To Oct. 1, 1936
Escanaba	1,279,457	1,639,574
Marquette	2,127,683	3,285,774
Ashland	2,416,158	3,424,738
Superior	7,941,333	12,447,107
Duluth	5,815,958	8,862,732
Two Harbors.....	2,623,624	4,102,663
Total	22,204,213	33,762,588

Coke By-Products

Coke By-Product Prices, Page 191

New York—Resumption of automobile production, with the subsequent demand for body finishes, has caused an increase in demand for toluol. The price, however, remains unchanged, at 30 cents a gallon in tanks. Demand for sulphate of ammonia is somewhat stronger than during the summer. The price of \$25.50 which prevailed during October and November will be increased to \$26 per ton around the first of December, the usual seasonal practice.

Tin Plate

Tin Plate Prices, Page 190

Pittsburgh—At least one leading canmaker has commenced issuing 1937 tin plate specifications, which enables mills to begin rolling plate for shipment late this year. Appearance of this type of business has more or less definitely assured

November and December rolling operations at close to the present rate of 100 per cent.

Bolts, Nuts and Rivets

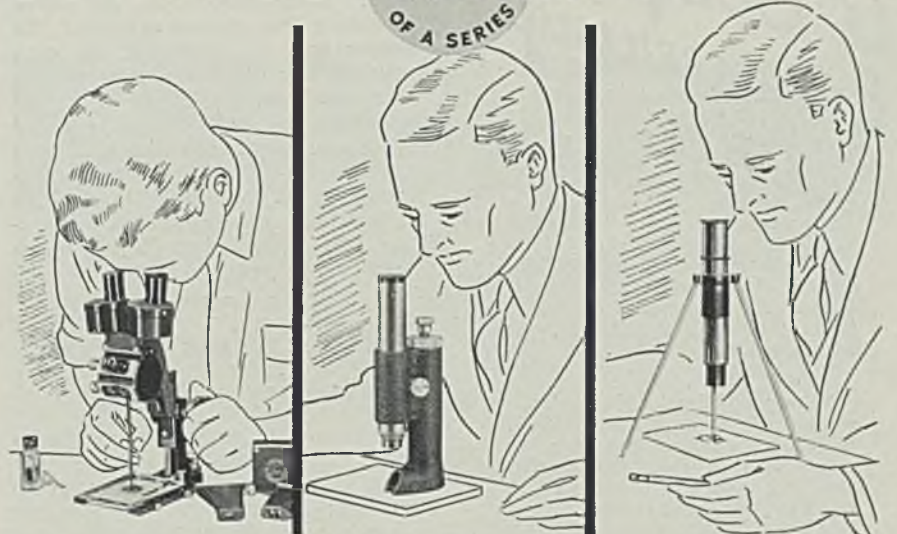
Bolt, Nut, Rivet Prices, Page 191

Bolt, nut and rivet demand retains recent gains, with consumption increasing moderately in some directions. Railroad shops and freight car builders in the Chicago district still account for substantial tonnages, with requirements at

some shops heavier as a result of increased activity in repairs. Operations of the farm implement industry have increased gradually and continue well ahead of previous years. Jobbers' specifications reflect occasional gains in consumption by miscellaneous users.

Wrought washers have been advanced for fourth quarter through a reduction in the discount. The market now is \$6 off list, against \$6.25 off formerly. Business continues active, for some interests being the best since 1929.

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To assist you in the selection of the proper instrument for your particular needs for surface examination equipment, the following table has been prepared.

	Wide Field Microscope	Shop Microscope	Wide Field Tube
Finish	1	1	1
Fractures	1	2	2
Roll Laps	1	2	2
Pipe Seams	1	2	2
Scale-condition and Depth	1	2	2
Surface Pitting	2	1	3
Gross Segregation	1	3	2
Deep etched objects	1	1	1
Case penetration	1	1	1
Dimensions—Scratches, etc.	1	1	1

After you have carefully checked the above, write for further details to Bausch & Lomb Optical Co., 680 St. Paul St., Rochester, N. Y.

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Semifinished

Semifinished Prices, Page 191

Most of the semifinished steel tonnage taken by producers two weeks ago at the third-quarter price was entered for shipment at their convenience, although serious efforts are being made to complete these backlogs by Nov. 1. According to conditions through late last week, this intent would be met by semifinished steelmakers who had already begun to reduce backlogs substantially on lower priced business than the present \$32 per ton, Pitts-

burgh, base. For the time being, the semifinished market is thus in a transitory state, although there is little consumer opposition to the advanced price schedule, and questions of obtaining satisfactory delivery are uppermost in consumers' minds.

Bituminous Coal Calls For Higher Duty on Oil

Appalachian Coals Inc., by recent action of its board of directors, is pledged to support a movement for an increased tariff on imported oil.

This is a marketing agency which has maintained Cincinnati headquarters since 1933 for distribution of high volatile coals from Kentucky, Tennessee, Virginia and West Virginia. In its resolution, the board "realizing the serious effect of the competition of imported oil with bituminous coal, resulting in the loss of much coal business, urges all stockholders to use every proper and legitimate means to procure such increased tariff charges on this imported oil as to relieve the coal industry from the burden of this unfair and often damaging competition."

Equitable Wage Revisions Under Way, Board Says

Revision of wage-rate schedules on a sound, equitable, and scientific basis is being undertaken by an increasing number of progressive companies, according to a survey by the National Industrial Conference board, New York.

Serious consideration of the economic and social soundness of wage scales, the board's study points out, did not end with the code-making period of the NRA. Actually, it only got well under way at that time. Whether the minimum rates, as established, worked out satisfactorily or not, the question of the defensibility of particular rates had been so definitely raised that industrial executives began to study this question on a wider scale.

