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# STEEL

ESTABLISHED 1882

## Contents



Volume 106—No. 18

April 29, 1940

READER COMMENTS .....	4
AS THE EDITOR VIEWS THE NEWS .....	19
NEWS	
Europe Expands Steel Output Despite War Difficulties .....	21
Further Expansion in Canada Necessitated by War Orders .....	24
Meetings .....	24
Manufacturers, Distributors Review Problems at Dallas .....	25
Financial .....	26
First Quarter Exports Triple Those for Same Period 1939 .....	27
Steelworks Operations for Week .....	28
Open Hearth and Blast Furnace Meeting Draws 700 to Pittsburgh .....	29
Aviation .....	33
Men of Industry .....	38
Obituaries .....	39
Steel Warehouse Distributors Move Record Tonnage in 1939 .....	40
Activities of Steel Users, Makers .....	41
WINDOWS OF WASHINGTON .....	30
MIRRORS OF MOTORDOM .....	35
EDITORIAL—Steel Business Becomes More Stable .....	42
THE BUSINESS TREND .....	43
TECHNICAL	
Stainless Steel for Aircraft .....	46
Sick Absenteeism in Industry To Be Studied .....	48
How Gases and Oxides Affect Machinability .....	62
Heat Treating	
Automatic Control for Hardening Crankshafts .....	50
Ohio A. S. M. Chapters Study Methods for Hardening Steel .....	49
Refractory Tubes Used in Heat Treating Furnace .....	69
Metal Finishing	
Complicated Factors Accompany Use of Aluminum in Galvanizing .....	54
Materials Handling	
Efficient Production System Aids in Truck Assembly .....	58
Progress in Steelmaking	
Determining Best Pouring Practice .....	60
Hole Detector Simplifies Quality Production on Shearing Line .....	55
Joining and Welding	
Automatic Welding of Axle Housings .....	64
Steel Plate Forming Press Is All Welded .....	54
INDUSTRIAL EQUIPMENT .....	70
MARKET REPORTS AND PRICES .....	79
BEHIND THE SCENES .....	94
CONSTRUCTION AND ENTERPRISE .....	98
INDEX TO ADVERTISERS .....	104

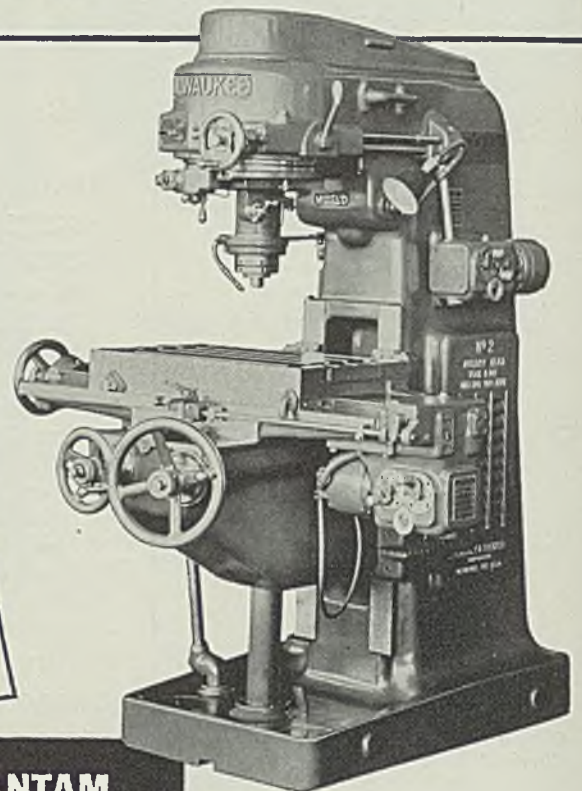
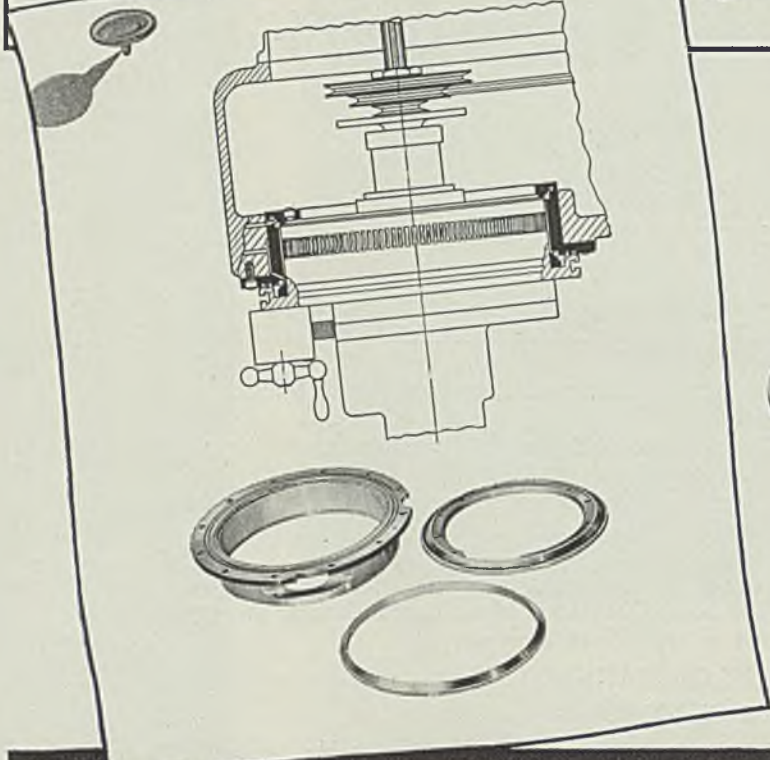
PRODUCTION • PROCESSING • DISTRIBUTION • USE

April 29, 1940

17

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# BANISHED



## KEARNEY & TRECKER TURNS TO BANTAM FOR ABSOLUTE BEARING ACCURACY

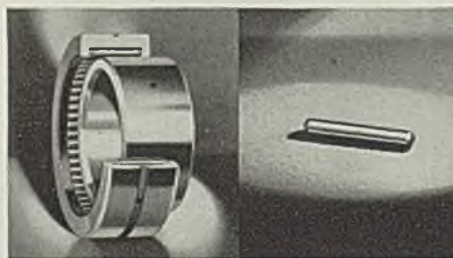
"ACCURACY of our 2D Rotary Head Tool and Die Milling Machine depends entirely on the accuracy of the bearing," say the engineers of Kearney & Trecker Corporation, makers of the well-known Milwaukee Milling Machines.

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(Left) BANTAM'S NEEDLE ROLLERS form an exceptionally compact, low-cost anti-friction unit. Where radial loads are high but space is limited and costs must be kept down, Bantam Needle Rollers will provide the answer to many design problems.

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# BANTAM BEARINGS

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## As the Editor Views

*The News*

STEEL output last week (p. 28) stood at 61½ per cent of ingot capacity, unchanged from the week previous. Demand for most finished steel products, while only moderate, is steady or (p. 79) tending upward. Withdrawal of the recent reductions in prices on sheet and strip, as of May 1, has accelerated buying of flat-rolled steel with indications that the mills are accumulating backlogs that will last them comfortably through June. As a result of new orders and others actively pending shipyards face capacity production for many months. Demand for alloy steels is heavy, due particularly to requirements of machine tool, aircraft and armament builders.

Iron and steel exports, excluding scrap, in the first quarter (p. 27) tripled those in the same period last year and still are rising. The United Kingdom and Italy (p. 79) have pushed ahead of Japan as buyers of American scrap. European buyers are seeking American pig iron. . . . "We are living in a madhouse," writes Vincent Delpont (p. 21) from London. He explains the intricate economic ramifications resulting from the European war—gripping neutrals as well as belligerents. . . . Leading producers have organized (p. 33) to develop information aimed at aiding airplane designers in the wider use of stainless steel. . . . STEEL's index of industrial activity (p. 43) is rising slightly.

"Wide open" debate on revision of the national labor relations act is foreseen as a result of action by the house rules committee. Other Washington developments of significance include invalidation of state anti-picketing laws by the Supreme Court and approval by the house of the Walter-Logan bill. . . . Re-sale price maintenance, the triple mill supply convention was told, is primarily the responsibility of

**Mill Supply  
Men Meet**

the manufacturer (p. 25) since he is in a position to see that his instructions are carried out. . . . South Africa's growing iron and steel industry (p. 32) is to be further increased. . . . Warehouses (p. 40) sold more steel tonnage in 1939 than than ever before.

While lighter aircraft structures will continue to be made of light alloys, says Carl de Ganahl, alloy steels, stainless steel in particular, will be used increasingly (p. 46) for construction of larger, longer-range planes. . . . John L. Burns (p. 49) comments on the advantages obtainable through interrupted or time quenching of steel. . . . A new refractory radiant heating tube has been installed (p. 69) in a furnace annealing sheet packs. . . . Special oxyacetylene equipment (p. 50) makes it possible to harden crankshaft wearing surfaces at rate of 20 shafts per hour. . . . Light armor plate has been developed (p. 69) for the protection of military airplane pilots.

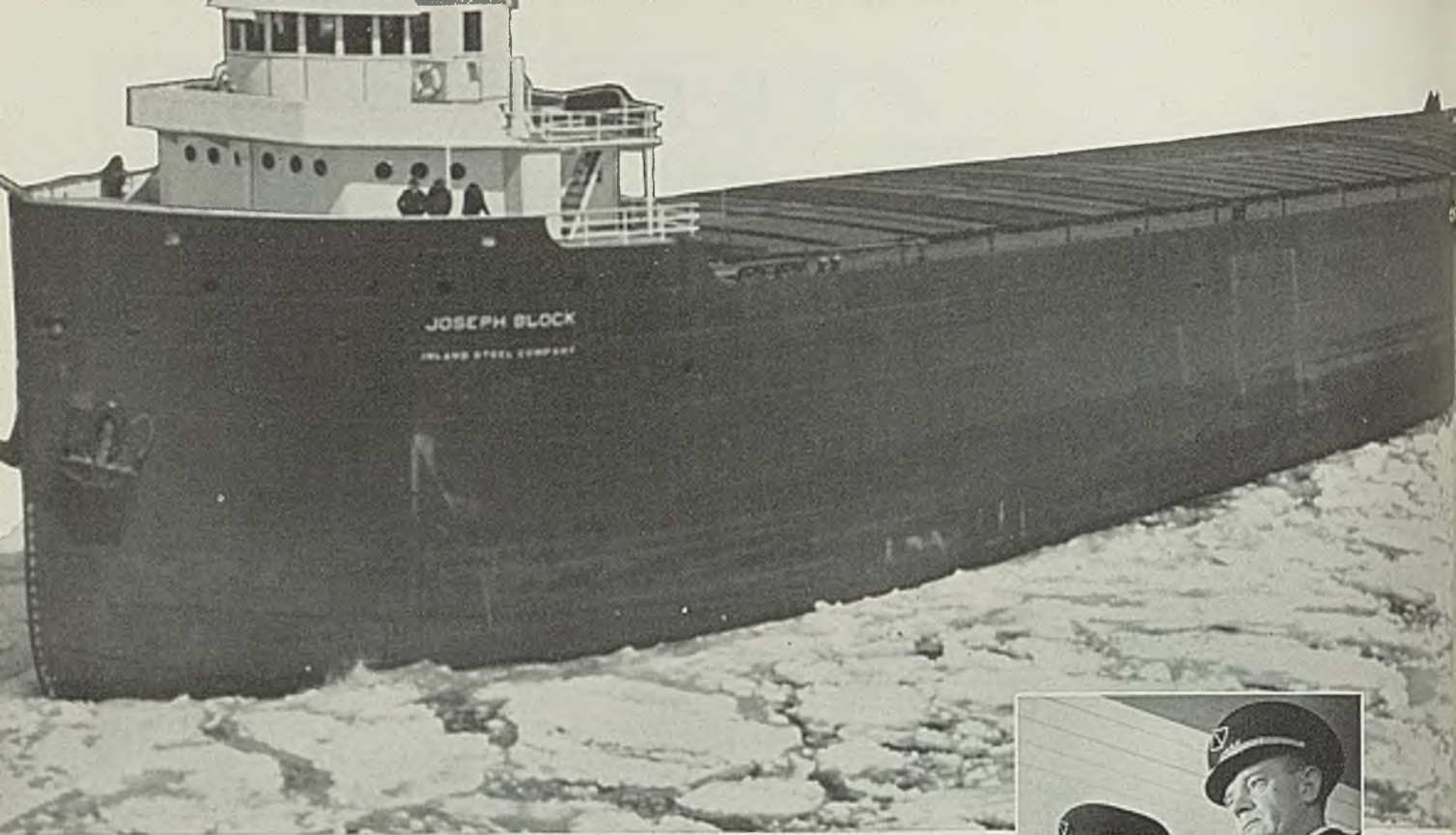
**Stainless  
In Aircraft**

George T. Motok reveals how gases and oxides (p. 62) affect the machinability of steel, accounting for idiosyncrasies of behavior of steels of identical chemical characteristics. . . . J. W. Meadowcroft (p. 64) tells how a problem in arc welding axle housings was solved. . . . E. H. Hollenback (p. 60) discusses variables in open-hearth pouring practice and recommends the development of controls based on careful study. . . . Wallace G. Imhoff (p. 54) gives pointers on how to keep the right amount of aluminum in a hot-dip galvanizing bath. . . . E. R. Nordin (p. 58) describes a production control system used in manufacturing 37 types of platform and fork trucks.

**Machining  
Problems**

*Watch for an early announcement of an important new service to STEEL's readers!*

*EC Kreutzberg*



## Inland Ore Freighters First to Open the 1940 Shipping Season!

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Again in 1939, navigation was opened by the L. E. Block, flagship of the Inland Fleet, which holds the record for transporting the largest single ore cargo of 15,778 gross tons.

Now in 1940, the Inland Fleet moves north into the ice fields to bring down raw

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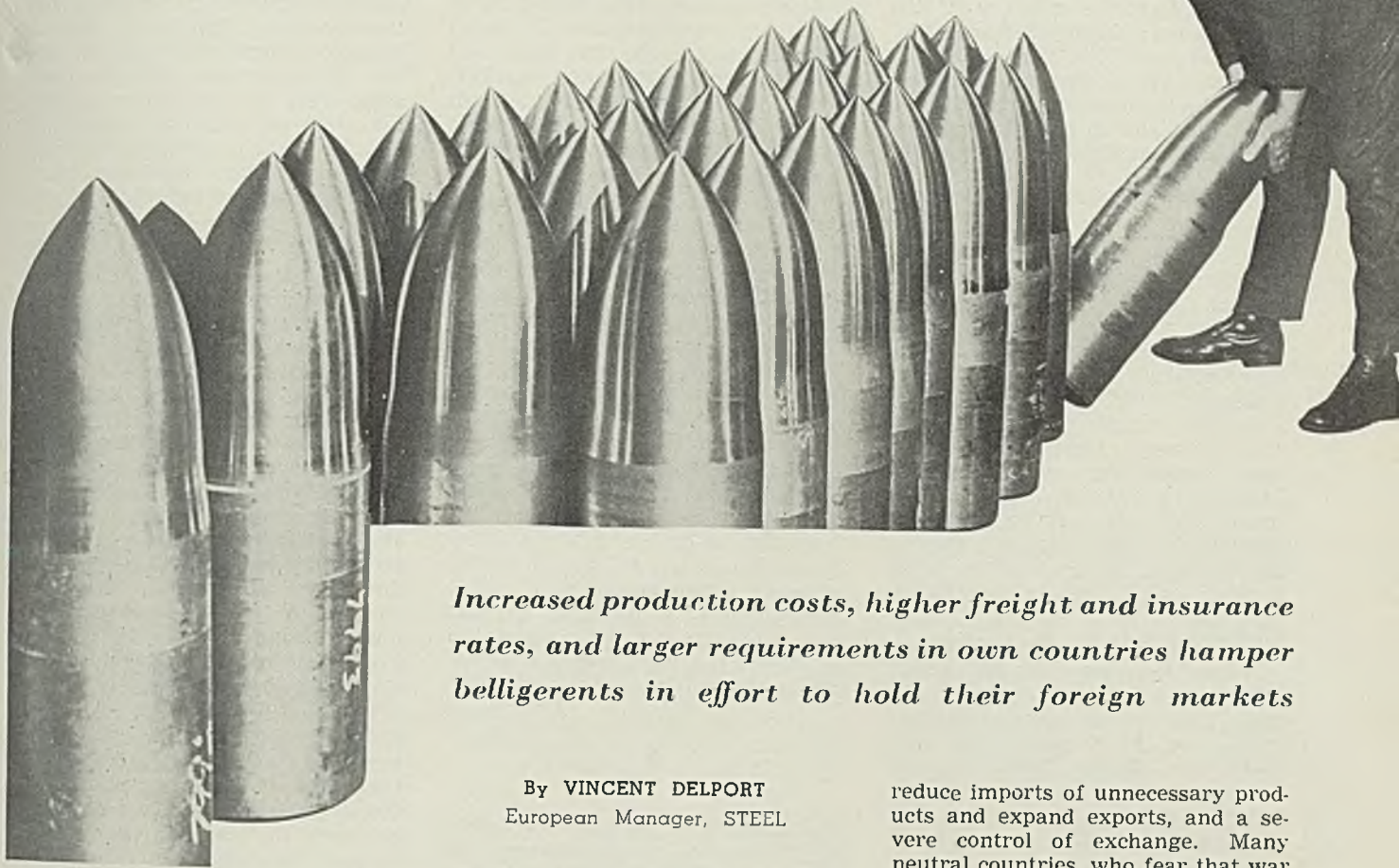
The Inland Fleet is an important unit of one of America's largest integrated steel producers, for Inland owns ore and coal mines, quarries, ships, docks and mills — every facility for steel making. From the time the raw materials leave the ground until the last metallurgist makes the final inspection and the steel is ready for the customer's use, Inland maintains continuous unified control of every process.

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# Europe Expands Steel Output Despite War Difficulties



*Increased production costs, higher freight and insurance rates, and larger requirements in own countries hamper belligerents in effort to hold their foreign markets*

By VINCENT DELPORT  
European Manager, STEEL

LONDON

(Passed by British censor)

■ MORE and more the strategy of this war lies in the economic field. A major battle to bring about a decision can be waged only by means of a terrific expenditure of ammunition and of oil for aircraft and transport. Thus, steel and oil are of paramount importance. Each side is striving to make sure of the necessary supplies, which must be available as a constant stream.

Therefore control must be had of the sources and the main theaters of the war at present are situated in the iron ore fields of Sweden and in the oil fields of Southern Russia and of Rumania. Britain and France control sufficient sources of supply for their own requirements; Germany does not. Germany is striving to maintain the flow of iron ore from Sweden and to acquire oil at its source in Rumania and Russia. The Allies are striving to prevent this action and cut Germany from outside sources. Thus diplomatic pressure backed by armed force, and a naval blockade are the tools of war today. Steel

and the ore from which it derives has a higher value than gold for the belligerents.

In such a war, ordinary methods of reckoning cannot be applied to any inquiry into economic conditions, nor are the usual means of investigation available. Logic is of little help since the measures taken by nations affected by war—and which nation is not affected directly or indirectly—bring about a situation full of contradictions.

To put it less mildly but more pointedly, we are living in the atmosphere of a madhouse.

### Trade Principles Contradicted

In our day of rapid communication and widespread trade activities darting from one end of the world to the other, a major war in one part of the globe scatters its disturbing influence far beyond the sphere occupied by belligerent nations. One of the most visible aspects of the present situation is found in the necessity for the belligerents to preserve all their national resources and at the same time increase their foreign holdings, which means an intensive drive to

reduce imports of unnecessary products and expand exports, and a severe control of exchange. Many neutral countries, who fear that war may extend to their own territory, take similar measures.

The contradiction is twofold: Foreign trade becomes impossible if nations expect others to buy from them while refusing to purchase those other nations' goods. Trade is based on the exchange of goods and services, and here this fundamental principle is destroyed. The effect within the nation itself is that not only must citizens be deprived of those products which they do not normally manufacture and which they are no longer allowed to purchase outside, but they must also restrict themselves in regard to their own goods which are earmarked for national requirements first, and secondly for the export markets.

Another form of trade balance is twisted: Owing to war necessities such as airplanes, machine tools, etc., certain classes of products are more essential than others to the countries at war or preparing for war. As a result, if such products must be imported in much larger quantities than normally, such increased imports must be compensated by a reduction of purchases of

less essential products and this causes a hardship to the so-called nonessential industries.

These contradictions apply to the iron and steel industry of Europe today and to its related fields such as iron ore mining and coal mining. In fact, the strategy of the war has been largely influenced by such factors as available supplies of Swedish ore to Germany, of German coke to Luxemburg, of German and British coal to Italy, and of Russian and Rumanian oil to Germany.

#### Raw Materials Limit Production

Where raw materials are available, steel producing nations are intensifying their output almost to breaking point. Such is the case in Great Britain, France, and presumably Germany. Belgium, having now largely overcome difficulties connected with ore supplies which are partly coming from France, has also markedly increased iron and steel production since January. Luxemburg is still at a disadvantage owing to restricted deliveries of German coal and coke necessary to her furnaces, but the position is improving and the monthly output of steel ingots now is about 145,000 tons, which is still below average.

Notwithstanding increased output, Britain and France have to supplement their requirements of semifinished steel by imports from Belgium, the British Dominions and America.

Influenced by the factors referred to at the beginning of this article, conditions in the European steel export trade are uncertain and, in some respects, novel. However much Britain, France and Germany are anxious to preserve their export markets and expand their export tonnage, their own heavy requirements for war purposes must come first and only a few classes of finished products can be exported.

Belgium and Luxemburg are main-

taining a certain volume of trade, but this is restricted by their own needs, and the abnormal demand of the belligerent nations for semifinished steel is diverting much of the trade from its peace time channels.

As a consequence the United States has done some business in South America and in the Far East, and even in certain European markets which were previously of difficult access to American steel, Sweden and Holland being cases in point.

In addition to the incapacity of Belgium and Luxemburg to supply their normal export markets, the factor of price also plays in America's favor. Costs of production are increasing more and more in Europe, and outgoing freight rates and insurance have also risen substantially. Thus the United States can supply South America and Far Eastern markets at lower prices than European countries can.

This tends to explain the drop in Belgian and Luxemburg export prices that has taken place since the beginning of the year, despite the heavy demand. At the beginning of January merchant bars for export were quoted at £7 13s (gold) per ton, f.o.b. Antwerp, but at the beginning of March the price was 10s lower. Heavy basic steel plates dropped



Germany's oil imports from Russia are being impeded by difference in gage between railroad tracks in the two countries, necessitating transfer of oil from Russian to German tank cars at border (lower left). Another source for the oil so vital to the Nazis' mechanized military forces is in Rumania's rich fields (lower right), toward which the Allies fear Germany may strike next. Britain, continuing to place faith in her navy, is feverishly building new ships (center) and shipyards are working at capacity. NEA photos

from £9 9s to £8 7s and black sheets, 24 gage from £9 9s to £7 19s. It is a sign of the present unbalanced state of things that sheets are actually sold at a lower price than plates.

The war affects many steel producing countries in a similar way. For example, Britain as well as France, Germany as well as Italy, are ferreting out iron and steel scrap for their furnaces, organizing, with more or less earnestness and success, nation wide searches to retrieve old iron bedsteads, empty cans, disused castings, etc.

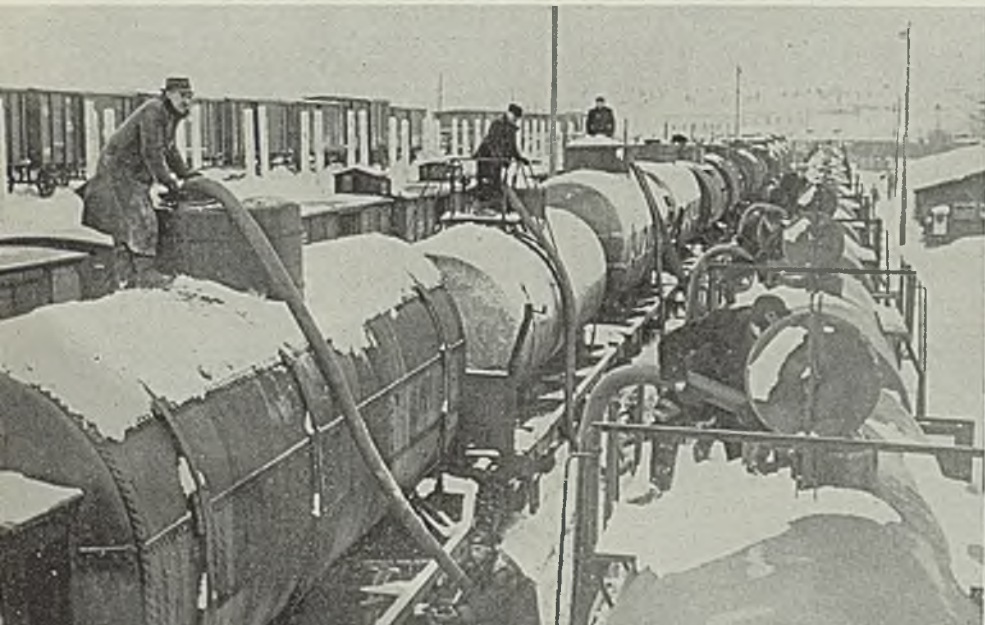
#### Rise in Iron and Steel Prices

Besides these common effects certain phases are particular to certain countries, and a brief review of the more outstanding features of recent date follows:

In Great Britain, the authorities have been greatly concerned with the necessity of expanding British export trade. For this purpose a special Export Council has been set up, and certain industries have been classified into groups, each making products of a similar kind that can find a market abroad. With this purpose in view it is expected that home consumers may be rationed in order to allow greater quantities to be available for export.

The iron and steel industry constitutes one of the groups for whose products there is an increasing demand from foreign markets beyond the seas, but national requirements are such that, so far, only certain finished products, tin plate, railroad rolling stock, automobiles, have been released in any substantial quantity. It is, perhaps, symptomatic that when this export drive started, Sir Andrew Duncan, then chairman of the British Iron and Steel Federation, was appointed to replace Oliver Stanley as president of the board of trade.

British iron and steel prices,



which had been increased Nov. 1, 1939, were increased a step higher Feb. 1, 1940. The rise amounted to 3s a ton for pig iron, one pound a ton for semifinished steel and corresponding increases for various finished products. The proceeds of these increases are allocated to a central fund for the purpose of meeting additional costs, such as higher freight rates for ore shipments, etc. This central fund is used to equalize the burden of costs over the whole industry.

On March 5, scrap prices were further increased by from 5s to 10s per ton, and this may indicate a new rise in iron and steel prices in the future.

British output of iron and steel is high, particularly as regards steel, and it has been estimated recently that present steel production is at the annual rate of 14,000,000 tons, which must be near capacity, although new plants are being added here and there. There is a corresponding increase in employment, which covers all classes of finishing industries but, perhaps more particularly at this time, the shipyards.

#### Steel Products Rationed

The latest development in Britain was the change, which took place as from April 1, in the system of issuing licenses for the sale and consumption of iron and steel products. Certain disadvantages were observed in this system, and in the light of the experience of the past six months a method of rationing has been established. Requirements of all consumers, including service departments, industries of national importance, export markets and domestic commercial users, have been assessed, and available supplies are to be rationed out quarterly, on the basis of this assessment, which will be adjusted from quarter to quarter.

It is believed that this method

will permit of a fairer distribution and more regular deliveries, enabling at the same time the various groups of consumers to base their programs on fixed delivery periods, knowing that for 12 months a definite tonnage of steel will be available for the trade in which they are engaged.

In France the works are extremely active, and distribution of the output is subject strictly to priority of national requirements. Not only is little French steel available for export—what there is is earmarked for Great Britain—but France is



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to the industry.*

**WATCH FOR DETAILS!**



importing from Belgium, and about 17,000 tons of rolled steel was purchased in February. Orders were also to be placed for American steel.

All such orders are placed through the Comptoir Siderurgique, which allocates the tonnages purchased to the consumers according to an order of priority based on war requirements.

French coal mines are working at capacity, but without producing enough to meet demand, especially in regard to coking coal.

Excepting a few isolated cases, French iron and steel prices have remained unchanged since the beginning of the year. Certain classes of iron and steel products are now allowed into the French market free of duty, a step which had already been taken in Great Britain.

From various reports concerning

conditions in Germany, it appears evident that the iron and steel industry there is working at full pressure, but that serious anxiety is caused by the difficulties experienced in obtaining the essential requirements of iron ore from Sweden. In the first two months of this year German imports of iron ore from Sweden totaled 381,131 tons, as compared with 963,372 tons in the corresponding months of 1939. British imports of ore from Sweden increased from 137,964 tons to 280,146 tons during the same periods.

Owing to this situation Germany must intensify her output of domestic ores of low iron content, which means higher production costs and a poor yield.

Works captured in Poland, Bohemia and Moravia are put to contribution and the inhabitants of those territories are reported to be drastically rationed in their consumption of steel.

#### Gained Coal Fields

Germany has obtained control of considerable coal fields, but it is not coal which the Germans are lacking but iron ore; surplus coal, however, can be used as a means of exchange for other products which Germany needs. Any surplus tonnages of steel manufactured products which she may have available, Germany is anxious to export to Eastern Europe, and particularly to Soviet Russia, but doubts are expressed as to the extent of this trade.

Most other steel producing nations in Europe are endeavoring to increase their output despite difficulties brought about by war conditions. The Ymuiden concern in Holland is extending its operations to a steel plant, which is expected to be completed by the end of the year, and to a new plate rolling mill. Russia is constructing additional blast furnaces; four are reported to date, each of a daily capacity of 1400 tons.



# Further Expansion in Canada Necessitated by War Orders

TORONTO, ONT.

■ PRODUCTION tempo in Canadian iron and steel industry continues to rise as the country's industrial facilities become better geared to war requirements. With strong increase in activities directly due to war orders, industry in Canada faces prospective expansion on a much wider scale in the immediate future.

March pig iron production totaled 91,772 gross tons, compared to 87,032 in February and 40,723 in March, 1939. April production, however, is expected to decline, due to banking of one 550-ton blast furnace at Sidney, N. S. Six furnaces are now in blast in Canada, two banked.

Steel ingot and direct steel casting output in March totaled 157,326 gross tons, against 140,343 in February and 95,697 in March, 1939. Last month's production included 150,537 tons of ingots and 6789 tons castings. Ferroalloy output in March aggregated 8298 gross tons, compared with 7711 in February and 3526 in March last year.

First quarter iron and steel production, compared with corresponding 1939 period, in gross tons:

	First Quarter 1940	First Quarter 1939
Pig iron .....	283,507	139,716
Steel ingots, castings .....	464,165	251,074

Most orders recently placed in Canada by Allied governments were for shells, guns and munitions. British supply board, Ottawa, currently is arranging to close contracts aggregating \$17,000,000. Awards, officials state, will be made very soon. Reports further indicate British government alone will place war orders averaging \$1,250,000 daily, with similar amounts placed by Canadian government.

Large orders for shells, other munitions have been placed with Dominion firms by Great Britain, according to official reports at Ottawa, with additional awards pending. Among Canadian companies engaged in wide scale production of shells are: National Steel Car Corp., Hamilton, Ont.; Canadian Car & Foundry Ltd., Dominion Engineering Co., and Robert Mitchell Co., Montreal, Que. Orders on hand, in most cases, are sufficient to tax capacity for at least a year; further awards would involve installation of additional equipment. Most of these companies are now engaged in making large plant additions.

Approximately \$75,000,000 has al-

ready been placed with Canadian firms, through domestic government agencies, for munitions. British government's appropriation for war purchases in Canada during first war year was \$445,000,000.

## MEETINGS

### MACHINE TOOL DEALERS TO MEET IN ATLANTIC CITY

■ ASSOCIATED Machine Tool Dealers of America will hold spring convention at the Claridge hotel, Atlantic City, N. J., May 13-14. At the opening session, the following papers will be presented: "Taxes," by George A. Fernley, advisory secretary; "Production of Interchangeable Precision Parts," by H. W. Young, production manager, Hamilton Watch Co., Lancaster, Pa.; "Artillery Shell Production," by Col. L. H. Campbell, Frankford arsenal. A golf tournament will be conducted on the afternoon of the first day.

At the informal banquet scheduled for May 13, Burnham Finney, editor, *American Machinist*, will speak on "After the War, What?"; "Navy Procedure in Machine Tool Purchases" will be discussed by Commander H. M. Scull, United States navy, and Dr. Allen A. Stockdale, National Association of Manufacturers, will speak on "Free Enterprise in Free America."

Subjects listed for the general session on the second day include: "What to Sell When Factories Are Loaded and Deliveries Are Bad," by F. W. Schiefer, F. W. Schiefer Machinery Co., Rochester, N. Y.; "How the Machine Tool Market Is Affected by the Airplane Industry Activity," by D. N. Macconel, Machinery Sales Co., Los Angeles, and "Special Ordnance Machine Tools," by Tell Berna, general manager, National Machine Tool Builders' association.

An inspection trip through Frankford arsenal is scheduled for Wednesday morning, May 15.

### WELDING EXPERTS TO SPEAK AT CLEVELAND CONFERENCE

Cleveland section, American Welding society, will conduct its annual conference at Hotel Statler, Cleveland, May 3. The program comprises an afternoon technical session, a dinner, and an evening technical session.

Papers and speakers scheduled at the afternoon session are: "Cutting

and Machining with Oxyacetylene Torch," by John J. Crowe, assistant to vice president, Air Reduction Sales Co., New York; "Flame Hardening, Flame Softening, Flame Strengthening," by J. H. Zimmerman, development engineer, The Linde Air Products Co., New York; and "Economic Production of Heavy Mechanical Equipment by Use of Welding and Cutting," by George A. Jessop, chief engineer, S. Morgan Smith Co., York, Pa.

Dr. J. C. Hodge, chief metallurgist, Babcock & Wilcox Co., Barberton, O., will address the evening meeting on "Metallurgy of Arc Welding."

### PROVIDING MORE SPACE FOR CLEVELAND METAL SHOW

Advance space reservations for the National Metal exposition in Cleveland public auditorium, Oct. 21-25, are the largest in the history of the show, and already exceed the entire floor space occupied in Chicago last year.

In February, the American Society for Metals, sponsor of the exposition, laid out an exhibit area of 85,000 square feet and gave exhibitors in previous shows an opportunity to engage their choices. By the closing date of April 6, requests for 86,000 feet had been received.

In view of this situation, assignments will be deferred until additional space is laid out. Public auditorium affords ample space—up to 150,000 square feet—but that laid out was in accordance with that of previous expositions.

### \$19,350,000 For Plant Expansions in Chicago

■ New construction and plant expansion announced in Chicago industrial district so far this year total \$19,350,000. Of this, \$3,350,000 has been announced in past 30 days, and includes 28 large plants. Hoefft & Co., poultry incubator manufacturers, have announced \$262,000 will be spent for plant improvements, while other expenditures will be made by Union Machinery Co., Brake Equipment & Supply Co., Goodrich Electric Co., and Safety Socket Screw Co.

### Bar Mill Wage Steady

■ Monthly settlement of bar mill wage base by Amalgamated Association of Iron, Steel and Tin Workers and the Western Bar Iron association last week developed a card rate for May on boiling, bar and 12-inch mills at 2.15c; on guide and 10-inch mills, 2.25c, rates that have been unchanged since June, 1939.



# Manufacturers, Distributors

## Review Problems at Dallas

■ MUTUAL problems were frankly reviewed at the triple convention of the Southern Supply and Machinery Distributors' association, National Supply and Machinery Distributors' association and American Supply and Machinery Manufacturers' association at Dallas, Tex., April 22-24. More than 500 attended.

Each organization has a relations committee for the purpose of working out selling and other problems affecting both manufacturers and distributors. It was pointed out the three groups show an increasing tendency to work together more harmoniously, attributed in large measure to the increasing difficulties in doing business.

Discussing this subject from the distributors' standpoint, H. H. Kuhn, The Hardware & Supply Co., Akron, O., and chairman, manufacturers' relations committee of the National association, said some manufacturers do create unrest, etc., because they do not publicly state their sales policies, but these are in the minority. There are also some distributors in the same category, he said, and the manufacturers should not permit this small group to influence their judgment of the rest of the industry.

### Distributors Must Be Sold

Mr. Kuhn said manufacturers do a poor job in selling their distributors. Salesmen often do not have technical training, he said, and thus are poorly equipped to tell the distributor what he wants to know, the products made, the type of consumers who can use them and sales policies.

He demonstrated the importance of the distributor market by pointing out that five manufacturer's salesmen calling on 40 distributors each or a total of 200, reach about 2000 salesmen, based upon ten per mill supply house. These 2000 salesmen have an average of 15 accounts or a total of 30,000 customers. Further, each customer represents an average of two key men or a total of 60,000 individuals.

J. B. Crimmins, Mills & Lupton Supply Co., Chattanooga, Tenn., and head of the Southern group's relations committee, touched upon the problem of reciprocal selling, now being studied but for which no satisfactory solution has been found. Too often, he said, a manufacturer will sell a finished product to a customer in Pittsburgh and the customer will request billing through

a dealer in Kansas, in turn one of its customers.

H. F. Seymour, Columbian Vise & Mfg. Co., Cleveland, who spoke as head of the relations' committee of the manufacturers' group, pointed out the more cordial relations existing between the three organizations and cited the increasing tendency to sell more products through distributors as part of that plan, although expressing the opinion that some products should be sold direct. Manufacturers are choosing more selective and exclusive distributors, he said, and are studying more carefully such problems as packaging and small orders on which the distributor makes little or no money.

A questionnaire sent to distributors revealed considerable information which may be used as the basis for further improvement of relations. First, it was found that definitions of a trading area varied



H. K. Clark

Elected president, American Supply & Machinery Manufacturers' association

widely but it was agreed that it should constitute the section which salesmen cover regularly and in which adequate service can be given. Second, it was found that adequate stocks are carried where distribution is selected and where resale price schedules are maintained. Third, it was noted that few manufacturers enforce resale prices. Also, granting of exclusive territories offers more sales incentive to the distributor.

C. A. Channon, Great Lakes Supply Corp., Chicago, said that from a selling standpoint, supply houses must have products which will sell steadily, which may be introduced with good "repeat potentials," and

which will tend to sell themselves.

Fully half the orders taken by distributors average under \$5 and are handled at a loss, Mr. Channon said. A markup of over 40 per cent would be required to break even on this type of business.

Markup problem is a serious one, especially on small orders. Speaking on this point, D. W. Northrup, Henry G. Thompson & Son Co., New Haven, Conn., said the industry will hear more about it in the next year or so.

One interesting feature was a "Town Hall Meeting" covering "Necessity for 2 Per Cent Cash Discount in Our Industry," and "Resale Prices and the Responsibility for Their Maintenance."

Tyler W. Carlisle, Strong Carlisle & Hammond Co., Cleveland, said fully half of distributor dollar billings were paid by the tenth of the month and thus earned 2 per cent discount. Abandonment of the present 2 per cent discount allowed by manufacturers to distributors in turn would work a hardship on the latter, he said. In stressing its importance, he stated in the case of some distributors, the 2 per cent discount represented as much as 38 per cent of their net profits. Distributor customers also often extend the discount date to the twentieth, he said. Around 85 to 90 per cent of the manufacturers allow the 2 per cent discount and he urged other manufacturers to follow a similar policy. The discount of 1/2 per cent on steel items is satisfactory, he said, since this is the rate expected by customers.

### Resale Prices Controversial

Question of resale prices aroused lively debate. Howard W. Schramm, Turner Supply Co., Memphis, Tenn., said price maintenance is "primarily the responsibility of the manufacturer since he is in a position to see that his instructions are carried out." In one case a manufacturer took a firm stand to clear up price cutting and as a result the distributor is pushing the line harder since it now is more profitable.

On the other hand, said Robert D. Black, Black & Decker Mfg. Co., Towson, Md., the responsibility is "50-50" between the manufacturer and the distributor. Many distributors like to use their own judgment in quoting prices, making situation difficult to police.

H. K. (Tony) Clark, Norton Co., Worcester, Mass., said distributors need the margin now available without cutting prices, as indicated by their small net profits. Requests often are made by distributors for larger margins, he declared.

An entire session of the Southern and National associations devoted to questions and answers  
(Please turn to Page 97)

# FINANCIAL

## GRACE EXPRESSES OPTIMISM REGARDING STEEL'S FUTURE

■ EXPRESSING optimism over steel industry's immediate future, Eugene G. Grace, president, Bethlehem Steel Corp., Wilmington, Del., last week declared the industry's current 60 per cent operating rate anything but discouraging. Particularly is this so, he said, in light of limited railroad and automobile demands, along with low structural activity. Mr. Grace explained that although automobile production was at a high rate, requirements were being met largely from steel on hand.

Bethlehem's new business, according to Mr. Grace, is coming in at 75 per cent of capacity, easily sustaining current 74 per cent operations. He attributed the corporation's high ingot operations, as compared to industry's average, to miscellaneous demand, primarily, plus ship tonnage and improved export requirements. Bethlehem's integrated business, he also suggested, particularly shipbuilding operations, provides a strong supporting tonnage.

Exports, said Mr. Grace, were relatively much better than last year's 12 per cent of Bethlehem's total business. Virtually all buying so

far, he asserted, has been in commercial steel, particularly for neutral nations previously relying upon the belligerents for steel. Most tonnage placed to date by France and Great Britain, he said, has been semifinished, with very little shell steel tonnage awarded.

Volume of orders on hand March 31, said Mr. Grace, aggregated \$255,802,117, third largest in company's peace-time history, and surpassed only by preceding two quarters' totals. Ship business volume at first quarter's end was virtually unchanged from preceding quarter.

Declaring he had not seen any factors in the competitive situation to justify the recent price reduction, Mr. Grace said lowered prices had not added tonnage to Bethlehem's orders for strip and sheets. He emphasized that orders booked by his company at present levels until May 1 would be only for delivery over remainder of this quarter.

Net income for quarter ended March 31 totaled \$10,891,139, compared to \$2,409,059 in corresponding period last year and \$13,028,928 in last 1939 quarter.

Dividend of \$1.75 per share on 7 per cent cumulative preferred stock was declared, payable July 1 to record of June 7. Also \$1.25 per common share, payable June 1 to record of May 10.

First quarter employment was highest since World war days, to-

taled 111,339, compared to 110,824 in preceding period. Average hourly earnings were 92.6 cents, against 92.4 cents in last 1939 quarter; working hours per week, 36, compared to 37.2; and total payroll, \$47,494,000, against \$49,167,000.

Steel production, ingots and castings, averaged about 87.4 per cent of capacity in first quarter, compared with 98.6 per cent in last 1939 period and 53.8 per cent in first quarter last year.