Most wage-rate structures, the report continues, are the hit-or-miss result of a multitude of conflicting factors and influences.

Freight Yard 50% Busier

Movement of railroad freight cars in the Conway, Pa., yards of the Pennsylvania railroad, near Pittsburgh, reached a new high record during September, when a total of 221,195 freight cars was handled, nearly 7000 above the Au-

gust figure. Made up largely of coal, ore and manufactured products, the September movement in and out of the Conway yards was an average of 7373 cars a day, an increase of 50 per cent over the same month in 1935.

Sintered Carbides Reduced

Firth-Sterling Steel Co., McKeesport, Pa., announces, effective Oct. 1, a new schedule of prices on Firthite sintered carbides, blanks to be sold on a base of 45 cents per gram, much below the former range. Methods for calculating weights have been simplified and manufacturing charges for tools in quantities of five or more have been reduced.

Quantity discounts will be based on total annual purchases from all sources, instead of monthly purchases from one source.

Equipment

Chicago—Activity in some equipment markets has turned upward the past week or two. Machine tool sales have recovered from what lull was experienced during August and the fourth quarter outlook is favorable. Political developments are expected to have a certain bearing on tool demand late in the year. Buying of small tools has continued steady at a relatively high rate, and reflects good operations among important metalworking industries. Deliveries still are extended on certain machine tools, particularly radial drills and punch presses. Few orders for machinery are appearing from railroad shops, though some buying of repair parts continues. Various tools still are pending on recent lists from farm implement manufacturers.

Pittsburgh—Wheeling Steel Corp. has awarded contract to Rust Engineering Co. here for all foundation work and fill required for the extension of the Wheeling company's tin plate mill at the Yorkville, O., division. It is planned to install a five-stand cold reducing mill at that point.

Cleveland—Fisher Body Corp. here is planning an addition to plant facilities involving expenditure of about \$1,000,000. A new press shop is to be erected, construction to start as soon as the appropriation is approved by General Motors headquarters. Presses, dies and auxiliary equipment to the extent of approximately \$500,000 will be required, it is reported.

Seattle—Inquiry continues active for miscellaneous items, road machinery, mining equipment and public works projects leading.

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Construction and Enterprise

Ohio

AKRON, O.—A. Schulman Inc., Akron Savings & Loan building, plans rebuilding rubber reclaiming plant at a cost of \$60,000.

AKRON, O.—Klages Coal & Ice Co., 551 South Main street, plans repairs and alterations to its plant at a cost of over \$38,000.

BEDFORD, O.—Republic Bronze Powder Co., subsidiary of Sheffield Bronze Powder Co., 3000 Woodhill road, Cleveland, plans construction of boiler plant on Forbes road, Bedford. Engineer is Edward Hoefler, 5005 Euclid avenue, Cleveland.

BUCYRUS, O.—Swan Rubber Co. plans building a 1-story, 50 x 50-foot factory for manufacturing small vehicle rubber tires, garden hose, etc. Cost is estimated at \$40,000.

CINCINNATI—Western Electric Co., 312 Elm street, and 195 Broadway, New York, will ask bids soon for construction of a manufacturing plant at Mougey and Dana avenues, to cost \$40,000. W. T. Cattelle, 195 Broadway, New York, is architect.

CLEVELAND—City division of water and heat, room 105 City hall, is taking bids due noon Oct. 16 for one portable gasoline engine-driven electric welder.

CLEVELAND—National Box & Can Co., 4131 Broadway, plans constructing an addition to its plant to cost \$40,000.

CLEVELAND—Columbia Mfg. Co., 4519 Hamilton avenue, will build a 1-story addition, 60 x 650 feet.

CLEVELAND—Joseph F. Novak, embroidery manufacturer, 3031 Trowbridge avenue, will construct a 2-story factory addition.

CLEVELAND—City division of light and power, room 105, City hall, is taking bids due noon Oct. 16 for constant current regulating transformers, branch line service transformers and series multiple transformers.

CLEVELAND—Fisher Body Corp., Colt road and East 140th street, will build a \$1,000,000 plant addition, to be 400 x 400 feet, housing a press and die shop. Half of the cost will go for new equipment. Bids will probably not be asked until final approval comes from the General Motors Corp., General Motors building, Detroit, which controls Fisher Body.

COLDWATER, O.—Pet Milk Co., Arcade building, St. Louis, plans installation of electric power equipment in new milk condensing plant here, costing \$225,000. Architects are Helfensteller, Hirsch & Watson, Chemical building, St. Louis.

COLUMBUS, O.—Vess Bottled Beverage Co., 9 East Brewer street, plans building a bottling plant at 1027 West Fifth street, to cost \$37,000 with equipment.

DAYTON, O.—Village plans construction of sewage disposal plant to cost \$15,000, and voters will pass on the proposal at the November election.

DAYTON, O.—City plans waterworks improvement and extensions costing \$400,000, voters to pass on the work at the November election. W. W. Morehouse is waterworks superintendent, city hall.

DELPHOS, O.—City has completed

plans for building a municipal light plant to cost \$389,560, to be financed by sale of mortgage revenue bonds. A meeting will be held soon to determine feasibility of erecting plant.

EAST PALESTINE, O.—City service director H. F. Lemley, city hall, is taking bids due noon Oct. 14 for a steam driven, duplex, pot valve type boiler feed-water pump for use on 500-horsepower boiler operating with 200 pounds


steam pressure. Estimated cost is \$1500.

EDGERTON, O.—Village is considering construction of waterworks at an approximate cost of \$88,000, village's share of \$18,000 to be voted on at November election. Engineer is George Champe & Associates, 1025 Nicholas building, Toledo, O.