## PURNELL SAYS CONSUMPTION EXCEEDS STEEL BUYING

Youngstown Sheet & Tube Co., Youngstown, O., reports first 1940 quarter operations resulted in \$1,253,929 net income, compared to \$217,107 earned in corresponding 1939 period. Net income in fourth quarter last year was \$3,693,225; in third quarter, \$765,066.

Declaring current actual steel consumption exceeds new business, Frank Purnell, president, last week predicted an upturn in steel buying when consumers' present inventories have been reduced. Speaking at the company's annual meeting, Mr. Purnell said export trade to supply neutral nations' civil needs "now accounts for a fair portion of our operations."

Neutral buying, he said, is cautious at present, "but if war continues, countries not at war will have to depend more and more

## 65 Iron, Steel Consumers Report \$36,586,043 First Quarter Net Profit

■ AGGREGATE net income earned by 65 iron and steel consumers during first 1940 quarter totaled \$36,586,043, compared to \$20,767,113 net profit reported by the same companies in corresponding 1939 period.

Only five reported a net deficit for the quarter, compared to 15 in first quarter last year. All figures tabulated below are net earnings, except where asterisk denotes loss:

	First 1940 Quarter	First 1939 Quarter		First 1940 Quarter	First 1939 Quarter
Aetna Ball Bearing Mfg. Co., Chicago	\$87,628	\$63,552	Hoe & Co. Inc., R.; New York	\$5,652	\$77,172*
American Brake Shoe & Foundry Co., New York	582,562	408,937	Houdaille-Hershey Corp., Detroit	761,656	407,140
Atlas Tack Corp., Fairhaven, Mass.	28,737	28,044	Jackson Co., Byron; Huntington Park, Calif.	147,133	119,071
Aviation Corp., New York	196,447*	426,280*	Johns-Manville Corp., New York	781,681	125,118
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.	17,426\$	2,578\$	Kingston Products Corp., Kokomo, Ind.	23,731*	63,661
Bliss & Laughlin Inc., Harvey, Ill.	203,452	134,381	Le Tourneau Inc., R. G.; Peoria, Ill.	389,798	315,862
Bridgeport Machine Co., Wichita, Kans.	22,049*	139,264*	Lynch Corp., Anderson, Ind.	119,945	86,866
Briggs & Stratton Corp., Milwaukee	398,893	344,188	Marchant Calculating Machine Co., Emeryville, Calif.	225,001	168,894
Budd Mfg. Co., E. G.; Philadelphia	341,532	101,389	Marion Steam Shovel Co., Marion, O.	62,393\$	32,685*
Budd Wheel Co., Philadelphia	260,195	135,506	Master Electric Co., Dayton, O.	207,613	94,277
Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.	218,772	1,250	Maytag Co., Newton, Iowa	356,394	390,928
Caterpillar Tractor Co., Peoria, Ill.	1,470,046	928,118	Midland Steel Products Co., Cleveland	597,682	540,966
Central Foundry Co., New York	17,984*	32,727*	Minneapolis-Honeywell Regulator Co., Minneapolis	294,704	67,289
Chicago Railway Equipment Co., Chicago	140,125	10,835*	Motor Products Corp., Detroit	399,880	66,961
Clark Equipment Co., Buchanan, Mich.	548,194	243,791	Mullins Mfg. Corp., Salem, O.	52,951	94,840
Cutler-Hammer Inc., Milwaukee	406,295	56,702\$	National Cash Register Co., Baltimore	480,871†	484,024
Dresser Mfg. Co., Bradford, Pa.	350,875	20,026*	National Malleable & Steel Castings Co., Cleveland	470,625	286,329
Driver-Harris Co., Harrison, N. J.	143,036	34,649	New York Air Brake Co., New York	541,417	107,803
Eaton Mfg. Co., Cleveland	937,878	725,999	Noblitt-Sparks Industries Inc., Columbus, Ind.	286,049	138,655
Electric Auto-Lite Co., Toledo, O.	2,485,280	1,620,903	Seagrave Corp., Columbus, O.	16,341	26,405*
Electrolux Corp., New York	521,424	443,913	Signode Steel Strapping Co., Chicago	112,281	87,599
Emasco Derrick & Equipment Co., Los Angeles	80,489	50,548*	Standard Products Co., Cleveland	149,930	115,823
Eureka Vacuum Cleaner Co., Detroit	32,147*	27,086*	Stewart-Warner Corp., Chicago	328,202	146,275
Fairbanks Co., New York	9,415	3,961*	Superheater Co., New York	232,485	174,938
Federal Screw Works, Detroit	31,475	14,004*	Transue & Williams Steel Forging Corp., Alliance, O.	22,789	7,930
Ferro Enamel Corp., Cleveland	123,409	148,689	Twin Coach Co., Kent, O.	74,588	55,985
Florence Stove Co., Gardner, Mass.	198,030	106,333	Underwood Elliott Fisher Co., New York	588,728	560,163
Gardner-Denver Co., Quincy, Ill.	227,378	216,770	U. S. Hoffman Machinery Corp., New York	51,413	28,288*
General Electric Co., Schenectady, N. Y.	11,951,450	7,373,431	Victor Equipment Co., San Francisco	35,148	1,022*
General Railway Signal Co., Rochester, N. Y.	115,882	71,867*	Westinghouse Air Brake Co., Wilmerding, Pa.	1,847,140	399,015
General Time Instruments Corp., New York	350,905	125,276	Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.	4,041,428	2,356,150
Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.	152,630	119,638			
Gillette Safety Razor Co., Boston	696,447	867,547			
Greenfield Tap & Die Corp., Greenfield, Mass.	116,633	35,137			

\$Before federal income tax; †preliminary net profit; \*loss.

upon this country for their normal requirements." United States, he pointed out, is practically the only nation capable of supplying neutrals with steel products for their civil needs.

**CONTINENTAL FIRST QUARTER NET PROFIT TOTALS \$211,456**

Continental Steel Corp., Kokomo, Ind., reports first 1940 quarter net profit, after \$62,000 provision for future inventory price decline added to reserve for contingencies, was \$211,456. This was equal, after preferred dividend requirements, to 89 cents a share on common stock, was 24.3 per cent less than \$279,178 net income, equal to \$1.18 a share, earned in corresponding 1939 period. Net profit in fourth quarter last year totaled \$477,754; in third quarter, \$198,138.

Regular \$1.75 dividend on preferred and one of 25 cents a share on common stock were paid April 1, to record of March 15.

**COPPERWELD NETS \$227,687 PROFIT IN MARCH QUARTER**

Copperweld Steel Co., Glassport, Pa., reports first quarter net profit, subject to audit and adjustment, was \$227,687; this was equal, after preferred dividend requirements, to 45 cents a share on 431,714 common shares. Net income in corresponding 1939 period was \$200,177, equal to 46 cents a share on 431,714 shares of capital stock then outstanding.

**JONES & LAUGHLIN'S MARCH QUARTER NET IS \$1,134,611**

Net profit earned by Jones & Laughlin Steel Corp., Pittsburgh, during first 1940 quarter ended March 31, totaled \$1,134,611. This was equal, after dividend requirements on corporation's 7 per cent preferred stock, to 18 cents a share on 576,320 shares of common, and compares with \$376,525 net deficit incurred in same 1939 quarter.

**COLORADO FUEL & IRON NETS \$564,927 IN FIRST QUARTER**

Colorado Fuel & Iron Corp., Denver, reports first 1940 quarter net profit totaled \$564,927, equal to \$1 per share on capital stock, compared to \$163,631 or 29 cents a share in corresponding 1939 period. Net sales and operating revenue in quarter ended March 31 aggregated \$8,553,510, compared to \$6,117,779 in same 1939 period.

**WHEELING STEEL REPORTS SMALLER FIRST PERIOD NET**

Wheeling Steel Corp., Wheeling, W. Va., report shows first 1940 quarter net income was 11.5 per cent smaller than in corresponding 1939 period, despite 3.3 per cent increase

(Please turn to page 97)

# First Quarter Steel Exports Triple Same Period Last Year

■ IRON and steel exports in March, scrap excluded, totaled 457,052 gross tons, valued at \$34,220,853, exceeding the modern record of 436,585 tons valued at \$33,361,201, established in February, according to the metals and minerals division, department of commerce. In March, 1939, the corresponding figures were 162,098 tons, valued at \$12,569,693.

First quarter exports, again excluding scrap, 1,289,701 tons valued at \$98,735,419, were virtually three times as great in tonnage and more than three times as valuable as in the corresponding period last year, 431,663 tons valued at \$32,556,947.

Shipments to every continental area increased in March as compared with February. Trade with Europe increased from 146,447 tons to 153,326 tons; South America, 119,639 tons to 125,874 tons; Far East, 83,260 tons to 89,337 tons; North and Central America and West Indies, 72,662 tons to 73,870 tons; Africa 14,577 tons to 14,645.

Each of the leading markets increased its shipments in March over February. United Kingdom, 78,828 tons against 68,130 tons; Argentina, 47,859 tons against 43,281 tons; Canada, 46,266 tons compared with 40,586 tons; Brazil, 35,563 tons against 30,547 tons, and Japan, 22,174 tons compared with 10,952 tons.

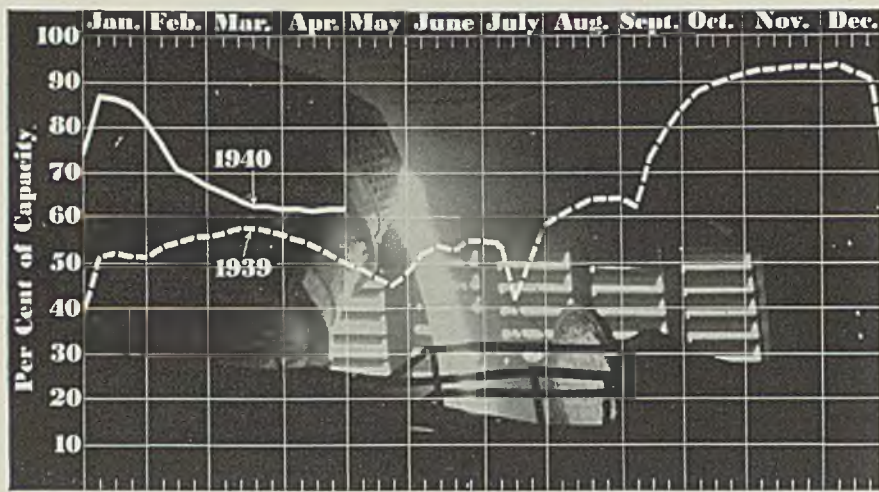
First quarter scrap exports, 629,101 tons valued at \$11,091,893, were 17.7 per cent smaller in quantity but only 2.2 per cent less in value than for first quarter last year, when they aggregated 765,059 tons valued at \$11,337,293.

In March Japan, usually leader in scrap purchases, occupied third place. United Kingdom led with 73,937 gross tons.

	Mar. 1940	Feb. 1940	Jan. thru Mar. 1940
Articles			
Sheets, galv. steel...	14,780	15,286	46,067
Sheets, "black" steel:			
Not containing alloy	44,372	38,142	113,083
Stainless steel	176	151	568
Alloy, not stainless	636	455	1,653
Sheets, black iron...	5,679	2,977	11,150
Strip steel, cold-rolled:			
Not containing alloy	4,299	4,615	13,706
Stainless steel	41	36	174
Alloy, not stainless	31	12	83
Strip steel, hot-rolled:			
Not containing alloy	12,868	8,892	35,064
Stainless steel	18	.....	21
Alloy, not stainless	103	4	142
Tin plate, taggers' tin	44,376	60,643	169,320
Terneplate (including long ternes)	528	399	1,554
Tanks, except lined	2,380	1,535	5,872
Shapes, not fabricated	16,751	13,008	44,288
Shapes, fabricated	5,479	6,706	19,075
Plates, fabricated	572	2,868	5,547
Metal lath	182	101	408
Frames and sashes	128	79	371
Sheet piling	238	13	2,222
Rails, 60 lbs.	10,548	10,104	24,604
Rails, under 60 lbs.	858	1,450	3,031
Rails, taggers' tin	1,510	344	3,008
Rail fastenings	1,025	1,284	2,690
Switches, frogs, crsags	606	495	1,482
Railroad spikes	491	546	1,528
R.R. bolts, nuts, etc.	119	212	700
Boiler tubes, seamless	1,953	2,357	5,849
Boiler tubes, welded	167	81	468
Pipe:			
Seamless casing and oil-line	8,355	12,767	34,763
Do., welded	3,845	4,536	12,038
Seamless black	4,633	3,102	9,458
Pipe fittings:			
Mall. iron screwed	392	516	1,406
Cast-iron screwed	272	161	714
Pipe and fittings for:			
Cast-iron pressure	1,443	7,097	9,991
Cast-iron soil	864	913	3,081
Pipe, Welded:			
Black steel	3,542	4,544	10,139
Black wrought-iron	351	561	1,328
Galvanized steel	3,549	4,602	13,690
Galv. wrought-iron	848	565	2,141
All other pipe, figs.	1,542	1,210	5,031
Wire:			
Plain iron or steel	9,238	7,692	23,551
Galvanized	4,564	2,875	10,564
Barbed	2,060	1,736	6,214
Woven-wire fencing	389	278	1,166
Woven-wire sc'n cloth:			
Insect	85	33	157
Other	191	263	597
Wire rope and cable	1,011	705	2,525
Wire strand	161	208	410
Electric welding rods	303	277	863
Card clothing	1	1	3
Other wire	1,343	1,981	4,550
Wire nails	4,254	4,275	13,887
Horseshoe nails	85	64	270
Tacks	65	71	209
Other nails, staples	419	239	987
Ordinary bolts, machine screws	1,199	1,185	3,465
Castings:			
Gray-iron (incl. semisteel)	426	329	1,197
Malleable-iron	174	151	456
Steel, not alloy	177	164	646
Alloy, incl. stainless	278	113	591
Car wheels, tires and axles:			
Wheels and tires	1,724	807	3,302
Axles, no wheels	240	157	578
Axles with wheels	11	67	85
Horseshoe and calks	100	6	110
Forgings, n.e.s.:			
Not containing alloy	1,709	1,322	5,037
Alloy, incl. stainless	318	180	785
Total	457,052	436,585	1,289,701
Scrap, iron and steel	205,041	232,800	623,494
Scrap, tin plate	702	419	1,570
Tin plate circles, strips, cobbles, etc.	533	454	1,313
Waste-waste tin plate	466	729	1,990
*Terneplate clippings & scrap	186	314	734
Total scrap	206,928	234,716	629,101
GRAND TOTAL	663,980	671,301	1,918,802
Iron ore (gross tons)	1,830	1,027	3,304
*New class.			

**UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS (Gross Tons)**

	Mar. 1940	Feb. 1940	Jan. thru Mar. 1940
Articles			
Pig iron	26,146	18,927	60,130
Ferromanganese and spiegeleisen	301	5,069	5,778
Other ferroalloys	479	473	1,699
Ingots, blooms, etc.:			
Not containing alloy	80,874	65,794	204,862
Alloy, incl. stainless	285	1,277	4,170
Steel bars, cold fin.	3,794	4,937	11,492
Bars, iron	2,651	2,176	6,276
Bars, concrete	13,880	18,710	52,134
Other steel bars:			
Not containing alloy	38,852	24,293	85,722
Stainless steel	65	58	203
Alloy, not stainless	2,193	1,325	5,118
Wire rods	19,124	14,417	42,836
Boiler plate	1,463	911	3,016
Other plates, not fab.:			
Not containing alloy	32,641	35,001	88,958
Stainless steel	51	9	64
Alloy, not stainless	148	383	704
Skelp iron or steel	2,420	3,388	14,343
Sheets, galv. iron	610	889	2,483



## PRODUCTION... Steady

■ STEELWORKS operations last week held steady at 61½ per cent of capacity. Six districts showed small increases and four were at a lower rate, led by a substantial decrease at Chicago. The remaining two showed no change. A year ago the rate was 49 per cent; two years ago it was 32 per cent.

**Chicago** — Declined 4½ points to 57 per cent following changes at two large mills. Other producers continued unchanged.

**Detroit** — Unchanged at 72 per cent, 19 of 26 open hearths in production.

**Birmingham, Ala.** — Up 2 points to 83 per cent, with 18 open hearths active.

**Buffalo** — Advanced 2 points to 44 per cent as Bethlehem Steel Co. added an open hearth.

**New England** — Down 3 points to 57 per cent.

**Pittsburgh** — Steady at 55 per cent, despite various shifts in active units.

**Wheeling** — Gained 7 points to 80 per cent, continuing steady rise of recent weeks.

**Youngstown, O.** — Increased 2 points to 45 per cent, several open hearths being put in service late

in the week. This week the rate probably will be about 49 per cent, the schedule including 44 open hearths.

**Central eastern seaboard** — Rose 1 point to 57 per cent.

**St. Louis** — Slipped 2½ points to 42½ per cent on curtailment by one producer.

**Cincinnati** — Fell 7½ points to 42½ per cent. One plant closed temporarily as a precaution against flood water.

**Cleveland** — Regained 5 points to 70 per cent as one producer boosted output sharply.

## Price Policy Benefits Tool Steel Industry

■ Tool steel industry, according to L. Gerald Firth, president, Firth-Sterling Steel Co., McKeesport, Pa., is now benefiting by its refusal to increase prices during last fall's upsurge in demand. Mr. Firth said this action in stabilizing prices has been a factor in stemming the industry's business downcurve which began early this year.

"Without impetus of a price change, the industry's production jumped from an August, 1939, level of about 50 per cent to nearly 100 per cent by mid-October. There was no question but that some buying in excess of immediate requirements was then practiced. Had a price scare been added to that feeling of concern regarding supply, the inventory situation would now be such that the present operating rate would be appreciably below the current level of about 60 per cent.

"As a result of this more favor-

able inventory situation among buyers, operations in our own plants struck a parallel with consumption by April 1. Moreover, there is considerable evidence today of a slight but more basic upturn in demand. Inquiries for tool steels and cutting materials have recently taken a more healthy and substantial trend.

"This improved picture also reflects a tangible change in the export trade."

## 1939 Steel Earnings 4.2% on Investment

■ Steel companies representing more than 90 per cent of the industry's output earned \$140,394,000 last year, after meeting all charges, but before paying dividends, according to American Iron and Steel institute.

In 1938 the same companies met with a deficit of over \$14,506,000 before paying dividends. Against an average investment of \$4,180,600,000 in 1939, the steel companies last year earned 4.2 per cent against earnings of 0.5 per cent on investment the year before when steel operations were at a substantially lower level.

The industry's return on investment over the ten-year period, 1930 to 1939 inclusive, averaged 1.8 per cent.

The total payrolls of reporting companies last year, including payrolls of certain subsidiary companies which do not produce iron or steel products, amounted to nearly \$971,000,000, against \$730,000,000 the year before.

In each of the last two years, stockholders received less than seven cents in dividends for every dollar going into payrolls.

Dividends paid to the 520,000 stockholders of the companies last year totaled \$66,550,000, against \$48,935,000 in 1938.

## Joseph T. Ryerson & Son Holds Open House May 11

■ Joseph T. Ryerson & Son Inc., Inland Steel Co. subsidiary, will hold open house at its Chicago plant May 11. Company's executives will be hosts. Buffet luncheon will be served and special buses provided for guests. Tours through the plant are scheduled.

In addition to warehouse facilities, Ryerson plants are equipped with machinery for sawing, burning, shearing, rolling, corrugating, threading, bending, punching and other operations on steel or other metals. Chicago and Jersey City, N. J., plants are also equipped with structural steel fabrication facilities.

## District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended		Same week	
	Apr. 27	Change	1939	1938
Pittsburgh	55	None	43	26
Chicago	57	- 4.5	49.5	33.5
Eastern Pa.	57	+ 1	37	27.5
Youngstown	45	+ 2	43	29
Wheeling	80	+ 7	63	46
Cleveland	70	+ 5	39	32
Buffalo	44	+ 2	37.5	28
Birmingham	83	+ 2	55	66
New England	57	- 3	43	27
Cincinnati	42.5	- 7.5	52	30
St. Louis	42.5	- 2.5	42	36.3
Detroit	72	None	59	18
Average	61.5	None	49	32

# Open Hearth and Blast Furnace Meeting Draws 700 to Pittsburgh

■ CONFERENCE of the Open Hearth and Blast Furnace and Raw Materials committee of the American Institute of Mining and Metallurgical Engineers at the William Penn hotel, Pittsburgh, April 24-26, was the best attended since the two committees were organized. Over 700 members and guests were registered for the three-day sessions. The open hearth meeting was the twenty-third which the committee has sponsored.

The acid open-hearth group inaugurated its first conference by meeting separately instead of with those interested in basic practice. The Blast Furnace and Raw Materials committee discussed its problems in a morning and afternoon session the first day, then met jointly with the open hearth group the second day.

It was announced by the Open Hearth committee that its contributions for a fellowship at Massachusetts Institute of Technology have been combined with other gifts and a scholarship awarded to Carl Fetters of Youngstown Sheet & Tube Co. Mr. Fetters at present is engaged in a program of investigating the equilibrium of slags up to open-hearth temperatures. A report of his investigation will be published next February.

Henry A. Roemer, president, Pittsburgh Steel Co., Pittsburgh, scheduled to speak at the fellowship dinner April 14, was not present because of illness, but his address was presented by G. A. Connors, vice president of the same company.

The future, Mr. Roemer believes, is more promising than ever before except for the political upheaval that may come as a result of the international situation. The immediate outlook is not discouraging. Inventories have been reduced and there is still a healthy demand for automobiles, railroad materials, agricultural implements, containers, etc.

The speaker predicted that 1940 will be a better year from the standpoint of steel tonnage than was 1939. The labor problem is not difficult, and will continue to be no trouble unless brought to a state of excitement. He pointed out that he has no more trouble in dealing with men under the present working conditions than experienced over the past 30 years.

In discussing the foreign situation, Mr. Roemer stated that if the dictator nations are successful in

sweeping across Europe this nation will have to fight for the rest of the world. America must be prepared and such preparations should have been in progress for the past four years. Instead, millions of dollars have gone down rat holes and



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for an important  
announcement in  
STEEL Soon!*



for raking leaves; the greatest navy in the world should have been built.

The railroads should have been given serious consideration along the lines of improvement for they are our most efficient system of transportation.

In the opinion of the speaker, this country is nearer war than generally realized. What effect will it have on the steel industry? It will mean greater production. Labor and man-

agement co-operating will arise to the occasion.

Several hundred made an inspection trip to the Edgar Thompson works of Carnegie-Illinois Steel Corp., Braddock, Pa., on the afternoon of April 25.

A complete report of the three-day sessions will be presented in STEEL next week.

## March Household Washer Shipments Total 149,730

■ Household washer factory shipments during March totaled 149,730 units, 1.9 per cent less than 152,725 in same 1939 period, according to American Washer and Ironer Manufacturers' association, Chicago. March was first month since October, 1938, in which shipments showed a decline from the same month in previous year.

Shipments in first quarter this year aggregated 411,276 units, were 4.7 per cent higher than 392,519 in corresponding 1939 period.

Ironer unit shipments in March totaled 12,048, down 10.3 per cent from 13,431 in March last year.

■ Latest developments in welding technique as applied to nickel and high nickel alloys, brass, copper, aluminum and aluminum alloys will be demonstrated at a Chicago district general welding clinic, May 16-17, according to report from Steel Sales Corp., Chicago. Demonstrations will be held at Steel Sales Corp.'s Chicago warehouse, 3348 South Pulaski road.

## Cast Iron Rings Form Tunnel Lining



■ Cast iron rings 30 feet in diameter and weighing 3200 pounds each form the lining for Queens Midtown tunnel under East river, New York. To make tunnel waterproof, grooves between rings were caulked with lead. Rings were prepared for caulking by power-driven wirewheel brushes to clean off rust and a wax coating. Photo, courtesy Osborn Mfg. Co., Cleveland

# Windows of WASHINGTON



By L. M. LAMM  
Washington Editor, STEEL

## WASHINGTON

■ HOUSE rules committee took unexpected and practically unprecedented action last week in clearing way for taking up amendments to national labor relations act.

With only rules committee chairman Sabbath opposing the procedure, committee reported out a rule which permits representatives to consider recommendations of the regular house labor committee and special committee of which Representative Smith, Virginia, is chairman. Labor committee, as previously pointed out in this column, recommended four amendments to labor act, while Smith majority committee suggested more sweeping changes.

Rules committeemen said this procedure would permit "wide open" debate on Wagner act changes.

Labor committee's amendments would increase labor board from three to five members, protect craft unions, permit employers to petition labor board for collective bargaining election and insure, for at least one year, valid operation of a legal employer-employee contract.

Majority of Smith committee would create a new national labor board, separate its judicial and administrative functions and revamp much of the board's procedure.

"It would set up a most dangerous precedent," Mr. Sabbath said. "It is the most drastic rule ever reported by our committee."

Exact time when so-called "rule" on the two sets of amendments can be presented to the house will depend largely on administration leaders' wishes.

## ANTIPICKETING LAWS RULED INVALID BY SUPREME COURT

Two decisions handed down last week by United States Supreme Court grant the right of peaceful picketing in labor disputes.

Voting eight to one, the court de-

clared invalid antipicketing laws enforced in Alabama and Shasta county, California, under which Committee for Industrial Organizations and American Federation of Labor members had been convicted.

Unions had challenged the laws as infringement on constitutional right of free speech, press and assembly.

"In the circumstances of our times the dissemination of information concerning the facts of a labor dispute must be regarded as within that area of free discussion that is guaranteed by the constitution," the court said.

Justice McReynolds dissented, but did not write an opinion.

## Sees Threat to Freedom of Speech

Alabama picketing case reached Supreme Court on an appeal by Byron Thornhill, president of a creators' union affiliated with AFL, who had been fined \$100 in state circuit court for violating law prohibiting "loitering and picketing" in connection with a strike at Brown Wood Preserving Co. plant., Brownville, Ala. Defendant, whose conviction was upheld by Alabama court of appeals, had urged another worker not to resume employment until strike was settled.

"Range of activities proscribed (by law), whether characterized as picketing or loitering, or otherwise," court said, "embraces nearly every practicable, effective means whereby those interested—including employes directly affected—may enlighten the public on nature and causes of a labor dispute. Safeguarding of these means is essential to securing of an informed and educated public opinion with respect to a matter which is of public concern."

Answering the state's contention that "the purpose of the challenged statute is protection of the community from violence and breaches of the peace, which, it asserts, are concomitants of picketing," United

States Supreme Court responded:

"Power and duty of the state to take adequate steps to preserve the peace and to protect the privacy, lives and property of its residents cannot be doubted. But no clear and present danger of destruction of life or property, or invasion of the right of privacy, or breach of the peace can be thought to be inherent in activities of every person who approaches premises of an employer and publicizes facts of a labor dispute involving the latter."

In the California case, John Carlson, a striking member of the Construction Workers' CIO local, was fined \$25 for picketing designed to induce members of the AFL to leave the Delta tunnel project near Redding, where members of the newly-organized CIO group had been denied re-employment when work reopened after a shutdown due to the weather.

Of this ordinance, which prohibits picketing and carrying signs and banners, court said: "The sweeping and inexact terms of the ordinance disclose the threat to freedom of speech inherent in its existence."

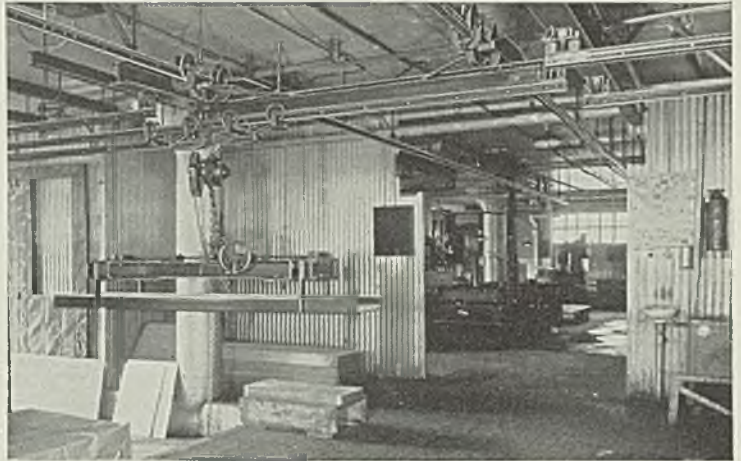
## TNEC TO START BUSINESS EFFICIENCY STUDY MAY 6

Best information available is that temporary national economic committee will devote its next hearings to efficiency in big, medium and small business. While no official announcement has been made, it is expected hearing will begin May 6. Committee later will hold a general round-up hearing to complete the TNEC hearings.

Federal trade commission will be in charge of the business efficiency hearings and it is probable one question to be presented to TNEC by the commission will be the rate of return on invested capital in the steel industry.

It has been stated in Washington

*"I want Easy Roll MonoRail!"*



Small system in sheet metal plant.

*"You mean American?"*

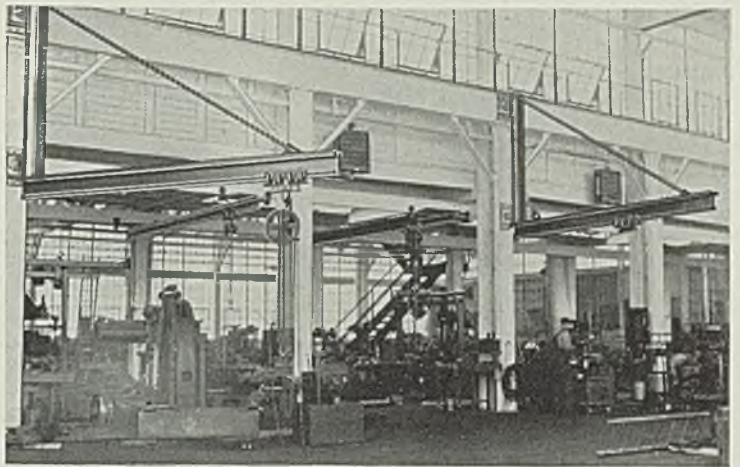
*"Sure, that's it! The track we put up the other day—the gang in the shop says the trolleys are so easy to push."*

*"That's right! I saw the first guy try it out. His load got away from him and rolled 30 feet down the track before it stopped. I guess he was used to our old rail."*

This actually happened in a large automotive plant where they originally installed their own overhead system. They now call for "Easy Roll" track, a name they coined after the above experience.

American MonoRail is "Easy Roll" because it's a high carbon, twin section rail, with overlapping splice to eliminate butt joints and a one piece forged hanger clamped in the rail head to prevent interference with trolleys. Trolleys "Roll Easy" because they contain precision bearings.

Let an American MonoRail engineer show you these features and explain the cost saving advantages of specialized overhead handling equipment.



Individual jibs for heavy machine service.



Two cabs operate on long span crane.

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during the past week, without confirmation, that the trade commission also expects at the business efficiency hearings to present testimony relative to rebates to industrially-owned railroads, including those owned by the steel industry.

It is reported interstate commerce commission, federal trade commission and securities and exchange commission have co-operated in the rebates study.

#### **ASKS \$975,000,000 FOR RELIEF; MAY BE SPENT IN 8 MONTHS**

President Roosevelt last week asked congress to appropriate \$975,000,000 for relief in the 1941 fiscal year with the understanding that the entire sum could be spent in the first eight months. This would hold the immediate appropriation within the present budget limit, and would delay until next year a decision whether the budget has to be exceeded.

WPA this fiscal year is spending \$1,500,000,000. The \$975,000,000, if spent in eight months, would provide about the same monthly amount.

Expressing hope that employment conditions will be at least as good as during the present year, Mr. Roosevelt said that in the event his hopes fail of materialization, congress next winter can provide a deficiency appropriation.

His proposal was sent to congress in the form of a letter to Speaker William B. Bankhead. Discussing the recommendations at a press conference, the President said the letter will be referred to the appropriations subcommittee which now is drafting a new relief bill.

Explaining the recommendation, he insisted that modification of the present Woodrum clause, requiring the appropriation to be stretched over 12 months, would not necessarily mean that the full appropriation would be expended during the first eight months of the fiscal year.

#### **APPROPRIATIONS FOR NLRB, WAGE-HOUR DIVISION LIFTED**

Senate appropriations committee last week restored \$228,000 to the national labor relations board out of the \$337,000 which was cut from its appropriation by the house.

Committee also added \$1,045,000 to the wage and hour appropriation bill which restored all but \$35,000 cut from the bill as it passed the house.

In upping the NLRB grant, the senate group specifically suggested restoring funds for the division of economic research, whose head, David J. Saposs, has been attacked as a radical by two congressional committees. Other cuts made by the house in funds for the board's legal and trial examining divisions, as well as for travel and communi-

cations, were restored in whole or in part by the senate committee.

The additional \$1,045,000 which the senate committee members added to the house figure for the wage and hour division is "to clean up the backlog of complaints and to get a start on routine periodic inspections."

It was suggested that 1096 inspectors and 203 payroll examiners could be recruited in the next fiscal year. "Once the initial enforcement work is completed and the backlog cleared up, it is the hope of the committee that substantial reductions can then be made in the inspection force," said the report.

#### **WALTER-LOGAN BILL GIVEN APPROVAL BY THE HOUSE**

House has approved and sent to the senate the Walter-Logan bill. Bill provide rules and regulations issued by the national labor relations board and other independent federal administrative agencies must be approved by the United States circuit court of appeals here before they become effective.

#### **GOVERNMENT ASKS BIDS ON CHROMIUM ORE MAY 7**

Bids will be received May 7 by the procurement division of the treasury department for chromium ore under the provisions of the strategic materials act.

A maximum of 25,000 long tons of the ore is being sought. Bids are asked for quantities ranging from 1000 to 20,000 long tons to be delivered f.o.b. cars, Philadelphia Harbor, or United States army general depot, New Cumberland, Pa. From 1000 to 5000 long tons also are sought for delivery f.o.b. cars, United States army ordnance depot, Ogden, Utah.

#### **REACH ACCORD ON AIRCRAFT EXPORTS TO NEW ZEALAND**

By exchange of notes between the American consul general at Wellington and the prime minister of New Zealand, the United States and New Zealand have entered into an arrangement relating to importation into New Zealand of aircraft and aircraft components manufactured in the United States.

Arrangement provides competent aeronautical authorities of New Zealand will, upon certain conditions, confer the same validity upon certificates of airworthiness for export issued by the competent aeronautical authorities of the United States for complete aircraft subsequently to be registered in New Zealand and for certain components imported into New Zealand as if such certificates had been issued pursuant to regulations in force on the subject in New Zealand.

Conditions upon which the aero-

nautical authorities of New Zealand will approve the importation and use of components for which a certificate of airworthiness is not issued are also set forth in the arrangement.

#### **SOUTH AFRICA TO EXPAND IRON, STEEL INDUSTRY**

South Africa's iron and steel industry, which has experienced a remarkable growth in the past six years, is to be expanded further, according to a report from Consul Russell M. Brooks, Johannesburg.

Iron and Steel Industrial Corp. Ltd. announced it plans to increase production of the company's plant at Pretoria to 450,000 net tons of steel ingots per year and to erect a new steelworks at Vereeniging, Transvaal. The new plant will be used chiefly for the manufacture of lighter steel products, heavier items continuing to be produced in Pretoria.

Reviewing the history of the Iscor corporation, the announcement pointed out that the first ingot was made at Pretoria in 1934 and during that year 66,000 tons of steel and 144,000 tons of pig iron were manufactured. In 1938 production had risen to a total of 332,000 tons of steel and 300,000 tons of pig iron.

#### **RUMANIA TIGHTENS IRON, STEEL SCRAP CONTROL**

According to American consulate at Bucharest, Rumania, a recent decree-law declares all quantities of old iron, steel or cast iron, belonging to anyone within the boundaries of Rumania to be at the disposal of the ministry of armaments for the needs of the army. Owners of over 200 kilograms of such scrap and waste iron must declare the quantities they are holding during the first ten days of each month. Sale and purchase prices for such scrap iron will be established by the ministry of armaments.

#### **GOVERNMENT IRON, STEEL AWARDS TOTAL \$978,635**

During the week ended April 13, the government purchased \$978,635.08 worth of iron and steel products under the Walsh-Healey act as follows: Albert Pipe Supply Co. Inc., Brooklyn, N. Y., \$42,274.54; Lansdowne Steel & Iron Co., Morton, Pa., \$11,000; Central Iron & Steel Co., Harrisburg, Pa., \$20,150.99; Atlantic Screw Works Inc., Hartford, Conn., \$11,917.86; The McKay Co., York, Pa., \$15,036.82; Norris Stamping & Mfg. Co., Los Angeles, \$334,524.96; Carnegie-Illinois Steel Corp., Washington, \$496,620.28 (estimated); J. R. Hunt & Co., Baltimore, \$20,944.57; Sheffield Steel Corp., Kansas City, Mo., \$15,046.51; and Lewis-Shepard Co., Watertown, Mass., \$11,118.55.



# AVIATION

## PLANEMAKERS TO HAVE COMPLETE STAINLESS DATA

■ TO PROMOTE use of stainless steel in aircraft by making more information available to plane designers, leading producers have arranged for a thorough study of stainless' physical properties by national bureau of standards, Washington. Several companies are co-operating and have appropriated \$25,000 for the work. Other companies are expected to join in the move.

Program results from realization that new cross sections for aircraft structural members will have to be worked out before plane designers more generally can utilize the high strength-weight ratio available in stainless members.

### Raise Tensile Strength

To obtain tensile strengths above 175,000 pounds per square inch without losing ductility necessary to form sheet into structural members and to obtain uniform stress-strain curves, one steelmaker is experimenting with stainless sheet which is highly worked by cold-rolling and then subjected to low-temperature heat treatments. Results to date indicate heat treatment probably will be at a temperature around 600 degrees Fahr. for from 15 to 48 hours. Effect of heat treatment would be to raise Young's modulus line above 28 million value and smooth out leg of the stress-strain curve.

Original army specifications on alloy steel aircraft parts called for magnaflux testing of all pieces. This was strictly adhered to until recently when it was decided such testing was unnecessary on parts of minor importance, inasmuch as this often slowed down inspection. Army

specifications now are being revised to call for magnaflux testing only on the more important, highly stressed parts. Manufacturers' drawings, which are approved by the army, will specify the test. Meanwhile, as drawings are being changed, manufacturers are making out lists of the important parts for inspectors. It is estimated magnaflux inspection of alloy steel parts will be reduced by 90 per cent.

Recently a one-week course in magnaflux testing for inspectors of alloy steel parts and forgings was conducted at Wright Field, Dayton, O. Misunderstandings had arisen in interpretation of test results, particularly on forgings. Many sound forgings were rejected by inspectors because of indications which later were proved to have been caused by normal granular flow lines. Inspectors were taught to distinguish granular flow and inclusion indications. The former, in general, are low ridges of magnetic accumulations, the latter much higher ridges.

Experiments at Case School of Applied Science, Cleveland, indicate higher plane speeds may be attained by introducing a moving layer of air between wing surface and air stream. Air supplied by a pump in the plane is introduced at high pressure over the wing surface by jets placed near the top of the leading edge of the wing. To be

effective, wing surface must be rigid; otherwise pulsations would build up turbulence in the boundary layer. To attain the higher speeds of the future, metal-covered wings, it is believed, will be a necessity.

Rear Admiral John H. Towers, in recently testifying before the senate naval affairs committee, expressed belief that ultimate speed of planes will be around 750 miles per hour, or about the speed of sound. Highest recorded speeds to date are about 500 miles per hour, at which speed "flutter" or resonant vibration of the whole plane is severe. To span the gap from 500 to 750 miles per hour clearly is a design task in which high tensile strength metals will play an important part.