FLUSHING, O.—Village plans construction of waterworks costing over \$40,000. Engineer is W. Herbert, St. Clairsville, O.

JEFFERSONVILLE, O.—Village plans construction of waterworks costing \$61,000, village to issue mortgage bonds of \$20,000 as its share. Engineer is Marcus Shoup, Schmidt building, Xenia, O.

PANDORA, O.—Village is considering construction of waterworks plant cost-




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ing \$50,000. Engineer is Carl Simon, Van Wert, O.

YOUNGSTOWN, O. — Swift & Co., meat packers, West Commerce street and Union Stockyards, Chicago, will install electric power equipment in proposed new \$140,000 plant addition.

Michigan

BATTLE CREEK, MICH.—United Steel & Wire Co., George J. Benebach president, will start immediate construction of plant additions costing not less than \$150,000.

DEARBORN MICH.—City is surveying

possibility of constructing a municipal light and power plant to cost about \$3,400,000. Frederick R. Storrer is city engineer, City hall.

DETROIT—Industrial Iron & Steel Co., 3327 Barlum tower, has been incorporated to deal in scrap metals. Correspondent is Allen L. Robinson, 2024 Clairmount avenue.

DETROIT—Arvey Corp., 6400 East Nevada street, plans building factory addition to cost \$100,000, and engineer is I. M. Lewis, 1704 Cadillac Square building.

FLAT ROCK, MICH.—Detroit, Toledo

& Ironton railroad, F. W. Kasten chief engineer, 4921 Calhoun avenue, Dearborn, plans building roundhouse and machine shop at Flat Rock. Architects are Shreve, Anderson & Walker, Book tower, Detroit.

GRAND RAPIDS, MICH.—Leonard Refrigerator Co., division of Kelvinator Corp., 14250 Plymouth street, Detroit, plans expansion, including erection of metal stamping plant, 180 x 230 feet, and installation of presses, electric welding equipment and other machinery.

HILLSDALE, MICH.—Alamo Engine Co. plant has been sold to the Spicer Mfg. Co., 4100 Bennett road, Toledo, O.

LANSING, MICH.—City plans new electric generating plant at foot of Ottawa street and Grand river, to cost close to \$2,500,000. Federal aid in financing will be sought. Burns & Roe Inc., Woolworth building, New York, is engineer.

PLYMOUTH, MICH.—Burroughs Adding Machine Co., 6071 Second avenue, Detroit, plans construction of factory on 140-acre site near Plymouth.

Illinois

CAIRO, ILL.—City will take bids late in October for construction of filter plant at waterworks, to include installation of eight 5,000,000-gallon filters, at a total cost of \$55,000. Engineer is American Waterworks Construction Co., 50 Broad street, New York.

CANTON, ILL.—City plans construction of waterworks plant. Engineer is Kensey Engineering Co., Pekin, Ill.

CHICAGO—Nu Enamel Corp., 8 South Michigan avenue, plans purchasing a manufacturing plant and altering and equipping it for own use. Cost is estimated at \$40,000.

CHICAGO—Advance Pattern & Foundry Co., 2742 West Thirty-sixth place, has been incorporated by N. Shean, E. G. Grundstrom and R. W. Wilson. Correspondent is Sanders, Childs, Bobb & Westcott, 231 South La Salle street.

CHICAGO—Van Cleef Bros., 7806 South Woodlawn avenue, manufacturer of rubber and chemical products is starting construction of an addition to comprise 20,000 square feet, and including a boiler room. New machinery will be installed.

CHICAGO—Kraft-Phenix Cheese Corp. will soon start construction of a \$2,000,000 plant at Grand avenue and Illinois street. Architects and engineers are Mundle, Jensen, Bourke & Havens, 39 South La Salle street.

FISHER, ILL.—City plans construction of water softening and iron removal plants. Engineers are Williamson & Winkelman, 134 East Main street, Urbana, Ill.

Indiana

ANDERSON, IND.—W. H. and H. Don Forse have purchased the Lavelle Foundry plant at Fourteenth street and the Big Four railroad, and may remodel it for manufacturing window shades, venetian blinds, or dry cleaning equipment.

RICHMOND, IND.—Wayne Works, J. Clemens president, North Sixteenth and F streets, plans construction of a 10-story factory addition costing \$50,000.

WABASH, IND. — General Tire & Rubber Co., 1708 East Market street, Akron, O., will purchase the building of Relay Corp. and will take bids Oct. 15 for remodeling and re-equipping it

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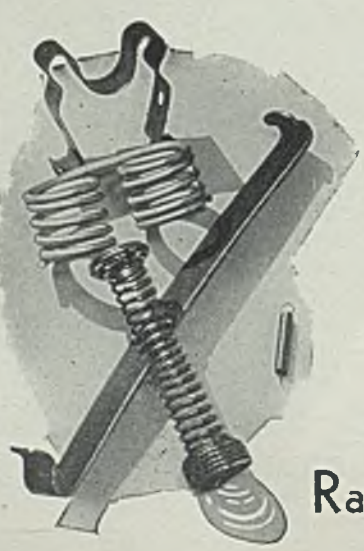
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for tire manufacturing. Total cost is estimated at \$75,000.

Alabama

ALABAMA CITY, ALA. — Dwight Mfg. Co., textile mill, plans construction of \$900,000 plant addition, with installation of new equipment.

BIRMINGHAM — W. M. Smith & Co., Forty-fifth street and First avenue North, is in the market for a pipe straightening machine.

GADSDEN, ALA. — Gulf States Steel Co., L. E. Gehegan general manager, Brown-Marx building, Birmingham, plans expenditure of approximately \$2,000,000 on additional plants and facilities in Gadsden.

TUSCUMBIA, ALA.—Municipality plans construction of waterworks plant and system, to cost \$90,000.

TUSKEGEE, ALA. — City plans construction of waterworks plant, for which PWA has granted \$50,000.

Delaware

LEWES, DEL. — Indian River Electric Co-operative Inc., Roland J. S. Marsh chairman, plans constructing transmission lines in Sussex and Kent counties, totaling about 215 miles and costing \$230,000. Federal aid has been secured.

SEAFORD, DEL. — Seaford Light & Power Co., subsidiary of Fairbanks-Morse Co., 900 South Wabash street, Chicago, plans construction of power plant costing \$200,000.

Maryland

BALTIMORE—York Street Brass & Aluminum Foundry, 125 East York street, plans constructing 1-story addition to cost \$45,000.

BALTIMORE — Owens-Illinois Can Co., Boston and Linwood avenues, plans construction of new 3-story, 180 x 260 feet, plant addition, to cost \$300,000. Engineers are Francisco & Jacobus, 511 Fifth avenue, New York.

Connecticut

BRADFORD, CONN. — Ashley Shirt Factory Co., Rose street, plans construction of a 2-story, 60 x 120-foot addition costing \$50,000. Engineer is J. Weinstein, 341 State street, New Haven.

WATERBURY, CONN. — Waterbury Farrel Foundry & Machine Co., 425 Bank street, plans building addition to plant costing over \$37,000. Architect is F. A. Weston, 51 West Main street.

Vermont

BENNINGTON, VT.—Twin State Gas & Electric Co. plans extensions to electric power plant and distribution lines at a cost of \$200,000.

New York

ALBANY, N. Y.—C. A. Holmquist, director of department of sanitation, bureau of health, State building, has recommended construction of sewage disposal plants costing about \$25,000 for each of the following towns in New York state: Andover, Cohoes, Cornwall-on-Hudson, Deposit, Franklinville, Greene, McKownville, Menands and Watervliet.

BUFFALO—Worthington Pump & Machinery Corp., Iroquois building, will construct a \$60,000 addition to its foundry, to increase production 25 per cent.

(Please turn to Page 217)

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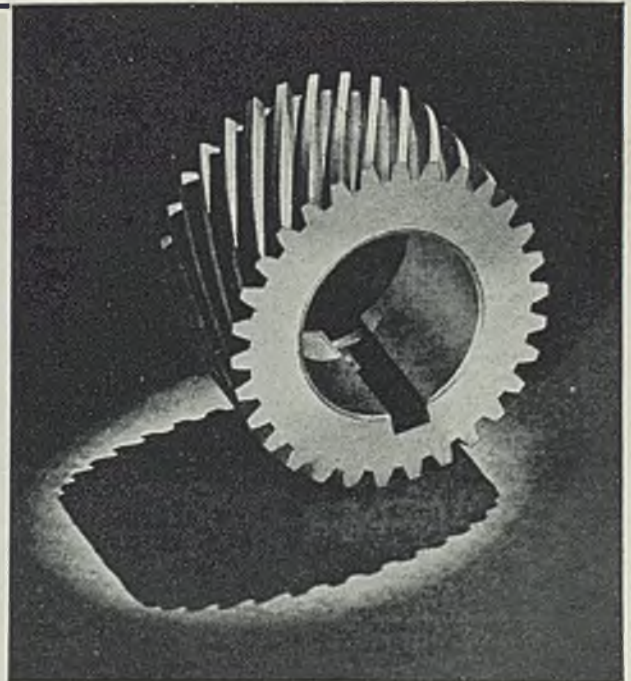
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(Continued from Page 215)

District of Columbia

WASHINGTON—Bureau of supplies and accounts, navy department, will receive bids until Oct. 16 for a radial, motor driven drill, schedule 8954; a motor driven planer and shaper, schedule 8965; a motor driven single cylinder surfer, schedule 8956, and a motor driven universal shear, punch, and coper machine, schedule 8957, all for delivery submarine base, Conn., and for a motor driven light duty engine lathe, schedule 8987, for delivery Brooklyn, N. Y. The bureau will take bids until Oct. 20 for a turret type punch, schedule 8933; an electric heat treating furnace, schedule 8957, for delivery San Diego, Calif.; a motor driven travelling crane, schedule 8958, for delivery Keyport, Wash.; a motor driven turret lathe, schedule 8971, for delivery Keyport, Wash.; miscellaneous engine lathes, schedule 8977, for delivery Mare Island, Calif.; single phase transformers, schedule 8984; a motor driven universal bench miller, schedule 8998, a motor driven bench type drilling machine, schedule 8996, and a motor driven bench lathe, schedule 8997, all delivered Puget Sound, Wash. Bids will be taken until Oct. 23 for a motor driven woodworking lathe, schedule 9000, for delivery San Diego, Calif. The bureau will take bids until Oct. 20 for turbine driven main condenser circulating pumps, schedule 8979, for delivery various coast points, and until Oct. 23 for motors and brakes, hoists and brakes, schedule 8992, for delivery Portsmouth, N. H., and Mare Island, Calif.

Florida

DUNEDIN, FLA. — B. C. Skinner will construct plant, 100 x 200 feet, requiring a 150-horsepower boiler, steam turbine and alternator for generating 3-phase, 60-cycle, 220-volt current with about 50-kilowatt capacity. Other equipment needed includes lathes, drill presses, punch and shearing machines, and welding outfits.

LAKELAND, FLA. — Lakeland Coca Cola Bottling Co., W. Sams manager, plans building bottling plant on Rose street, to cost over \$40,000.

Georgia

ATLANTA, GA. — Plants of All-Metal Bottle Cooler Corp., 780 Ponce de Leon avenue, were damaged by fire recently.