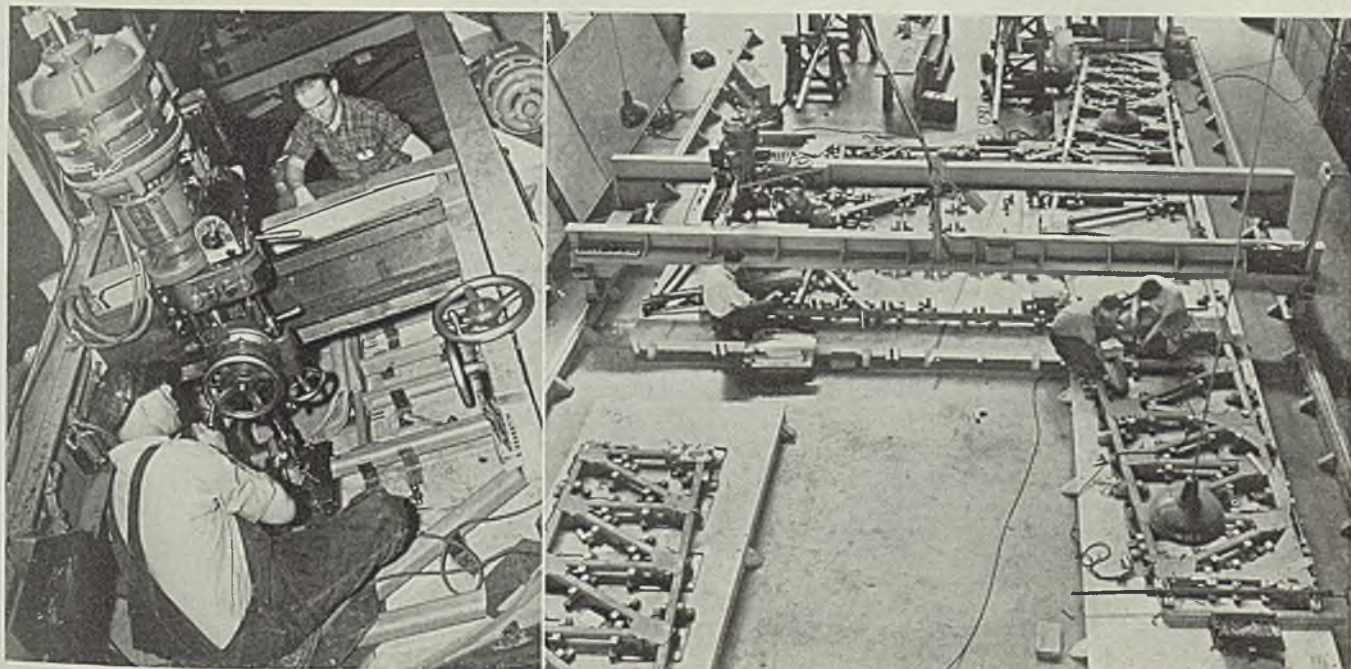
### Hydraulic Equalizer Developed

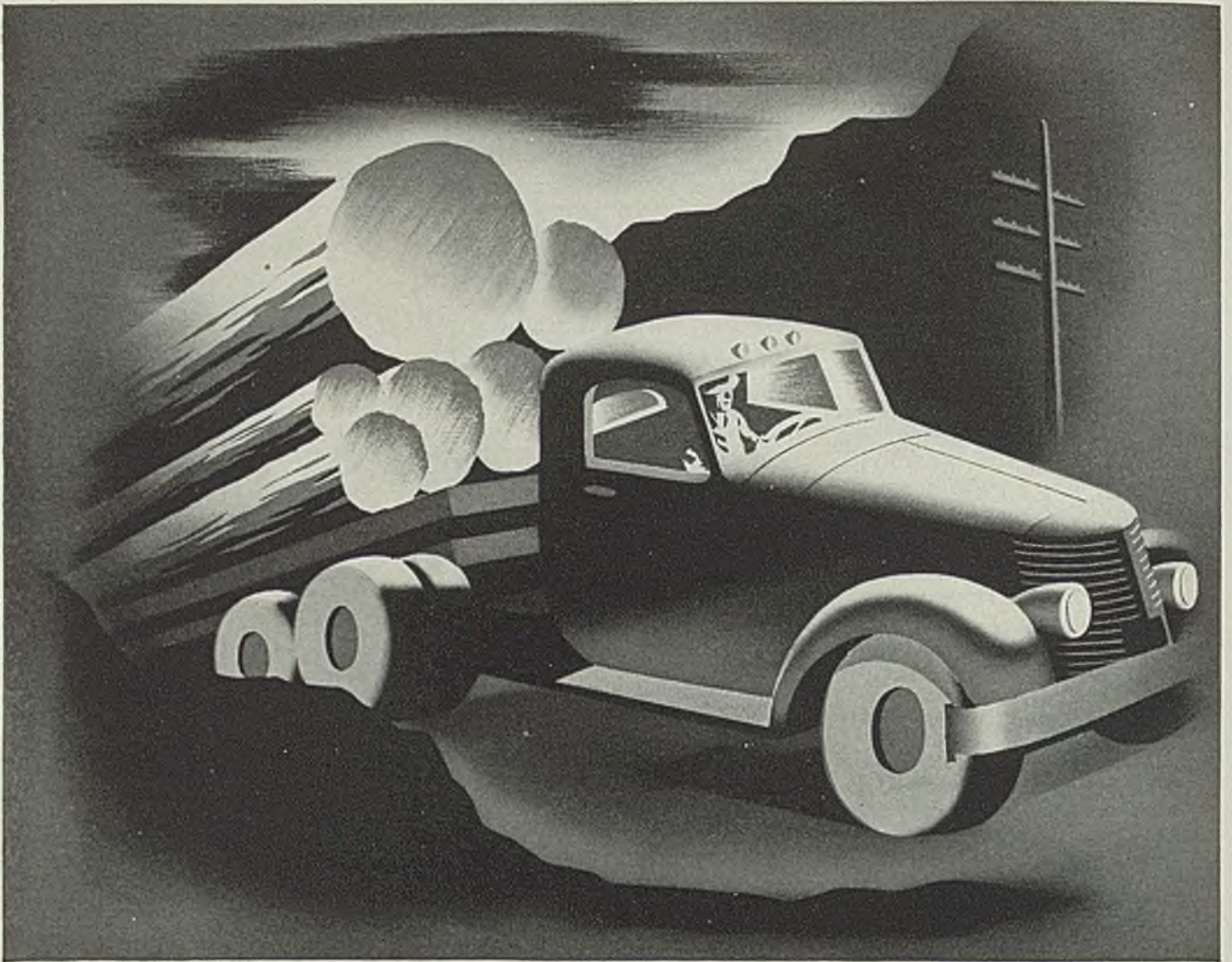
To eliminate the hazard of inequality in wing flap operation, a new metering device has been developed by Pump Engineering Service Corp., Cleveland, to equalize flow of hydraulic fluids to each flap control cylinder. Operating as a flow divider, the equalizer distributes fluid equally from a common pressure line into the two discharge lines leading to cylinders. Lines incorporate a combination of pressure balancing valves to compensate for variations in required operating pressures. Variations in volumetric discharge from the outlet ports of the two flap control cylinders is less than 1 per cent with pressure differentials up to 1400 pounds per square inch.

When the direction of flow is reversed, equalizer allows only an equal amount of fluid from each line to enter the common line. Should one flap or cylinder lock, equalizer also will lock to prevent operation of other cylinder. Equalizer also may be applied similarly for synchronizing landing gear cylinders or other pairs of hydraulic units.

### "Gantry" Drill Press

■ To permit drilling at any point in jig-assembled members of large transverse frames for flying boat hulls, this drill press is mounted on a gantry traveling over rails on floor beside jig. Positioning blocks of jig hold structural members while holes for rivets are drilled. Photos, courtesy of Boeing Airplane Co., Seattle, and "American Machinist"





## A CASE IN POINT...

Making sure of dependable performance while keeping costs within reasonable limits is a problem common to manufacturers in practically every line.

Frequently it is solved by a change in specifications to take advantage of the capabilities of modern materials.

A manufacturer of logging trailers, for example, finds that the use of cast Chromium-Molybdenum Steel (0.25 – 0.35% Molybdenum) for couplings has brought worthwhile economies while actually bettering performance.

The steel casts well in intricate patterns and a

simple heat treatment develops the necessary tensile strength and hardness. Thus the manufacturer, using a comparatively inexpensive steel and economical fabrication methods, turns out couplings which, while weighing only about twenty-eight pounds, can be trusted to stand up under pulls as high as 77,000 pounds.

A re-check of your own specifications may disclose similar opportunities. You will find our technical book, "Molybdenum in Steel", helpful. It is sent free on request to interested production executives and engineers.

PRODUCERS OF MOLYBDENUM BRIQUETTES, FERRO-MOLYBDENUM, AND CALCIUM MOLYBDATE

**Climax Mo-lyb-den-um Company**  
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**MOLY**

# Mirrors of MOTORDOM

By A. H. ALLEN  
Detroit Editor, STEEL



**DETROIT**  
■ WINDUP of the 1940 model season, at least as far as scheduling of materials and parts is concerned, is in sight, and present indications point to about two months more of assemblies before the changeover to 1941 models starts. July 3 is the day on which the several producers now plan to draw 1940 production to a close. Chrysler divisions, Pontiac, Olds and probably Chevrolet figure to run off the last of the current models on this day. Buick tentatively is planning to shut down June 28. Packard likely will suspend before this time, as the last releases for parts will be made there this week, production evidently being scheduled through May.

Packard probably will be the first to resume on new models, as is usually the case, the date now heard being July 25. Buick probably will resume around Aug. 15, and most of the others about this time or shortly thereafter. No plans have been released for Ford, a new budget having been released about a week ago to cover June production.

Changeovers will require in general about six weeks, which is neither a shorter or a longer period than that of recent years.

## 1941 Outlook Encouraging

Outlook for the 1941 model season is definitely up. Encouraged by sustained sales during the winter and spring months, producers are confidently expecting a continuation of strong sales this fall. Buick for example, last fall set a goal of 210,000 units for the 1940 model season. Later this was revised upward to 238,000, which is about what actual production will total at the close of June. For 1941 models, a goal of 300,000 units al-

ready is being discussed, an increase of 26 per cent.

Retail sales are keeping fairly well abreast of production increases, the Automobile Manufacturers association reporting the March total for passenger cars and trucks in the United States at 398,013, some 20 per cent over the same month in 1939. Passenger cars gained 22 per cent and trucks 11 per cent, bringing first quarter sales to 967,816 units, or 29 per cent above the same period in 1939.

From the standpoint of actual factory output, by the end of April there will have been produced

roughly 3,000,000 of the 1940 models in this country and Canada. With two full months left, plus scattered output in July and August, the model year's total should pass the 4,000,000 mark, or roughly half a million cars beyond the 1939 model total.

■ SPECULATION naturally is rife over the reported abandonment of the Ford 6-cylinder engine program, none of it supported by any official comment from the Ford organization, but mainly among those close to Ford production, either from a

## All-Stainless Truck Hauls Greater Pay Load



■ First all stainless steel shotwelded truck trailer to come off assembly line at plant of Fruehauf Trailer Co., Detroit, last week. Of 18-8 chrome-nickel steel, the trailer weighs 5500 pounds, is 28 feet long, 8 feet wide, 6 feet 6 inches high, will carry 12 tons payload. Fruehauf is building the units under manufacturing license from Edw. G. Budd Mfg. Co., Philadelphia

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supplier's position, or from merchandising activities. The following analysis should not be construed as reflecting opinion of Ford officials, but rather the composite views of a number of "extracurricular" experts:

The Ford V-60 engine from a design standpoint has few deficiencies and over a period of years has been refined to the point where it is an excellent power plant. Various changes have been made from time to time, such as the switch to welded steel water jackets a few years ago which worked out fine from a manufacturing standpoint, but proved objectionable because of loss of rigidity in the engine and resultant "telegraphing" of engine noise to the rest of the car. The practice subsequently was abandoned and the former cast iron design re-adopted.

At one time, the proposal was considered at Ford to build a separate body to house the V-60 engine, but this was dropped and the 60 was placed in what is substantially the same body as that used for the V-85 engine. Now engineers' studies of factors affecting tank mileage, acceleration and other factors in operation of a car have shown that a vital factor is the ratio of weight of the car to engine displacement.

**Merchandising Problem Involved**

Thus in some respects the V-60 engine may be considered as too small for the body in which it is now used. This is no indictment of the Ford 60, for there are thousands of satisfied users, but on a purely analytical basis, it is reasoned that a wise move might be to develop a smaller and lighter body—say 400 pounds lighter—then step up the gear ratio and use the V-60 engine. A whale of a sweet performing car in the light-weight low-price class would be the result, virtually eliminating what objections have been voiced to the V-60 engine because of poor acceleration, low power, etc.

Certainly any cold-blooded analysis of the proposal to change to a 6-cylinder engine would point to a tremendous merchandising problem, in view of the emphasis which Ford has always placed on the V-8 engine since its introduction. With an engine already developed and refined practically to the ultimate, it would seem good policy to retain the values already established in it by virtue of years of intensive engineering and merchandising effort, and to circumvent what objections may have been voiced by designing a body and transmission better adapted to the engine characteristics.

■ **INGENIOUS** use of V-8 engines for the dual purpose of supplying power and inert gases is being

made in the Ford tire plant. Not new, the installation nevertheless is typical of Ford shrewdness in manufacturing and may suggest similar possibilities in other industries.

In the curing of tires, a heavy rubber tube or curing bag is set inside the green tire before it is placed in the curing mold and subjected to heat and pressure. First steam is forced into the curing bag under 300 pounds pressure and after 8 minutes it is exhausted and then air is blown in under pressure. With the use of compressed air, it was found that the oxygen in the air caused deterioration of the curing bags to the point where they were supplying only about 50 cures.

Remedy was thought to be the use of inert gas instead of compressed

air, but the cost of such gas was prohibitive. Then engineers conceived the idea of installing four V-8 engines to drive compressors and of drawing off exhaust gases, scrubbing them and compressing them for use in the curing bags, thereby eliminating the corrosive effect of compressed air.

Running at fixed speed the four engines produce about 14,500 cubic feet of exhaust gas an hour, precisely the amount the four compressors are able to handle. Compressors boost the pressure of the nitrogen and carbon dioxide exhaust gases to 450 pounds and dispatch it to the curing molds.

Precautions are taken to prevent impure gas from entering the system. If a fouled spark plug or some other condition should cause one engine to produce exhaust gas too impure for the apparatus to refine properly, a cutoff valve is actuated automatically and exhaust from the fouling engine is bypassed out of the system. Carbon monoxide detectors immediately note any leakage of dangerous fumes from the engines, sounding gongs and flashing warning lights.

This \$6,000,000 tire plant, by the way, is probably the most advanced tire manufacturing establishment in the world—for two reasons. One is that only two or three persons working there ever worked in a tire plant before, thereby insuring against the prevalence of old ideas or prejudices. The second is that Ford buys tires from several independent producers, and all these purchases involve manufacturing rights, permitting Ford to adopt the best procedures of different tire manufacturers for his own.

**Automobile Production**

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1938	1939	1940
Jan.....	226,952	356,962	449,314
Feb. ....	202,597	317,520	421,820
March....	238,447	389,495	439,911
April....	237,929	354,266	.....
May.....	210,174	313,248	.....
June.....	189,402	324,253	.....
July.....	150,450	218,494	.....
Aug.....	96,946	103,343	.....
Sept.....	89,623	192,678	.....
Oct.....	215,286	324,688	.....
Nov.....	390,405	368,541	.....
Dec.....	406,960	469,120	.....
Year ....	2,655,171	3,732,608	.....

Estimated by Ward's Reports

Week ended:	1940	1939†
Mar. 30.....	103,370	85,980
April 6.....	101,655	87,019
April 13.....	101,940	88,050
April 20.....	103,725	90,280
April 27.....	101,405	86,640

†Comparable week.

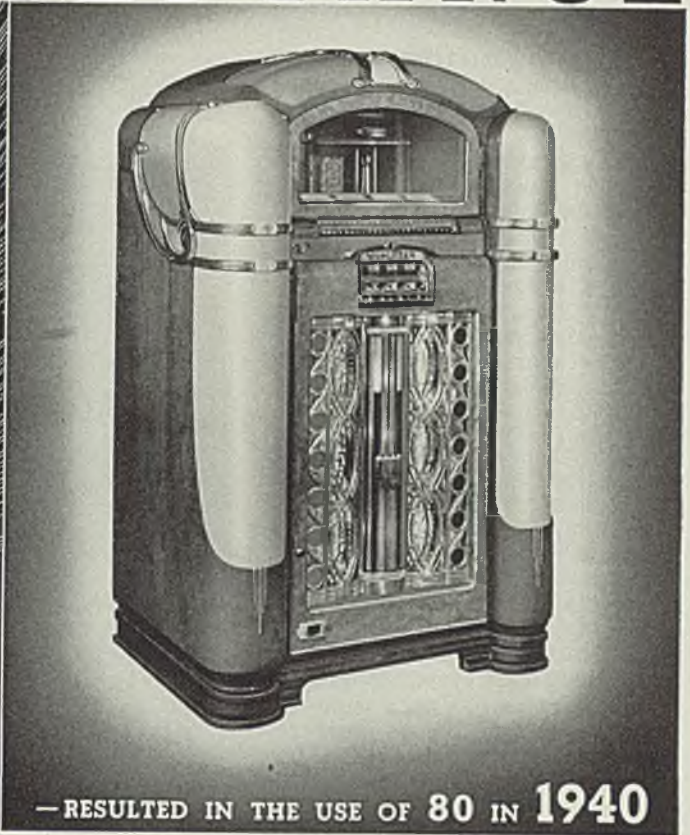
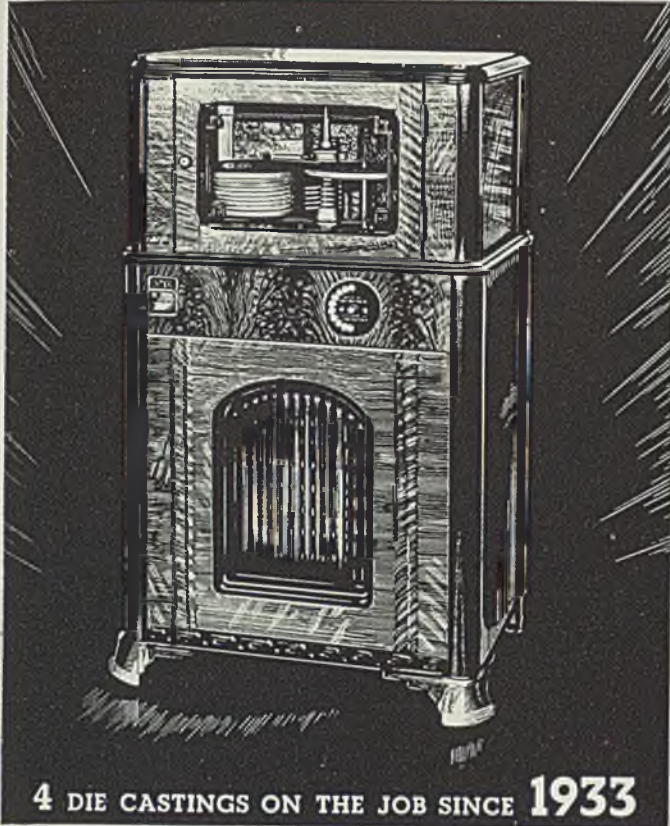
■ **FIRST** all stainless steel truck trailer came off the assembly line in a new plant of the Fruehauf Trailer Co. here last Wednesday. Produced under manufacturing license from E. G. Budd Mfg. Co., Philadelphia, the unit led a parade of 10,000 which Fruehauf has undertaken to build, with Budd supplying welded subassemblies such as roof and side panels, frame members and other parts. Construction principles have been adapted from those used in fabrication of stainless steel railroad equipment, involving chiefly the use of Budd's shotwelding process.

Fruehauf is setting up fixtures and assembly facilities here for production of 12 to 15 trailers per 8-hour day, operating nine shotwelding units. Branches in Kansas City and Los Angeles also have been set up for assemblies at these points, the former already turning out four or five stainless units daily.

Important advantage stressed for the stainless steel trailers is the increase in payload possible, ranging from \$1000 to \$2500 per load. Although trailers cost twice those of conventional designs, it is claimed that the additional investment can be amortized in a matter of months. Horton truck line in the East is operating a fleet of 160 stainless units, built by Budd in Philadelphia, which has now abandoned manufacturing of trailer units, turning over this business to Fruehauf.

Stainless steel trailers will be built in standard models in multiples of 2 feet in length, the first job off the line being 28 feet long, 8 feet wide and 6 feet 6 inches in height, with load capacity of 12 tons and gross weight of 5500 pounds. It is to be used by the Rodgers motor freight lines. All steel is of the 18-8 chrome-nickel type, in slightly different grades depending upon whether it is used for corrugated side and roof panels, deep drawn curved sections or frame members.

# FIELD ACCEPTANCE



## —DIE CASTINGS ARE "PROVED IN"

The 1940 model of a well known automatic phonograph utilizes 80 ZINC Alloy Die Castings—in contrast to only 4 on a 1933 unit produced by the same manufacturer.

As progressive as a company may be, it will not accept new materials or production processes until they have proved their worth. The designers of the above illustrated phonographs specified 4 ZINC Alloy Die Castings on the 1933 model as "feelers" for a promising production method. Field acceptance combined with impressive manufacturing economies to "prove in" this type of metal part in increasing quantities on all succeeding models.

"From 4 to 80" represents an impressive

trend—and one which is occurring with increasing frequency in a wide variety of industries. If you are not thoroughly informed on the physical and economic advantages offered with ZINC Alloy Die Cast parts, we suggest that you consult a commercial die caster—or write to The New Jersey Zinc Company, 160 Front Street, New York City.

Copies of earlier advertisements in this series gladly mailed on request.



**ZINC**  
ALLOY DIE  
CASTINGS

The Research was done, the Alloys were developed, and most Die Castings are made with  
**HORSE HEAD SPECIAL** ( 99.99 + %  
Uniform Quality ) **ZINC**

# MEN of INDUSTRY

■ L. E. CREIGHTON, formerly manager of bar products, Republic Steel Corp., Cleveland, has been appointed vice president, Rotary Electric Steel Co., Detroit. Mr. Creighton has been active in the steel business for 30 years, and at one time headed sales of Union Drawn Steel division of Republic.

John S. Abbott, manager of alloy sales for Rotary Electric, has been named sales manager. John S. Andrews, vice president in charge of sales, has resigned, effective May 1.

A. C. Cummins, since Aug. 1, 1936, assistant manager of Pittsburgh district operations for Carnegie-Illinois Steel Corp., has become general superintendent, Youngstown, O., district operations, succeeding L. N. McDonald, who will retire May 1 upon completion of 55 years of service with subsidiaries of United States Steel Corp.

Mr. Cummins has been with Carnegie-Illinois and the former Carnegie Steel Co. since 1911. He served in various engineering, construction and operating capacities at Duquesne works, subsequently becoming superintendent, electrical department; assistant general superintendent of the plant in 1932, and a year later general superintendent.

Mr. McDonald joined the former Carnegie Steel Co. at Edgar Thomson works in 1885. He was transferred to Duquesne works in 1890, and to the Ohio works at Youngstown as superintendent of bessemer department in 1902. Six years later he was given supervision of both the bessemer and open-hearth departments; from 1916 to 1925 was assistant general superintendent.

William Paul, formerly enameling



A. C. Cummins

superintendent, Acme Porcelain Enameling Corp., is now associated with O. Hommel Co., Pittsburgh, as service man in the Frit division.

O. G. Houser has been appointed sales representative in the Tulsa, Okla., district for Logansport Machine Inc., Logansport, Ind., effective May 15. His headquarters will be at 310 Thompson building, Tulsa.

E. S. Chapman, formerly general works manager, Plymouth division, Chrysler Corp., Detroit, has been elected vice president in charge of production and assistant general manager, succeeding the late P. C. Sauerbrey. He joined Chrysler in 1928, after 13 years with a large machine tool manufacturer.

A. H. Paterson, former factory manager, succeeds Mr. Chapman as general works manager. He joined Dodge Bros. in 1913, and advanced through various departments until, in

1928, he left to supervise construction of the present Plymouth plant.

John Bos Jr., son of the late John Bos, has been elected president, Bos-Hatten Inc, Buffalo, steel fabricating firm. Mrs. Hendrika H. Bos has been re-elected vice president. Peter H. Bos has been named treasurer, and Herman Hatten, secretary.