ROME, GA.—Tubize Chatillon Corp., 2 Park avenue, New York, will construct addition buildings to plant. Robert & Co., Bona Allen building, Atlanta, Ga., engineers. (Noted STEEL Sept. 28.)

THOMASVILLE, GA.—Georgia Packing Co., plans construction of 3-story canning plant to cost \$45,000. Engineer is A. Ten Eyck Brown, Forsyth building, Atlanta.

Kentucky

DRY RIDGE, KY.—Village plans construction of waterworks plant. H. K. Bell, McClelland building, Lexington, Ky., is engineer.

FULTON, KY.—City will construct waterworks plant costing \$80,000.

GREENBRIER, KY. — J. E. Conway and C. E. Keith, Bardstown, Ky., plan construction of power house costing \$100,000 at Greenbrier.

LUDLOW, KY. — Trumbull Electrical Mfg. Co. Inc., Plainville, Conn., plans construction of a 1-story plant addi-

tion, 90 x 200 feet, here. E. T. Carlson is sales manager at Ludlow.

MIDDLEBORO, KY. — City will construct electric power plant costing \$175,000, and bond issue for that amount will be voted on at the November elec-

tion. J. S. Watkins, Lexington, Ky., is engineer.

Louisiana

BERNICE, LA.—City plans construction. (Please turn to Page 219)

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 Shoop Bronze Co., The, 344-360 W. Sixth St., Tarentum, Pa.
 Timken Roller Bearing Co., Canton, O.

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 Norma Hoffman Bearings Corp., Stamford, Conn.
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 Timken Roller Bearing Co., The, Canton, O.

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 Standard Steel Works Co., Burnham, Pa.
 The Stanley Works, New Britain, Conn.
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 Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
 Timken Steel & Tube Co., Canton, O.
 Youngstown Sheet & Tube Co., Youngstown, O.

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 Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa.
 Steel Industries Engineering Corp., Empire Bldg., Pittsburgh, Pa.

BLAST FURNACES—See FURNACES (Blast)

BLOCKS (Chain)
 Ford Chain & Block Co., York, Pa.
 Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia, Pa.

BLOWERS
 Buffalo Forge Co., 490 Broadway, Buffalo, N. Y.
 Coppus Engineering Co., 359 Park Ave., Worcester, Mass.

General Electric Co., Schenectady, N. Y.
 Ingersoll-Rand Co., Phillipsburg, N. J.
 Strong, Carlisle & Hammond Co., The, 1400 W. 3rd St., Cleveland, O.

BLOWPIPES (Oxy-Acetylene)
 Linde Air Products Co., The, 30 E. 42nd St., New York City.

BLUE PRINTING EQUIPMENT AND SUPPLIES
 Bruning, Chas., Co., Inc., 445 Plymouth Ave., Chicago, Ill.

BOILER HEADS
 Bethlehem Steel Co., Bethlehem, Pa.

BOILER TUBES—See TUBES (Boiler)

BOILERS
 Babcock & Wilcox Co., 19 Rector St., New York City.
 Murray Iron Works Co., Burlington, Iowa.
 Oil Well Supply Co., Dallas, Texas.

BOLT AND NUT MACHINERY
 Landis Machine Co., Waynesboro, Pa.

BOLTS (*Also Stainless)
 Bethlehem Steel Co., Bethlehem, Pa.
 Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
 Cleveland Cap Screw Co., 2935 E. 79th St., Cleveland, O.
 Columbia Steel Co., San Francisco, Calif.
 Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh, Pa.

*Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland, O.
 Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
 Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
 Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.

BOLTS (Carriage and Machine)
 Bethlehem Steel Co., Bethlehem, Pa.
 Cleveland Cap Screw Co., 2935 E. 79th St., Cleveland, O.
 Oliver Iron & Steel Corp., So. 10th and Muriel Sts., Pittsburgh, Pa.
 Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland, O.
 Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
 Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.

BOLTS (Special)
 Bethlehem Steel Co., Bethlehem, Pa.
 Cleveland Cap Screw Co., 2935 E. 79th St., Cleveland, O.
 Oliver Iron & Steel Corp., So. 10th and Muriel Sts., Pittsburgh, Pa.
 Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland, O.
 Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

BOLTS (Stove)
 Cleveland Cap Screw Co., 2935 E. 79th St., Cleveland, O.
 Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland, O.
 Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
 Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.

BOLTS (Track)—See TRACK BOLTS

BORING MACHINES (Horizontal)
 Landis Tool Co., Waynesboro, Pa.

BOSH PLATES (Copper)
 Lawrenceville Bronze Co., Bessemer Bldg., Pittsburgh, Pa.

BOX STRAPPING
 Acme Steel Co., 2840 Archer Ave., Chicago, Ill.

BOXES (Annealing)
 Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
 Petroleum Iron Works Co., Sharon, Pa.
 United Engineering & Foundry Co., First National Bank Bldg., Pittsburgh, Pa.
 Wilson, Lee, Engineering Co., 1370 Blount St., Cleveland, O.

BOXES (Case Hardening)
 Driver-Harris Co., Harrison, N. J.
 Strong, Carlisle & Hammond Co., The, 1400 W. 3rd St., Cleveland, O.

BOXES (Open Hearth Charging)
 Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
 Morgan Engineering Co., The, Alliance, O.
 Petroleum Iron Works Co., Sharon, Pa.
 Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

BOXES (Skid)
 Youngstown Pressed Steel Co., Warren, O.

BRACING (Carload)
 Acme Steel Co., 2840 Archer Ave., Chicago, Ill.

BRAKES (Electric)
 Clark, The, Controller Co., 1146 E. 152nd St., Cleveland, O.
 Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.

BRAKES (Press)
 Cincinnati Shaper Co., Elam and Garrard Sts., Cincinnati, O.

BRICK—(Insulating)—See INSULATING BRICK

BRICK (Refractory)—See REFRACTORIES, CEMENT, etc.

BRICK (Silicon Carbide)
 Carborundum Co., The, Perth Amboy, N. J.
 Norton Co., Worcester, Mass.

BRIDGE CRANES (Ore and Coal Handling) See CRANES (Bridge)

BRIDGES, BUILDINGS, VIADUCTS, STACKS
 American Bridge Co., Frick Bldg., Pittsburgh, Pa.
 Babcock & Wilcox Co., 19 Rector St., New York City.
 Belmont Iron Works, 22nd and Washington Ave., Philadelphia, Pa.
 Bethlehem Steel Co., Bethlehem, Pa.
 Columbia Steel Co., San Francisco, Calif.
 Ohio Structural Steel Co., The, Newton Falls, O.
 Petroleum Iron Works Co., Sharon, Pa.
 Truscon Steel Co., Youngstown, O.

BRACING MACHINES
 Bullard Co., The, Bridgeport, Conn.
 Colonial Broach Co., 147 Jos. Campau, Detroit, Mich.

BRUSHES (Industrial)
 Pittsburgh Plate Glass Co., Rennous-Kleinle Div., 3221 Frederick Rd., Baltimore, Md.

(Continued from Page 217)

tion of waterworks and erection of steel elevated tank, total cost \$50,000.

NEW ORLEANS — Equitable Equipment Co., 410 Camp street, is in the market for an engine or turbine driven generator set, to be 300-kilowatt, 3-phase, 60-cycle and 240-volt.

Mississippi

VICKSBURG, MISS.—United States engineer, post office box 667, will take bids until Oct. 26 for 29,300 machinery bolts, ¼ to ¾-inch, with square heads and nuts.

North Carolina

CHARLOTTE, N. C. — City plans improvement program at waterworks, to cost \$1,000,000, and to include three 1,000,000-gallon storage tanks and new pumping equipment. J. B. Marshall is city manager, city hall.

CHARLOTTE, N. C.—Virginia Paper Co., 601 South Cedar street, S. H. Mulford manager, will spend \$40,000 for expansion, to include a 2-story building at Mint and Graham streets. Walter Blair is architect, 154 East Sixty-first street, New York.

DARLINGTON, N. C. — City plans construction of sewage disposal plant costing \$74,545, of which PWA has granted \$33,545.

WILMINGTON, N. C.—Atlantic Refining Co., 260 South Broad street, Philadelphia, plans erection of oil terminal on 111-acre site on the east bank of the Cape Fear river.

South Carolina

CHARLESTON, S. C.—West Virginia Pulp & Paper Co., 230 Park avenue, New York, is starting construction of a \$5,000,000 paper plant. David L. Luke Jr., is vice president.

Tennessee

BRISTOL, TENN. — East Tennessee Light & Power Co., Bristol, and Tennessee Eastern Electric Co., Johnson City, Tenn., plan extensions in rural transmission lines, to cost about \$250,000.

CLARKSVILLE, TENN.—City is taking bids for improvements to waterworks plant, estimated to cost \$74,575.

DUCKTOWN, TENN.—Tennessee Corp., 61 Broadway, New York, has acquired the Ducktown Copper Co. and plans altering and improving plant, which will later be consolidated with the Tennessee Copper Co. Cost of the improvements will be \$37,000.

FAYETTEVILLE, TENN. — City has voted issuance of \$150,000 bonds for construction of a municipal power system.

MEMPHIS, TENN. — Memphis Power & Light Co. plans rural electrification program in Shelby county, at a cost of \$1,500,000.

West Virginia

BELLE, W. VA. — E. I. du Pont de Nemours Inc., Wilmington, Del., plans building a switch house extension on the right bank of the Kanawha river at Belle.

Virginia

HERNDON, VA. — Town will vote

Oct. 20 on issuance of \$87,000 bonds for financing construction of sewerage system and for purchase of water works. Allen H. Kirk is mayor.

PULASKI, VA. — Wallner Silk Hosier Mills, recently incorporated, will erect building on First street, South, to cost close to \$150,000, and will install machinery.

ROANOKE, VA. — Roanoke County board of supervisors has approved issuance of \$150,000 for financing construction of sewage disposal plant in Williamson road sanitary district No. 1.

Arkansas

EL DORADO, ARK. — Lion Oil Re-

fining Co. plans installation of lubricating oil plant.

Texas

CORPUS CHRISTI, TEX. — Amsco Refining Co., Mirando City, Tex., is starting construction of a new skimming plant here.

CORPUS CHRISTI, TEX. — Corpus Christi Refining Co. plans construction of a new 5000-barrel cracking unit.

ELECTRA, TEX.—Waggoner Refining Co. plans refinery modernization costing \$100,000.