Allen N. Bennett has been elected president, Graton & Knight Co., Worcester, Mass. He succeeds Frederick E. Barth, resigned. Mr. Bennett, who continues as treasurer, is vice president, treasurer and a director, Barrett & Co. Inc., Newark, N. J.

H. J. Naper has been named director of foreign sales, Webster Co., Chicago, manufacturer of sound equipment. Mr. Naper gained his foreign trade experience during the past six years while employed in the export department of a large Chicago firm.

J. G. Gidley has been named manager of sales, Schenectady section, turbine division, General Electric Co. He succeeds R. S. Neblett, who has been assistant manager of the turbine division since July, 1939. Mr. Gidley has been associated with sales of turbines built in Schenectady since 1926.

James C. Morgan, heretofore general sales manager, Philadelphia division, Yale & Towne Mfg. Co., Stamford, Conn., has been promoted to general manager of the entire Philadelphia plant. He joined the company in 1920, being placed in charge of Yale's electric truck sales;



E. S. Chapman



A. H. Paterson



James C. Morgan

subsequently he became assistant to the president and general sales manager, Philadelphia division.

Frank Armstrong, member of Pickands, Mather & Co., Cleveland, was elected president, Interlake Iron Corp., Chicago, last week at a meeting of directors. Mr. Armstrong has been first vice president of Interlake. He succeeds the late Clifford D. Caldwell.

George B. Garrett, for many years sales engineer, Arthur G. McKee & Co., Cleveland, has been appointed manager of iron and steel sales for United States and Canada.

Merrill Cox, heretofore chief engineer, has been named sales engineer and assistant to Mr. Garrett.

Norman L. Deuble is now associated with Copperweld Steel Co. at Warren, O., as assistant to vice



Norman L. Deuble

president. He formerly was with Republic Steel Corp., Cleveland, and had been associated with Central Alloy Co. and United Alloy Steel Co. He is a member, American Society for Metals and Society of Automotive Engineers.

Chester H. Lang, manager of advertising and sales promotion activities, General Electric Co., Schenectady, N. Y., since 1932, has been named manager of apparatus sales and vice chairman of the company's apparatus sales committee.

Robert S. Peare has been named manager of General Electric's publicity department. Heretofore he has been president and general manager, Maqua Co., printing and engraving firm affiliated with General Electric.

Charles J. Martin has been appointed chief engineer, Federal Machine & Welder Co., Warren, O. Before joining Federal Machine &



Charles J. Martin

Welder on April 1, Mr. Martin was associated with Ex-Cell-O Corp., Detroit, in the capacity of machinery salesman and sales engineer for six years, and prior to that was assistant chief engineer, Ford Motor Co.

Harold F. Pitcairn has been elected president, Southern Alkali Corp., subsidiary of Pittsburgh Plate Glass Co., Pittsburgh, succeeding Hugh A. Galt, retired. Mr. Pitcairn is a director, Pittsburgh Plate Glass, president of Autogiro Co. of America, and proprietor of Pitcairn Autogiro Co. He has been associated with Pittsburgh Plate Glass many years, first serving in its efficiency department in 1919.

George A. Blackmore has been elected chairman of the board, Duff-Norton Mfg. Co., Pittsburgh, succeeding the late Thomas A. McGinley. Mr. Blackmore is president and director, Westinghouse Air Brake Co. and the Union Switch & Signal Co., and is also a director of A. M. Byers Co., Pittsburgh Screw & Bolt Corp., Pittsburgh Coal Co., Flannery Bolt Co., Bendix-Westinghouse Automotive Brake Co., and a number of other companies.

John V. Jirasek has joined Worthington Pump & Machinery Corp., Harrison, N. J., as a special representative to the petroleum and chemical industries. Mr. Jirasek was graduated from the University of Prague and did post graduate work at the Sorbonne in Paris. He has, in the past 20 years, been engaged in research, experimental and development work with leading firms in the petroleum field, in the United States and Europe.

## Died:

■ NILES CHAPMAN, treasurer, Continental Steel Corp., Kokomo, Ind., April 25. He had been treasurer

since the company was formed in 1927 by merger of Superior Sheet Steel Co., Canton, O., Chapman Price Steel Co., Indianapolis, and Kokomo Steel & Wire Co. Previously Mr. Chapman had been president of Chapman Price Steel Co.

Frank C. Kip, 56, president, Automotive Thrust Bearings Corp., Chicago, April 16 in Chicago. He had been a past president, Illinois Automotive association, and a former director, National Standard Parts association.

William G. Wetherall, 82, for 52 years president, William G. Wetherall Co., Baltimore, in Baltimore, April 8.

Joseph S. Wells, 64, for 16 years a member of Chrysler Corp.'s purchasing department at Highland Park, Mich., in Detroit, April 17.

Morris Strober, 54, president and founder, K & S Metal Supply Co. Inc., Brooklyn, N. Y., in that city, April 15. He had been engaged in the metal supply, sheet metal and roofing materials business about 30 years.

Thomas Henry Drake, 56, chemist, Carnegie-Illinois Steel Corp., in Joliet, Ill., March 28. Associated with the company 35 years, at one time he was assistant chief chemist for the former Illinois Steel Co.

Harry Carpenter, 70, president, Car-Mor Metal Co., Philadelphia, April 18 in that city. Before establishing his own company in 1927, Mr. Carpenter was affiliated with Ajax Metal Co., Philadelphia, over 30 years.

Samuel K. Phillips, 45, secretary-treasurer, Eastern Gas & Fuel Associates, Boston, in Boston, recently. He joined the accounting department of Koppers Co. in 1916, and in 1929 went to Boston as secretary-treasurer of Eastern Gas & Fuel, formed by Koppers interests.

Frederick W. Peters, 63, inventor and founder of the old Peters Machine & Mfg. Co., now Cleveland Steel Products Corp., Cleveland, April 11 in that city. He founded the company in 1905 and became its vice president and general manager when it was incorporated in 1908. He left the company in 1919 and formed the Almetal Universal Joint Co., of which he was president until 1934. At his death he was head of the Peters Machine Co., which he organized a year ago to manufacture screw drivers with special patented handles of his own invention.

# Steel Warehouse Distributors

## Move Record Tonnage in 1939

■ STEEL warehouse distributors in 1939 moved a record tonnage of finished steel products. As disclosed by STEEL's compilation of finished steel distribution (April 22, page 21), warehouses accounted for 5,179,660 of the 33,122,628 net tons of finished steel produced.

Despite this record, steel warehouses dropped from first to second rank among leading consuming groups. Warehouses moved 15.64 per cent of the total, while the automotive industry used 18.1 per cent of the total.

Adopting STEEL's compilation for 1939 and former years, W. S. Doxsey, executive secretary, American Steel Warehouse Association Inc., Cleveland, has grouped pertinent warehouse figures as shown in the accompanying tables. Table at lower left shows total finished steel production, tonnages and percentages sold by warehouses for past 14 years. Table at right lists principal products and the proportion distributed through warehouses in 1939.

Mr. Doxsey comments: "Over a period of years, steel distribution statistics have shown relatively high percentages of total steel production moved by warehouses in years of low total production, and lower percentages in years of high total production. It is indeed significant that in 1939, although the percentage of the total production handled by warehouses decreased, the actual tonnage which they handled attained a peak.

"This characteristic reflects a marked degree of stability inherent in the warehouse distribution of steel and leads to the conclusion that the secondary market is not subject to such wide fluctuations as are experienced by some of the other major consuming industries. Definitely, over a period of years, these distribution figures reveal the in-

creasing importance of warehouses as factors in merchandising steel mill products.

"Of the principal steel mill products sold through warehouses, wire products with 1,045,367 net tons headed the list in 1939, followed closely by tubing and pipe with 983,957 tons; galvanized sheets came third with 857,519 tons; all other black plate and sheets except galvanized totaled 668,517 tons.

"Of the standard hot-rolled products, bars and bar shapes, not including reinforcing bars, came first with 476,159 net tons taken by distributors; then structural shapes over 3 inches, 283,235 tons; and plates, 215,241 tons. In 1939, 302,583 net tons of concrete reinforcing bars went to steel distributors.

"Tonnages of these products going to warehouses in 1939 showed the following increases over the preceding year: Hot-rolled bars, 75.2 per cent; structurals, 66.2; plates, 78.4; galvanized sheets, 34.5; all other sheets, 53.3; wire products, 37.5; tubing and pipe, 24.6."

### Additional Warehouse Chapters Elect Officers

■ Additional chapters of the American Steel Warehouse Association Inc. have elected officers:

St. Louis: President, G. K. Conant, Sligo Iron Store Co.; vice president, H. A. Williams, Berger Mfg. division, Republic Steel Corp.; secretary, H. G. Thompson, Scully Steel Products Co.; all of St. Louis. Mr. Conant will also serve as national director.

Southern California: President, E. Jungquist, Percival Steel & Supply Co.; vice presidents, J. L. Robertson, A. M. Castle & Co., and Donald Priest, Los Angeles Heavy Hardware Co.; secretary-treasurer, L. B. Yeaton; all of Los Angeles. Mr.

Jungquist will also serve as national director.

Cincinnati: President, J. C. Wagner, Todd-Donigan Iron Co., Louisville, Ky.; vice president, W. A. Kruse Jr., Union Iron & Steel Co., Cincinnati; vice president and treasurer, J. C. Betz, S. A. E. Steels, Cincinnati; secretary, G. E. Mayer, Jones & Laughlin Steel Corp., Cincinnati; national director, J. A. Thiele, Miami-Dickerson Steel Co., Dayton, O.

Connecticut: President, R. B. Shearer, The C. S. Mersick & Co., New Haven; vice president, S. H. Hascall, The Blodgett & Clapp Co., Hartford; secretary-treasurer, G. S. Brouso, The C. S. Mersick & Co. Mr. Shearer will also serve as national director.

New England: President, P. F. Avery, Avery & Saul Co., Boston; vice presidents, M. C. Harvey, Arthur C. Harvey Co., Boston, and Quincy W. Wales, Brown-Wales Co., Boston; secretary-treasurer, J. B. McIntyre, Scully Steel Products Co., Boston; national director, G. M. Congdon, Congdon & Carpenter Co., Providence, R. I.

### "Resistance Welding" Is Association Contest Topic

■ Prizes totaling \$700 will be awarded by Resistance Welder Manufacturers association, Philadelphia, to winners of a contest for technical papers on any welding subject. Sponsored by the association, contest opened April 1, closes at Midnight, Aug. 31.

Contest is open, without restriction, to anyone in United States and its possessions and Canada; also to all American Welding society members throughout the world.

Papers submitted will be judged according to their educational merit, fundamental or research value, practical application and presentation. Entries will become joint property of the Resistance Welder Manufacturers association and American Welding society, who will retain all rights thereto.

### How Warehouses Have Shared in Finished Steel Distribution

Year	Total Production	Tons Sold by Warehouses	Per Cent of Total	Product	Total of Each Product Produced	Tons Sold by Warehouses	Per Cent of Total
1939	33,122,628	5,179,660	15.64	Rails	1,224,621	16,037	1.31
1938	20,936,112	3,586,933	17.13	Track accessories	602,015	46,515	7.73
1937	36,618,791	4,862,935	13.28	Plates	2,584,057	215,241	8.33
1936	32,561,308	4,601,517	14.13	Structurals, over 3 in.	2,583,101	283,235	10.96
1935	23,318,075	3,365,744	14.43	Merchant bars	4,208,831	476,159	11.31
1934	17,775,180	2,492,843	14.02	Concrete bars	1,138,563	302,583	26.58
1933	15,392,296	2,295,331	14.91	Tin mill black plate	2,968,475	57,032	1.92
1932	10,436,131	1,681,944	16.12	Galvanized sheets	1,635,336	857,519	52.44
1931	19,484,637	2,470,238	12.68	All other sheets	6,755,635	668,517	9.90
1930	28,862,304	3,524,919	12.21	Strip steel	2,392,000	101,741	4.25
1929	40,495,946	4,468,937	11.05	Tubing and pipe	3,318,746	983,957	29.65
1928	31,962,136	3,462,721	10.83	Wire products	2,614,962	1,045,367	39.98
1927	31,564,059	4,046,812	12.82	All other finished steel	1,096,286	125,757	11.47
1926	33,215,656	3,496,595	10.52	Total, all products	33,122,628	5,179,660	15.64



# Activities of Steel Users, Makers

■ ALLEGHENY LUDLUM STEEL Corp., Pittsburgh, has opened its new warehouse at 36 Berry street, San Francisco. Special features include handling innovations permitting storage and moving of highly polished items without danger to finish. P. R. Thurston, district manager of sales, is in charge of the warehouse.

Century Electric Co., St. Louis, has moved its Chicago district office to 600 West Van Buren street.

Metal Stamping & Mfg. Co., Cleveland, has changed its name to Morrison Products Inc.

Contract Welders Inc., Cleveland, has changed its name to Contract Engineering Corp. There will be no change in personnel or management.

Atlas Abrasives Corp., New Rochelle, N. Y., has removed its plant and sales offices to its own building at 459 Twelfth street, Brooklyn, N. Y.

United Conveyor Corp., Chicago, has appointed Frank Howell Co., 318 American building, Richmond, Va., sales representative in that district.

Cowles Detergent Co., Cleveland, has appointed Apex Soap & Sanitary Corp., McKees Rocks, Pa., distributor for its line of metal cleaners in western Pennsylvania, northern West Virginia and eastern Ohio.

Barber-Colman Co., Rockford, Ill., has appointed Peden Iron & Steel Co., Houston, Tex., representative in the Texas territory to handle its line of hobbing machines, hob cutter and reamer sharpening machines, hobs, milling cutters and reamers.

Louis Goldsmith, Cincinnati, has acquired the Hisey-Wolf Machine Co., Cincinnati, manufacturer of electrically-driven drills, grinders and buffers, and will continue to operate the business under the same name.

Quality Spring Products Co. Inc. has recently been established in Coldwater, Mich. Officers are: President and treasurer, Wilfred T. Donkin; vice president, Earl H. Sortwell; secretary, John A. Kennedy.

Henry Nelkin Inc., New York, metal finishing firm, has recently made an addition to its plant and installed two new departments, bak-

ing and enameling, and tumbling. The baking and enameling department includes two 10 x 10 x 8-foot baking ovens and three smaller ovens. The tumbling department includes six new cadmium plating barrels, six nickel tumbling barrels and four burnishing barrels.

Joseph T. Ryerson & Son Inc. formally opened its new and enlarged warehouse plant in Philadelphia April 13. Several hundred attended the buffet luncheon and plant inspection.

J-B Sales Engineering Co., New Haven, Conn., has been appointed Connecticut engineering representative for the Worm Gear division, DeLaval Steam Turbine Co., Trenton, N. J., and has added Frank Griessing to its staff.

Cleveland Tramrail Erie Co., Erie, Pa., division of Cleveland Crane & Engineering Co., Wickliffe, O., has moved to 1731 Oxford street, Erie. H. M. Nelson is manager of that office.

Continental Gin Co., industrial division, Birmingham, Ala., has been appointed to represent Foote Bros. Gear & Machine Corp., Chicago, in the following localities: Alabama, replacing Ebbert & Kirkman; Georgia, replacing Paul A. King; South Carolina, replacing Cameron

Barkley Co.; North Carolina, replacing Briggs & Schaffner Co.; Florida, replacing Aetna Iron & Steel Co.; and southern portion of Mississippi. Northern portion of Mississippi will be covered by Eugene D. Wilson.

Vascoloy-Ramet Corp., North Chicago, Ill., has appointed H. Boker & Co. Inc., New York, selling agent for Vascoloy-Ramet tantalum carbide cutting tools and blanks. The Boker company also operates branch offices in Chicago, Cleveland, San Francisco and Montreal, Canada.

Trico Fuse Mfg. Co., Milwaukee, has appointed Huie-Simmer Co., Dallas, Tex., district sales representative in state of Oklahoma, and has appointed L. W. Sloan, 408 Olive street, St. Louis, district sales representative in St. Louis and vicinity.

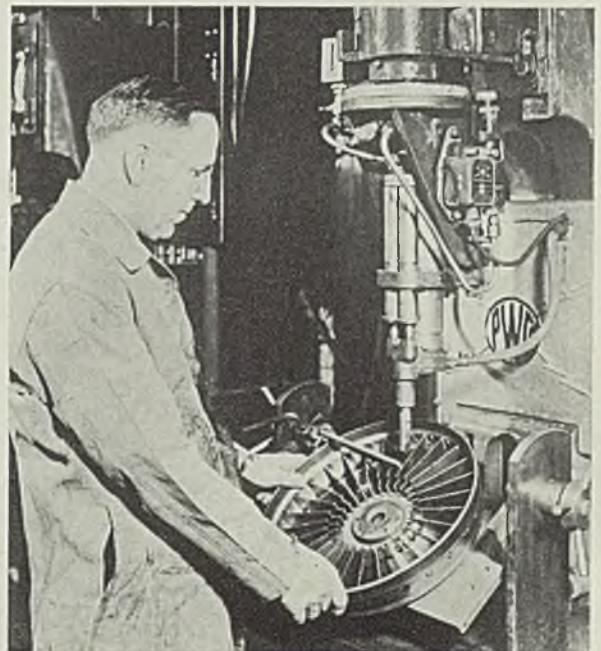
United States Rubber Co., New York, has moved its offices from Broadway and Fifty-eighth street, to new quarters in the fourteenth and final building in Rockefeller Center. The rubber company will occupy the top eleven floors in the new building.

Fedders Mfg. Co., Buffalo, has completed erection of a new plant in Owosso, Mich., for production of automotive radiators for original factory equipment on automobiles, trucks, tractors, buses and gasoline or diesel-driven industrial units, as well as heaters for automobiles, cars, trucks and buses.

## Welds Chrysler

### Fluid Drive Unit

■ Spot-welding steel fins in a Chrysler fluid drive unit runner subassembly. Other stamped steel runner has fins similarly welded, both are housed in an arc-welded steel casing. Chrysler Corp. is erecting a new building to house manufacture of these fluid drive units



## *Steel Business Becomes More Stable*

■ FOR A PERIOD of years the steel industry found itself periodically disconcerted by the unprecedented violence of the fluctuations in demand for steel. For example, steel production in March of 1937 averaged 89.9 per cent of ingot capacity, whereas a year later it stood at 33.7 per cent. Such fluctuations created difficult operating problems and had their effects on costs.

It is gratifying, therefore, that steel seems to be emerging—at least temporarily—from this period. While the ingot production rate advanced sharply from 52.4 per cent last July to 93.3 per cent in November, then declined with equal rapidity to a 63 per cent average in March, it has varied within a maximum range of only 2 to 3 points during the past six weeks.

How long will this comparative steadiness continue? The immediate prospect appears to be rather comforting in this respect. It is true that seasonal letdowns will occur here and there. There will come a time, for example, when automobile assemblies will drop from the present high level.

### **War Demand Strong Factor in Holding Production at Fairly Stable Level**

Were the steel industry dependent alone on normal domestic requirements, there would undoubtedly have been a sharper drop in ingot production this spring than has appeared to date, with a further decrease probable this summer. That is not the case on this occasion, however, and the reason is to be found in effects of the European war.

About 15 per cent of the rolled steel we now are producing is being shipped abroad—both in semifinished and finished form. A large portion is going to belligerents—and this estimate does not make allow-

ance for steel in airplanes, machine tools and many other fabricated products made for the foreign trade. All present indications point to the likelihood that our steel exports will be sustained or increased further while the war continues in progress.

Steadiness at present is being reflected in different ways. For example, the recent reduction in prices on sheets and strip has been restored as of May 1. Also, as shown by STEEL'S latest survey, steel inventories at consuming plants (STEEL of April 22, p. 26) are undergoing little fluctuation. Such inventories increased approximately 5 per cent in the first quarter of this year, following increases of 12 per cent during last September and October and 9 per cent during November and December. Only 26 per cent of consumers who reported regarded their inventories on April 1 as above normal. Ten per cent reported their inventories were below normal and 64 per cent said they were normal. Only 25 per cent said that they had enough steel to last them more than 90 days.

### **Consumer Inventories Near Normal; No Pitfalls Seen in Near Future**

Steel demand over the remainder of this year cannot safely be discounted. There are too many unknown quantities to permit that. But all known factors make it clear that business right now is on a fairly even keel, and that, as a result, comparatively few major buying, selling and expansion problems necessitate decisions that might lead to future headaches. As to how long this condition can be maintained involves a number of possible eventualities over which business has absolutely no control. In the meantime, everybody involved will do well to continue to realize that business stability is a highly desired condition and that it should be encouraged in every way possible.

# The BUSINESS TREND



## Activity Index Moves to Slightly Higher Levels

■ A MODERATE improvement in new demand is reflected in the slight gains recorded in some industrial indicators during recent weeks.