HOUSTON, TEX.—Dixon Packing Co.,

(Please turn to Page 221)

ROTARY KNIVES SHEARING . . . BLADES

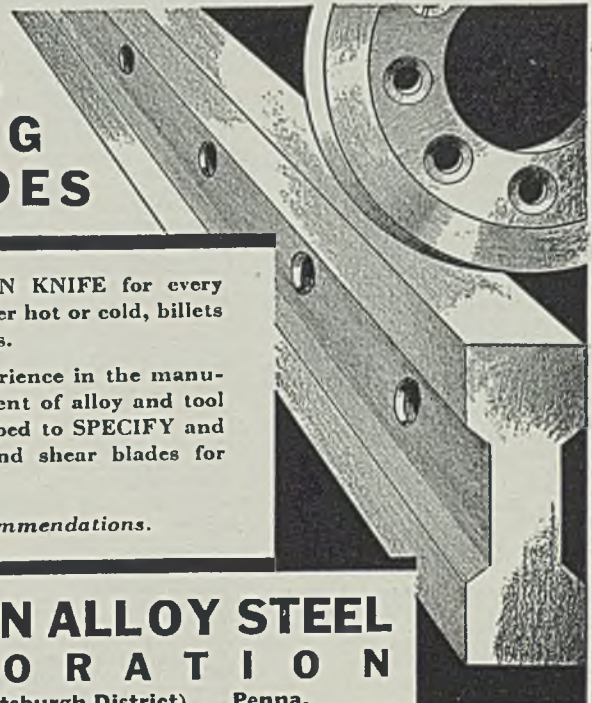
There is a BRAEBURN KNIFE for every shearing problem, whether hot or cold, billets or blooms, bars or sheets.

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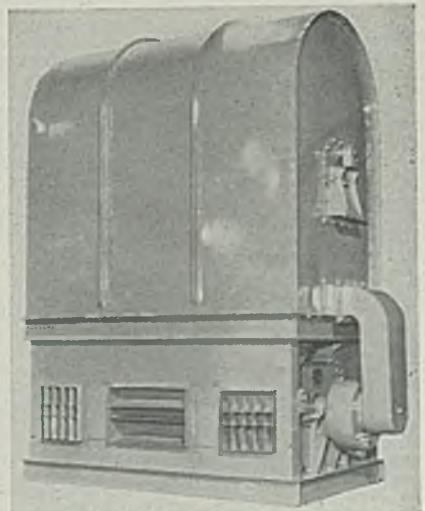


Lee Direct Fired Unit Heaters

For Steel Mill and Steel Warehouse Heating

Economical Operation — High Efficiency — Durability — No Stand-by Losses — No Boiler Plant — Installation and Maintenance Costs Reduced to a Minimum — Flexibility of Operation — Self Contained — Automatically controlled — Unit Adaptable to Space Heating or Spot Heating by Means of Duct System — Portable.

Designed for firing with oil, gas, coal, coke, or coke breeze, this heater can be either manually or automatically controlled. Cold air is taken in along the floor and hot air delivery can be either at floor level or any distance above the floor. Built in large capacities. Delivers dry hot air for warehouses. No steam leaks.



Write for bulletin containing detailed information.

Patent applied for

DRAVO-DOYLE COMPANY, Pittsburgh, Pa.

WHERE-TO-BUY

BUCKETS (Clam Shell, Drag-line, Grab, Single Line)
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Industrial Brownhoist Corp., Bay City, Mich.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

BUCKETS (Electric)
Erie Steel Construction Co., Berst Road and N. P. R. R., Erie, Pa.

BUCKETS (Elevator)
Link-Belt Co., 307 No. Michigan Ave., Chicago, Ill.

BUCKETS (Single Hook, Automatic Dump, Automatic Single Line)
Brosius, Edgar E., Inc., Sharpsburg, Pa.

BUILDINGS (Steel)—See BRIDGES, ETC.

BURNERS (Acetylene)—See TORCHES AND BURNERS

BURNERS (Automatic)
Kemp, C. M., Mfg. Co., 405 E. Oliver St., Baltimore, Md.
Pennsylvania Industrial Engineers, 2413 W. Magnolia St., Pittsburgh, Pa.
Surface Combustion Corp., 2375 Dorr St., Toledo, O.
Wean Engineering Co., Warren, O.
Wilson, Lee, Engineering Co., 1370 Blount St., Cleveland, O.

BURNERS (Fuel, Oil, Gas, Combination)
Babcock & Wilcox Co., 19 Rector St., New York City.
Best, W. N., Engineering Co., 75 West St., New York City.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh, Pa.
Pennsylvania Industrial Engineers, 2413 W. Magnolia St., Pittsburgh, Pa.
Surface Combustion Corp., 2375 Dorr St., Toledo, O.
Wean Engineering Co., Warren, O.
Wilson, Lee, Engineering Co., 1370 Blount St., Cleveland, O.

BUSHINGS (Bronze)
Cadman, A. W., Mfg. Co., 2818 Smallman St., Pittsburgh, Pa.
Gifford Engine Co., Eaton Rapids, Mich.
Shenango-Penn Mold Co., Dover, O.
Shoop Bronze Co., 344-360 W. 6th Ave., Tarentum, Pa.

BUSHINGS (Steel)
Gifford Engine Co., Eaton Rapids, Mich.

BUSINESS CARDS (Engraved)
Modern Card Co., 1153 Fullerton Ave., Chicago, Ill.

BY-PRODUCT PLANTS
Koppers Construction Co., 1438 Koppers Bldg., Pittsburgh, Pa.

CABLE GRIPS
Smith Devices, 2245 No. 12th St., Philadelphia, Pa.

CADMIUM
The Udyllite Co., 1615 E. Grand Blvd., Detroit, Mich.

CADMIUM PLATING PROCESS
The Udyllite Co., 1615 E. Grand Blvd., Detroit, Mich.

CALCIUM ALLOYS
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.

CAP SCREWS—See SCREWS (Cap, Set, Safety-Set)

CAR DUMPERS
Industrial Brownhoist Corp., Bay City, Mich.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

CAR PULLERS and SPOTTERS
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

CARBIDE
Linde Air Products Co., The, 30 E. 42nd St., New York City.

CARBURIZERS
Houghton, E. F., & Co., 240 W. Somerset Ave., Philadelphia, Pa.

CARLOAD BRACING—See BRACING (Carload)

CARS (Charging)
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Morgan Engineering Co., The, Alliance, O.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

CARS (Industrial and Mining)
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Petroleum Iron Works Co., Sharon, Pa.