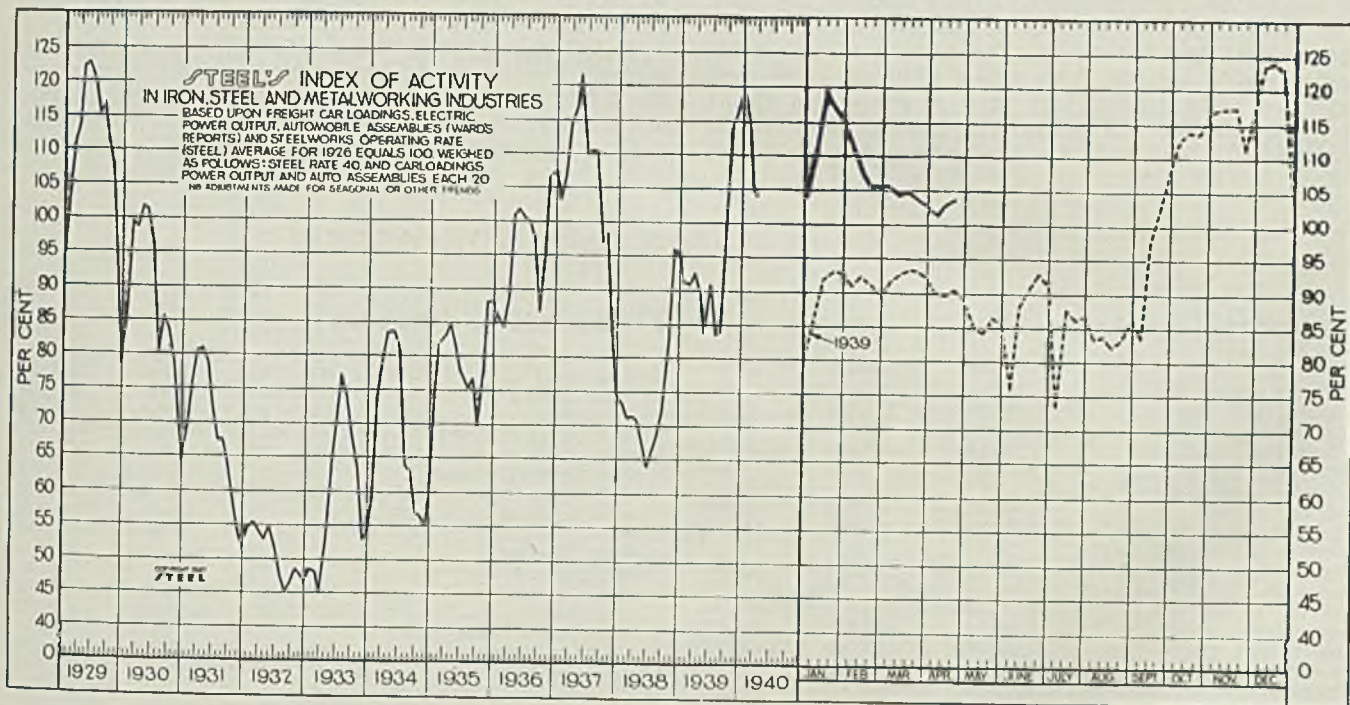
The four business barometers composing STEEL'S index turned upward in the latest week, forcing the index to the highest level since March 23. During the week ended April 20 the index advanced 0.7 points to 103.4 and compares favorably with the 90.4 level recorded in

the same week last year. In the corresponding periods of 1938 and 1937 the index stood at 70.8 and 122.2 respectively.

Exports continue to play an increasing part in bolstering domestic production. March exports are estimated at about \$344,000,000, a gain of 30 per cent over the corresponding month last year. In the first three months this year our export trade totaled over a billion

dollars compared with slightly less than \$700,000,000 in the same 1939 period. This bulge in exports has been concentrated in the steel, machinery, machine tools, motor trucks, lubricants, aircraft and industrial chemicals. The influence of war on foreign sales of these commodities has more than offset declines in other lines, particularly farm products.

Near capacity operations in the



STEEL'S index of activity advanced 0.7 points to 103.4 in the week ended April 20:

Week Ended	1940	1939	Mo. Data	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Feb. 10.....	107.2	92.1	Jan.	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6	104.1
Feb. 17.....	105.1	91.1	Feb.	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2	111.2
Feb. 24.....	105.4	89.3	March	104.1	92.6	71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
Mar. 2.....	105.6	91.5	April	.....	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7	122.5
Mar. 9.....	104.7	92.7	May	.....	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2	122.9
Mar. 16.....	104.9	93.3	June	.....	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8	120.3
Mar. 23.....	103.7	93.2	July	.....	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9	115.2
Mar. 30.....	103.2	92.2	Aug.	.....	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4	116.9
Apr. 6.....	101.8	90.0	Sept.	.....	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7	110.8
Apr. 13.....	102.7	89.7	Oct.	.....	114.0	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8	107.1
Apr. 20.....	103.4	90.4	Nov.	.....	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0	92.2
			Dec.	.....	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3	78.3

†Revised.

machine tool, aircraft and shipbuilding industries are indicated for some months ahead by the large order of backlogs reported by these industrial groups. Operating schedules in other industrial lines have been curtailed to a close relationship with incoming orders.

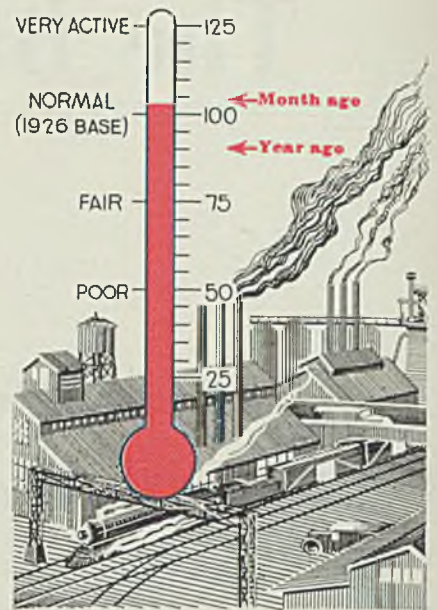
There are indications that the downward tendency of industrial activity since the first of the year has about run its course, but as yet there is little tangible evidence that the renewal of demand has reached sufficient volume to bring about a reversal of the downward trend.

Automobile production again advanced during the

## Industrial Weather

TREND:

*Sidewise*



### Where Business Stands

Monthly Averages, 1939 = 100

	Mar., 1940	Feb., 1940	Mar., 1939
Steel Ingot Output	97.3	107.5	87.6
Pig Iron Output	109.1	117.8	89.4
Freight Movement	95.0	94.1	91.3
Automobile Production	141.5	135.6	121.9
Building Construction	91.9	67.8	101.7
Wholesale Prices	101.3*	102.1	99.5

\*Preliminary.

week ended April 20. Output in that period totaled 103,725 units compared with 101,940 the previous week and 90,280 in the corresponding 1939 period. Motor car assemblies for April are expected to exceed 450,000 units. This would put the month 27 per cent ahead of the 354,266 units completed during April of last year. The March quarter output of 1,311,045 cars was the second best first quarter in the history of the industry exceeded only by 1929 when 1,546,319 units were produced. The general high level of production during the first quarter this year has raised dealers' stocks substantially. As a result, the second quarter period

is unlikely to show the normal seasonal improvement in production.

Retail automobile sales increased 20 per cent last month over the corresponding 1939 period and were 40.3 per cent greater than in February of this year. It is the third highest total on record for the month, exceeded only by 1937 and 1929.

Electric power consumption turned upward for the second consecutive week during the period ended April 20. In that week power output totaled 2,421,576,000 kilowatt hours, compared with 2,417,994,000 in the previous period. Electric power consumption remains well above the 2,199,002,000 kilowatts reported in the comparable week last year. Recent gains in electric power consumption are contrary to the normal seasonal trend.

## The Barometer of Business

### Industrial Indicators

	Mar., 1940	Feb., 1940	Mar., 1939
Pig iron output (daily average, net tons)	105,502	113,943	86,465
Iron and steel scrap consumption (tons)	2,932,000	3,054,000	2,634,000
Gear sales index	114	116	104
Foundry equipment new order index	243.4	179.4	146.6
Finished steel shipments	931,905	1,009,256	845,108
Ingot output (weekly average, tons)	956,219	1,056,673	860,951
Dodge buildings awards in 37 states (sq. ft.)	\$272,178,000	\$200,574,000	\$300,661,000
Automobile output	439,911	421,820	389,489
Coal output, tons	35,400,000*	39,105,000	35,438,000
Business failures; number	1,197	1,042	1,322
Business failures; liabilities Nat'l. Ind. Conf. board (25 industries, factory):	\$11,681,000	\$13,472,000	\$19,002,000
†Av. wkly. hrs. per worker	38.0	38.7	36.8
†Av. weekly earnings...	\$27.61	\$28.09	\$26.11
Cement production, bbls.†	5,041,000	6,205,000	5,505,000
Cotton consumption bales	626,331	662,659	649,237
Car loadings (weekly av.)	622,037	616,067	597,603

†February, January and February, respectively.

\*Preliminary.

### Financial Indicators

	Mar., 1940	Feb., 1940	Mar., 1939
25 Industrial stocks	\$192.71	\$192.67	\$118.01
25 Rail stocks	\$22.61	\$22.98	\$23.18
40 Bonds	\$73.14	\$72.89	\$72.72
Bank Clear'gs (000 omitted)	†\$20,446,000	\$23,922,000	\$19,711,000
Commercial paper rate, New York (per cent)	½-¾	½-¾	½-¾
*Com'l. loans (000 omitted)	\$8,596,000	\$8,528,000	\$8,191,000
Federal Reserve ratio (per cent)	87.8	87.5	84.7
Capital flotations: (000 omitted)			
New Capital	\$69,806	\$103,959	\$161,974
Refunding	\$171,377	\$346,842	\$79,367
Federal gross debt (millions of dollars)	\$42,540	\$42,365	\$39,990
Railroad earnings	†\$32,617,743	\$45,566,633	\$18,637,706
Stock sales, New York stock exchange	16,268,868	13,465,355	24,565,054
Bond sales, par value	\$135,488,450	\$120,647,000	\$185,855,800

†February, January and February, respectively.

\*Leading member banks Federal Reserve System.

### Commodity Prices

	Mar., 1940	Feb., 1940	Mar., 1939
STEEL'S composite average of 25 iron and steel prices	\$36.83	\$36.97	\$36.40
U. S. Bureau of Labor index	78.1*	78.7	76.7
Wheat, cash (bushel)	\$1.24	\$1.22	\$0.87
Corn, cash (bushel)	\$0.72	\$0.74	\$0.63

\*Preliminary.

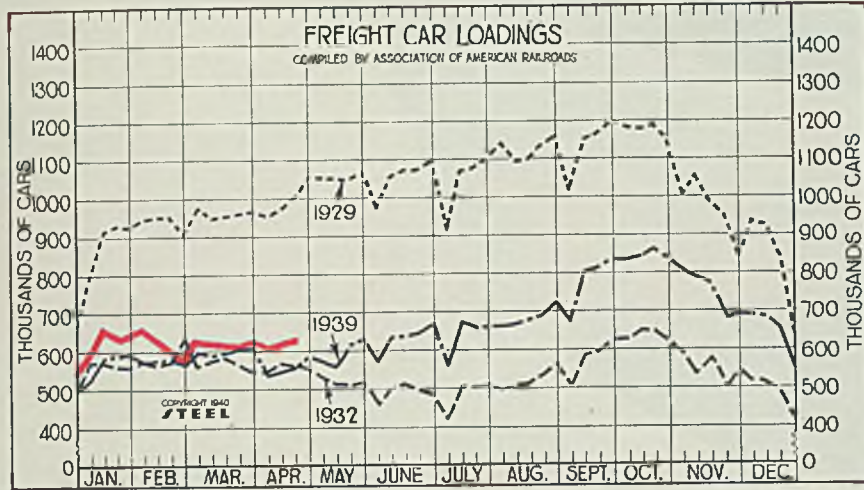
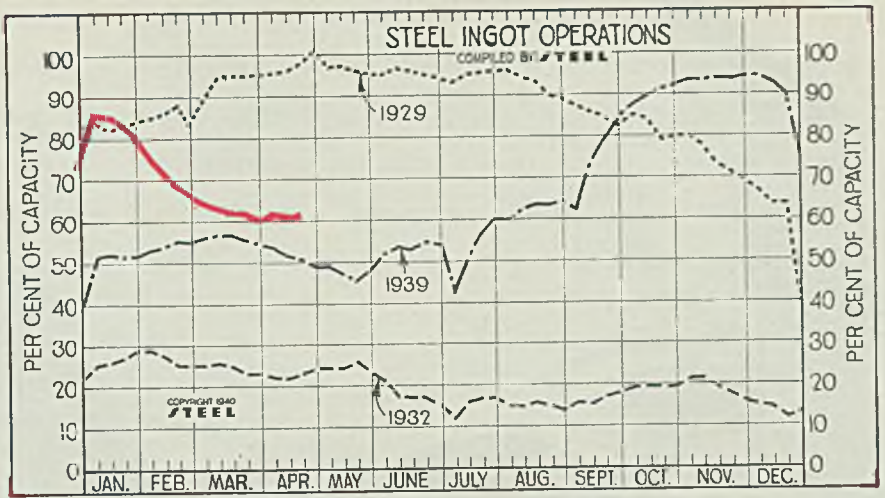
### Foreign Trade

	Feb., 1940	Jan., 1940	Feb., 1939
Exports	\$346,779,000	\$368,583,000	\$218,682,000
Imports	\$199,775,000	\$241,897,000	\$158,072,000
Gold exports	\$22,000	\$11,000	\$81,000
Gold imports	\$236,413,000	\$451,183,000	\$156,427,000

### Steel Ingot Operations

(Per Cent)

Week ended	1940	1939	1938	1937
Jan. 20....	84.5	51.5	30.5	80.0
Jan. 27....	81.5	51.5	33.0	76.0
Feb. 3....	76.5	53.0	31.0	79.5
Feb. 10....	71.0	54.0	30.0	81.0
Feb. 17....	69.0	55.0	31.0	83.0
Feb. 24....	67.0	55.0	30.5	84.0
Mar. 2....	65.5	56.0	29.5	86.0
Mar. 9....	63.5	56.5	30.0	87.0
Mar. 16....	62.5	56.5	32.0	89.0
Mar. 23....	62.5	55.5	35.0	90.0
Mar. 30....	61.0	54.5	36.0	91.5
Apr. 6....	61.5	53.5	32.0	91.5
Apr. 13....	61.0	51.5	32.0	91.5
Apr. 20....	61.5	50.5	32.5	91.5



### Freight Car Loadings

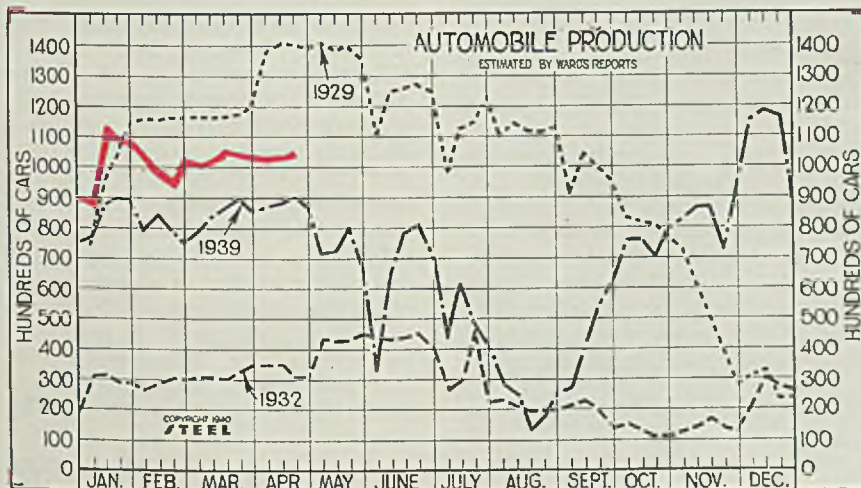
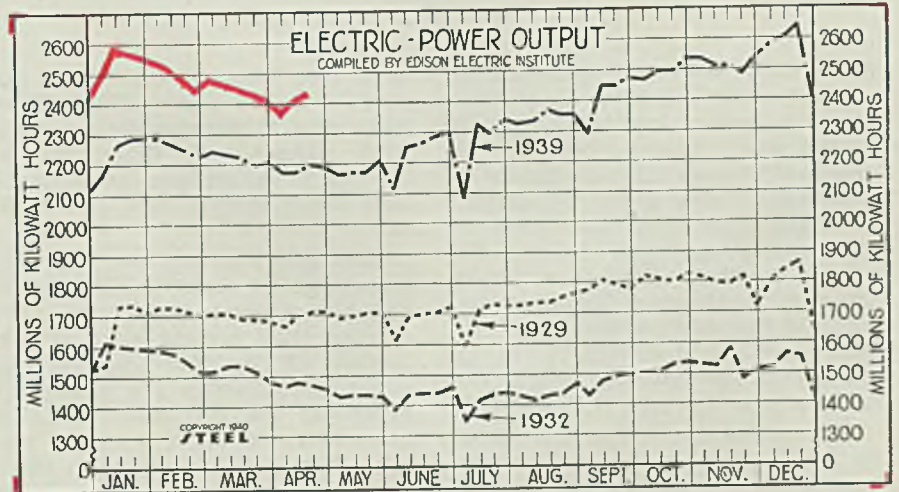
(1000 Cars)

Week ended	1940	1939	1938	1937
Jan. 20.....	646	590	570	670
Jan. 27.....	650	594	553	660
Feb. 3.....	553	577	565	675
Feb. 10.....	627	580	543	692
Feb. 17.....	608	580	536	715
Feb. 24.....	595	561	512	697
Mar. 2.....	634	599	553	734
Mar. 9.....	621	592	557	749
Mar. 16.....	619	595	540	759
Mar. 23.....	620	605	573	761
Mar. 30.....	628	604	523	727
Apr. 6.....	603	535	522	716
Apr. 13.....	619	548	538	751
Apr. 20.....	628	559	524	761

### Electric Power Output

(Million KWH)

Week ended	1940	1939	1938	1937
Jan. 20....	2,572	2,290	2,109	2,257
Jan. 13....	2,566	2,293	2,099	2,215
Feb. 3....	2,541	2,287	2,082	2,201
Feb. 10....	2,523	2,268	2,052	2,200
Feb. 17....	2,476	2,249	2,059	2,212
Feb. 24....	2,455	2,226	2,031	2,207
Mar. 2....	2,479	2,244	2,036	2,200
Mar. 9....	2,464	2,238	2,015	2,213
Mar. 16....	2,460	2,225	2,018	2,211
Mar. 23....	2,424	2,199	1,975	2,200
Mar. 30....	2,422	2,210	1,979	2,147
Apr. 6....	2,381	2,173	1,990	2,176
Apr. 13....	2,418	2,171	1,958	2,173
Apr. 20....	2,422	2,199	1,951	2,188



### Auto Production

(1000 Units)

Week ended	1940	1939	1938	1937
Jan. 20....	108.5	90.2	65.4	81.4
Jan. 27....	106.4	89.2	59.4	74.1
Feb. 3....	101.2	79.4	51.4	72.3
Feb. 10....	96.0	84.5	57.8	72.8
Feb. 17....	95.1	79.9	59.1	95.7
Feb. 24....	102.6	75.7	57.0	111.9
Mar. 2....	100.9	78.7	54.4	127.0
Mar. 9....	103.6	84.1	57.4	101.7
Mar. 16....	105.7	86.7	57.5	99.0
Mar. 23....	103.4	89.4	56.8	101.0
Mar. 30....	103.4	86.0	57.5	97.0
Apr. 6....	101.7	87.0	70.0	99.2
Apr. 13....	102.9	88.0	62.0	125.5
Apr. 20....	103.7	90.3	60.6	133.2

F5 SEA BIRD of stainless steel was delivered to CAA for development of airways in Alaska

By CARL de GANAHL

Vice President  
Fleetwings Inc.  
Bristol, Pa.



STAINLESS

■ TO GET a picture of trends in aircraft construction, it is a good idea to consider what has happened in the past. Historic prophecy is accorded Thomas Edison when he is supposed to have given the subject of flight some study and came to the conclusion, even before the Wright brothers flew, that "when internal combustion engines are made at 3 pounds per horsepower or less, man-controlled flight in a heavier-than-air machine would become a practical matter."

It is indeed interesting how closely Mr. Edison hit the nail on the head. Engines, during the twenties, were approaching 3 pounds per horsepower when Lindbergh first crossed the Atlantic and man-controlled flight was becoming practical. With continued reduction in weight per horsepower and continued increase of horsepower available per engine, the more practical and advanced flying has become. This has been a most important influence on aircraft structures.

The Wright brothers flew with an engine of their own design and manufacture which developed 12 horsepower and weighed about 200 pounds after first unsuccessfully endeavoring to purchase an engine

developing 8 horsepower. Entire airplane weighed about 750 pounds. With only 12 horsepower available, it is evident much ingenuity was necessary to produce an airplane that would carry a man and fly at all.

With improved engines, increased knowledge of aerodynamic efficiencies and structures, airplanes have reached their present state of perfection. Today, for instance, our long-range airplanes are rapidly approaching the maximum range of some of the finest ocean-going vessels. For their load capacity, these planes far exceed any other means of transportation in both range and speed.

Purpose of this article is to consider structural developments to date and in future. Practically without exception, early planes were built of wood and wire because aircraft spruce proved to have the best strength-weight ratio in compression and greatest stiffness with the light loads then imposed. In tension, however, piano wire has the highest strength-weight ratio. Therefore, basically, airplanes used wood for compression and stiffness with wire for tension.

Even to date nothing has exceeded

strength-weight ratio of wood for compression and stiffness. While its strength is fairly low, its bulk is so large and its specific weight so small that it is a simple matter to obtain the necessary form factors for stiffness and compressive strength with solid masses of wood without resorting to any serious complications in fabrication.

#### Wood Fractured Easily

As time went on, however, it was found that wood had an unhappy faculty of failing completely when overloaded through sudden fracture or splitting. This was lessened in some degree by development and use of cross-grained plywood. Fundamentally, however, the factor was still to be considered. A further difficulty was encountered in building larger aircraft for larger loads. Metal fittings had to be excessive in size and weight for proper distribution of loads into the mass of wood required to carry them.