CARS (Scale)
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.

CASTINGS (Acid Resisting)
Cadman, A. W., Mfg. Co., 2818 Smallman St., Pittsburgh, Pa.
Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
Electro-Alloys Co., The, Elyria, O.
Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn.
344 Vulcan St., Buffalo, N. Y.
International Nickel Co., Inc., 67 Wall St., New York City.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.

Shenango-Penn Mold Co., Dover, O.
Shoop Bronze Co., The, 344-360 W. Sixth St., Tarentum, Pa.
Wellman Bronze & Aluminum Co., 6017 Superior Ave., Cleveland, O.

CASTINGS (Alloy Steel)
Bobcock & Wilcox Co., 19 Rector St., New York City.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Damascus Steel Casting Co., The, New Brighton, Pa.
Forging & Casting Corp., The, Ferndale, Mich.

Industrial Steel Casting Co., 2237 Water Works Drive, Toledo, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Pittsburgh Rolls Corp., 41st and Willow Sts., Pittsburgh, Pa.
Reliance Steel Casting Co., 2818 Smallman St., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.

CASTINGS (Brass, Bronze, Copper, Aluminum)

Bethlehem Steel Co., Bethlehem, Pa.
Cadman, A. W., Mfg. Co., 2815 Smallman St., Pittsburgh, Pa.
Cramp Brass & Iron Foundries Co., Paschall Sta., Philadelphia, Pa.
Lawrenceville Bronze Co., Bessemer Bldg., Pittsburgh, Pa.
Morgan Engineering Co., The, Alliance, O.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.
Shenango-Penn Mold Co., Dover, O.
Shoop Bronze Co., The, 344-360 W. Sixth St., Tarentum, Pa.
Titan Metal Mfg. Co., Bellefonte, Pa.
Wellman Bronze & Aluminum Co., 6017 Superior Ave., Cleveland, O.

CASTINGS (Brass, Pressure)
Titan Metal Mfg. Co., Bellefonte, Pa.

CASTINGS (Electric Steel)
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Damascus Steel Casting Co., The, New Brighton, Pa.
Farrel-Birmingham Co. Inc., 110 Main St., Ansonia, Conn.
344 Vulcan St., Buffalo, N. Y.
Industrial Steel Casting Co., 2237 Water Works Drive, Toledo, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
West Steel Casting Co., 805 E. 70th St., Cleveland, O.

CASTINGS (Gray Iron, Alloy, or Semi-Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
Columbia Steel Co., San Francisco, Calif.
Cramp Brass & Iron Foundries Co., Paschall Sta., Philadelphia, Pa.
Erie Foundry Co., Erie, Pa.
Farrel-Birmingham Co. Inc., 110 Main St., Ansonia, Conn.
344 Vulcan St., Buffalo, N. Y.
Forest City Foundries Co., 2500 W. 27th St., Cleveland, O.
Forging & Casting Corp., The, Ferndale, Mich.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh, Pa.
Hyde Park Foundry & Machine Co., Hyde Park, Pa.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Midvale Co., The, Nicetown, Philadelphia, Pa.
Murray Iron Works, Burlington, Iowa.
National Roll & Foundry Co., The, Avonmore, Pa.
Oil Well Supply Co., Dallas, Texas.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

CASTINGS (Heat Resisting)
Driver-Harris Co., Harrison, N. J.
Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn.
344 Vulcan St., Buffalo, N. Y.

CASTINGS (Heating)
Electro-Alloys Co., The, Elyria, O.

CASTINGS (Magnesium Alloys)
Wellman Bronze & Aluminum Co., 6017 Superior Ave., Cleveland, O.

CASTINGS (Malleable)
Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
Lake City Malleable Co., 5026 Lakeside Ave., Cleveland, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Peoria Malleable Castings Co., Peoria, Ill.

CASTINGS (Manganese Steel)
Damascus Steel Casting Co., The, New Brighton, Pa.

CASTINGS (Steel) (*Also Stainless)
Allegheny Steel Co., Brackenridge, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Damascus Steel Casting Co., The, New Brighton, Pa.
Farrel-Birmingham Co. Inc., 110 Main St., Ansonia, Conn.
344 Vulcan St., Buffalo, N. Y.
Industrial Steel Casting Co., 2237 Water Works Drive, Toledo, O.

Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh, Pa.
Mesta Machine Co., P. O. Box 1124, Pittsburgh, Pa.
*Midvale Co., The, Nicetown, Philadelphia, Pa.
National Roll & Foundry Co., The, Avonmore, Pa.
Oil Well Supply Co., Dallas, Texas.

Pittsburgh Rolls Corp., 41st and Willow Sts., Pittsburgh, Pa.
Reliance Steel Casting Co., 2818 Smallman St., Pittsburgh, Pa.
Standard Steel Works Co., Burnham, Pa.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.
West Steel Casting Co., 805 E. 70th St., Cleveland, O.

CASTINGS (Worm & Gear Bronze)
Cadman, A. W., Mfg. Co., 2818 Smallman St., Pittsburgh, Pa.

CEMENT (High Temperature)
Carborundum Co., The, Perth Amboy, N. J.
Norton Company, Worcester, Mass.
Strong, Carlisle & Hammond Co., The, 1400 W. 3rd St., Cleveland, O.

CENTRAL STATION EQUIPMENT
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

CHAIN (Draw Bench)
Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

CHAIN (Malleable)
Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
Lake City Malleable Co., 5026 Lakeside Ave., Cleveland, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

CHAIN (Mortising and Cutting)
Boston Gear Works, Inc., North Quincy, Mass.

CHAIN (Roller)
Boston Gear Works, Inc., North Quincy, Mass.
Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.