In other words, wood and metal are so dissimilar in physical properties that considerable efficiency is lost when endeavoring to match the two structurally. Wood has the further unfortunate property of deteriorating and splitting with varying

moisture contents. Various means have been developed to lessen effectively this difficulty but it still exists.

With development of high-strength aluminum alloys, increased engine horsepowers and improved aerodynamic efficiencies, it became possible to build structures satisfactorily for aircraft use. Aluminum alloys do not have the same strength-weight ratio in tension that the best steel alloys have. Likewise they have not the same strength-weight ratio in compression and stiffness that wood may have. However, form factors and consequent increased strengths have been obtained by ingenuity in fabrication

*Larger longer-range aircraft must be constructed from material of highest possible strength-weight ratio. The high-strength alloy steels, particularly stainless, best meet this condition; fabricate easily*

a given grain to contend with as in wood. There is nothing like the same deterioration as in wood although careful protection against corrosion still must be provided.

At a matter of fact, improvements in engines and aerodynamic efficiencies has allowed the structural engineer to abuse his privileges to

proved aerodynamic knowledge and higher horsepowers available with gradually decreasing weight per horsepower.

As an example, a large airplane transport today carries about 175 pounds of excess weight per passenger just for his comfort, eye appeal, emergency safety and, as you might

# ESS STEEL

## F O R A I R C R A F T

and locating the metal in the form and shape where it can do its work most efficiently and where loads are high enough.

Steel bolts, fittings and tension members still, however, held their own and had to be used where heavy loads existed and where tension was the primary consideration. Differences between physical properties of aluminum alloys and high-strength steel alloys were much less than between wood and steel. Consequently design of fittings and proper distribution of loads in compression became much simpler.

There is still no question that a light airplane of small horsepower can be built lighter in wood and wire than in any other materials. However, increased power together with lighter engines has so raised loading requirements of aircraft structures that aluminum alloys and steel are the rule today.

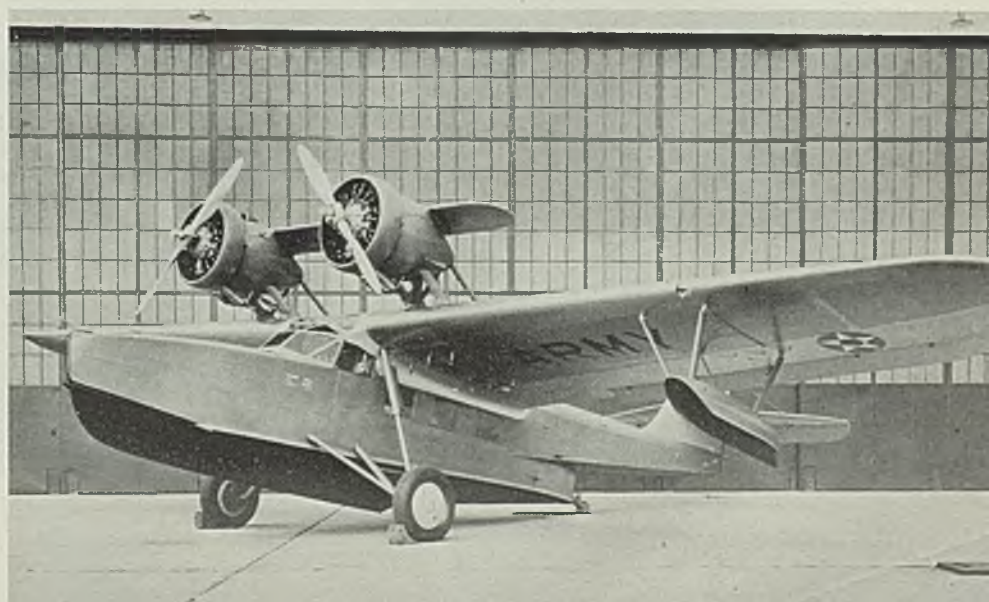
In contrast to wood, metals possess the beautiful property known as "yield point," an ability to stretch and give without complete failure. Likewise, there is no fracture along

such an extent that a number of factors often are given greater importance than low weight, such as field service, operators' and passengers' comfort and long life with low maintenance. Under this category comes the use of metal-covered wings, cantilever construction and various parts made so they can be replaced easily.

Much thought and considerable sacrifice in weight has been made to attain these results but they are possible through tremendously im-

say, de luxe travel considerations.

Obviously loads imposed throughout the plane are gradually increasing. Likewise, with the call for higher speeds, lowest possible frontal areas are being demanded to reduce drag. All this tends to limit dimensions to a minimum. Wings, for instance, should be made as thin as possible. Furthermore, stratosphere planes flying at high altitudes, with sea level air pressures being maintained in the cabin for passenger comfort are rapidly being developed. Thus



Stainless steel wings fitted to Douglas Dolphin for United States air corps

cabin strength must be increased tremendously to handle the pressures involved, further increasing structural loads.

All this means material of highest possible strength-weight ratio, regardless of its density. High-strength alloy steels seem to hold this field. As wing dimensions are limited and loads increase, it will gradually replace other materials until a material of higher strength-weight ratio is developed.

#### Steels More Easily Welded

In addition, high-strength alloy steels have other numerous advantages. They withstand impact loads better than other material. Elongation at high strength is greater, allowing them to resist overloads with only partial failure. Most important, they can be welded more easily and reliably than light alloys. The hard surface of steel is far more durable and less subject to damage through handling and misuse.

Stainless steel, in particular, lends itself to aircraft construction. It can be obtained in the cold-rolled state to a higher specific strength than almost any other material. Still it retains an excellent elongation.

Strengths approaching closely to 200,000 pounds per square inch with elongations of 10 to 20 per cent are available. In the cold-rolled high-strength state, it can be fabricated, draw rolled, bent, twisted and pulled into shapes desired without harm to the metal or further heat treatment.

Likewise, it is admirably suited to spot welding, infinitely cheaper for fabricating than riveting. In addition, spot welded stainless structures can be made with a much higher over-all modulus than riveted light alloys since welding makes a

more rigidly integrated structure. Furthermore, corrosion and deterioration is much less for stainless steel than any other known material. Thus it requires almost no protection from the deteriorating effects of weathering.

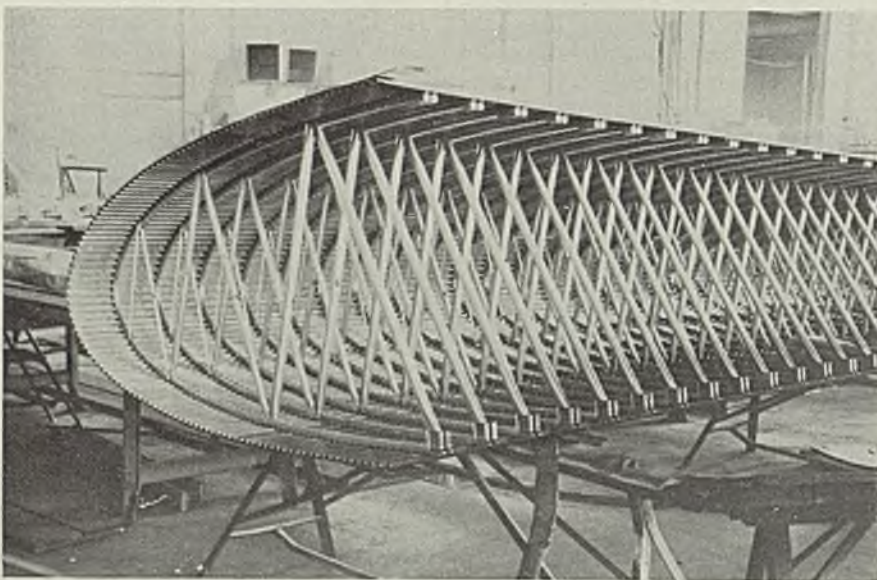
These points are beautifully illustrated in results of some design calculations made on a 36,000-pound flying boat of long range work. When designing the ship for a 2500-mile range, weight appeared to be about the same if the wings were made in either stainless or aluminum alloy

On the other hand, when the design was projected for a 4500-mile range, an advantage of almost 800 miles in range could be obtained by using stainless in the wings. This was accomplished through being able to build the wings satisfactorily with a higher aspect ratio and thinner root thickness than was practicable with the light alloy.

#### Use of Steel To Increase

It is not intended here to state that steel will displace light alloys in *all* aircraft construction. Where loads are small and dimensions not restricted, lighter structures will continue to be made of light alloys. However, it is predicted with confidence that as development continues, steel alloys will play a bigger and bigger part. Such numerous advantages as electric resistance welding of stainless, their cheapness and reliability will have a profound influence on their increasing use in fundamental structures of the planes of tomorrow.

Unique stainless steel wing construction. Smooth outside skin is fastened over corrugated shear web, in turn supported by internal tubular framework. Of course, section shown here is only part of the complete wing



## Sick Absenteeism in Industry To Be Studied

■ Sick absenteeism in industry is the subject of a study being made by a committee appointed by the Air Hygiene Foundation of America, 4400 Fifth avenue, Pittsburgh. Preliminary report of this committee has been published in form of a pamphlet, including as an appendix a proposed plan for recording of industrial absenteeism.

The purpose of the committee is to establish definite methods to reduce sick absenteeism throughout the heavy industries. This preliminary report showed that more than eight days each year per male worker and more than twelve days per year for each female worker is the average toll paid to sickness by industry.

The program outlined for the committee consists of three steps, the first of which is the preliminary report which has just been issued and which attempts to present a complete picture of the problem as it now stands. The second step will be keeping complete records of sick absenteeism by participating companies on standardized forms. The third step, analysis of these records, which will be held strictly confidential by the foundation, is expected to yield specific methods for reducing the number of lost workdays. Copies of this report have been sent out to 200 member companies. Other interested concerns may secure copies by addressing the foundation. There is a charge of 25 cents per copy to cover costs.

## Brightly Colored Enamel For Plastics Developed

■ Chemists of Sherwin-Williams Co., 601 Canal road, Cleveland, have developed a new finish which makes it possible to coat black plastic material with iridescent colors.

The enamel, called Kem Bakolescent in the iridescent form, and Kem Plastite in solid colors, can be dipped or sprayed on plastic parts and combines any color of the rainbow with an extraordinarily long-wearing surface.

## Free Chart Available

■ Handy wheel chart which contains complete engineering data concerning various types of Meehanite castings available to industry, has been prepared by Meehanite Research Institute of America Inc., 311 Ross street, Pittsburgh. The wheel reveals quickly the physical properties of general engineering castings as well as heat, corrosion and wear resisting types. Charts are offered free upon request.



# Ohio Chapters of A.S.M. Study

## Methods for Hardening Steel

■ HARDENING procedure for steel was the subject on which the Columbus, Cincinnati and Dayton chapters of the American Society for Metals based the program for their annual tri-chapter meeting at Battelle Memorial institute, Columbus, O., April 24. More than 125 members of the three sections and their guests attended the event, which included morning and afternoon technical sessions and a luncheon at Ohio State university.

Dr. S. L. Hoyt, technical advisor of Battelle, served as chairman of the two sessions. Speakers at the luncheon were C. E. MacQuigg, dean of engineering, Ohio State university; Dr. O. E. Harder, assistant director of Battelle institute, and national vice president of the American Society for Metals; and William H. Eisenman, national secretary of the society. Mr. Eisenman reported that with a membership of 11,500, the organization is at an all-time record and that requests for space in the National Metal show in Cleveland, Oct. 21-25, totaling 86,000 square feet, exceeded the space originally laid out and that an additional exhibit area is being arranged for.

### Factors Involved in Quenching

Contributing a paper on quenching media and related problems, Howard Scott, engineer in charge of metallurgical section, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., stated that three factors are of prime importance in quenching of steels. These are hardening, distortion and cracking. If conditions are provided that these factors can be held under control, then little trouble will develop in the quenching of any steel.

In the quenching of plain carbon steels, aqueous media are the most active agents, but these suffer from random formation of soft spots, particularly on shallow hardening steels. An extremely fast quench is necessary for hardening—agitation of the medium will assist in this and will minimize soft spots, but it increases distortion. Optimum concentrations for aqueous solutions of sodium chloride and sodium hydroxide were determined as 9 and 3 per cent, respectively, Mr. Scott stated.

Oil quenching gives a faster rate of cooling and thus is employed advantageously for the oil hardening types of steel. But, here again, the metallurgist is faced with the problem of selecting the oil which will

satisfy all conditions. The speaker also discussed the problems which arise in quenching with air and described a new type of furnace in which work is cooled in an atmosphere of dissociated ammonia gas. Air is so completely excluded from the cooling zone and the gas held at such purity that hardening is accomplished satisfactorily. This furnace was described in STEEL, Oct. 16, 1939, p. 152, and Nov. 6, 1939, p. 56.

Bore hardening of cylinders by induction heating was the subject of a paper by L. R. Jackson, metallurgical physicist and assistant supervisor, Battelle Memorial institute. The process referred to is that developed by Budd Induction Heating Inc., Philadelphia, and described in STEEL, Nov. 27, 1939, p. 54. This method of hardening is applicable to the bores of automobile hub forgings; cylinders of diesel, gaso-

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### A New Service by STEEL

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line and steam engines; and sleeves in sleeve-valve internal engines.

The speaker stated that although the process sounds simple, it is not. He considers that the matter of quenching is as important as the design of the inductor block. Properties of the steel also are an important factor. Referring to hardening of gray iron diesel cylinders, Mr. Jackson asserted that the induction method makes it simple to distinguish good material from defective. Since cylinders can be hardened before expensive machining operations are performed, weak spots will develop cracks and spongy sections will show themselves up.

It was stated in discussion that engine tests had shown that cylinder wear after 4000 hours was only 0.001-inch, this being 3000 hours longer than for the same amount of wear in cylinders hardened by other methods. Abrasion tests showed increase in life for induction hardened cylinders of about 100 per cent. However, this test was not run to completion because the engine broke down as a result of

the abrasive getting into the bearings.

John L. Burns, assistant superintendent, wire division, Republic Steel Corp., Chicago, explained research work and the theory of interrupted or time quenching of steel. Although the procedure has been practiced for many years, its use is quite limited as compared with ordinary quenching. It was revealed that concentric rings, which differ structurally, is a typical condition produced.

Dr. Burns discussed three methods of time quenching: (1) Simple time quenching where the part is quenched in water a given time, then removed and allowed to finish cooling in air; (2) double quenching where a part is quenched in water for a given time, then transferred immediately to oil to finish the quench; and (3) interrupted quench where the part is quenched for a given time in water, removed and exposed to the influence of air for a definite time, then returned to water to finish the quench.

The first method produces hardenability curves of the same general shape as straight oil or water quenching, whereas the second and third methods produce a differently shaped curve from the straight oil or water quench in that under certain conditions surface hardness is depressed with respect to subsurface hardness.

### Procedure Has Advantages

Advantages of the interrupted quench, according to the speaker, are: (1) In the comparatively tougher outer ring produced under the circumstances of lower stress that would be experienced with the straight water quench; and (2) in obtaining the necessary hardness with structural freedom from free ferrite in the outer part of the piece to be quenched, which would not be obtained with an oil quench.

It was stated that although time quenching should not be considered a panacea for problems of low hardenability oil quenching steel, or for parts showing a tendency to crack in water, its use can be widened by an understanding of the effect of the stepped cooling rate which results in the time quench.

An excellent summary and description of the process of austempering of steel to impart relatively high hardness with a most desirable degree of toughness and ductility was given in a paper by E. E. Legge, district director of research, American Steel & Wire Co., Worcester, Mass. This process, developed in its laboratory aspects about four years ago, as a result of extensive research on the transformation and result of austenite, was described in the March 29, 1937,

(Please turn to Page 78)



# Crankshaft Hardening

*Special equipment uses oxyacetylene flames and water quenching jets to control automatically the hardening of bearing surfaces of automobile crankshafts. Output of 20 shafts per hour handled easily*

■ CAST steel crankshafts for the 12-cylinder engines of 1940 Lincoln Zephyr models are being hardened on the four main bearing surfaces. Oxyacetylene flames increase the hardness of 255 to 321 brinell to approximately 600 brinell, or file hard. Equipment has been built

specially for this work by Lincoln engineers. It accommodates about 20 shafts per hour, ample capacity to keep abreast of production requirements.

Shafts are counterbalanced, of course, and have six pin bearings, two connecting rods per bearing

and four main bearings, one at each end and two in the center. Previously the shafts were surface heat treated on the bearing surfaces, but this year it was concluded that longer life, lower oil consumption and an all-around better shaft would result from hardening the main bearings.

## Shafts Given Double Treatment

As cast in the Rouge plant foundry of Ford Motor Co., the shafts are of the following analysis: 1.35 to 1.60 per cent carbon; 1.50 to 2.00 copper, 0.85 to 1.10 silicon, 0.70 to 0.90 manganese, 0.40 to 0.50 chromium, 0.010 maximum phosphorus and 0.08 maximum sulphur. After casting and cleaning, the shafts are given a double treatment involving heating at 1650 degrees Fahr. for 20 minutes, air cooling to 1200 degrees, reheating at 1400 degrees for one hour and furnace cooling to 1000 degrees.

Lincoln crankshafts are 32.25 inches in length with main bearings 2.4 inches in diameter and 2.5 inches on the face. Rod bearings are 2.26 inches in diameter. Weight is about 85 pounds. Shafts are routed through conventional rough and finish machining operations before the hardening treatment, the latter being followed only by rough

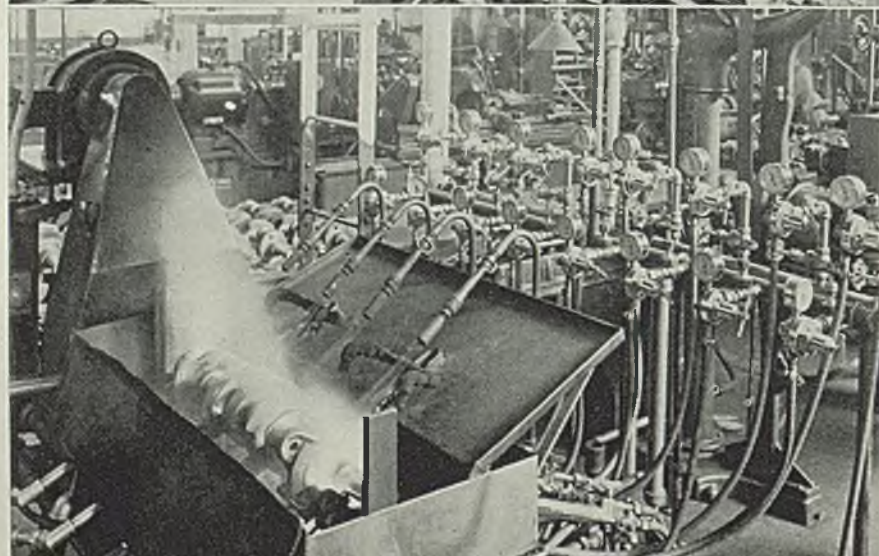
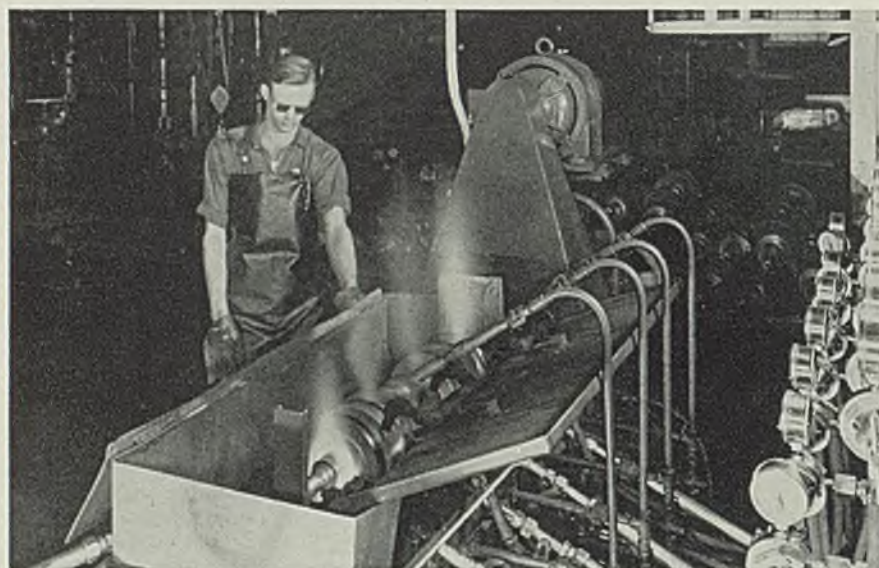


Fig. 1. (Upper)—View from rear of hardening machine. Motor in upper center drives the shaft at a speed from 150 to 200 revolutions per minute

Fig. 2. (Lower)—Four oxyacetylene torches with tips close to the crankshaft bearing surfaces are directed on either side of the shaft. Four flames from burners above the shaft are pilots. Note the pipes for the quench spray retracted from above the four main bearing surfaces



and finish grinding operations on the bearing surfaces.

The automatic flame-hardening machine, Figs. 1 and 2, is of interesting construction. It comprises essentially a lathe bed with superstructure rebuilt and adapted for the work. Between headstock and tailstock has been erected a shallow steel pan, perhaps 3 feet long, 2 feet wide and 1 foot deep. Through the front and back sides of this pan are inserted four oxy-acetylene torches or burners, spotted so the tips are about  $\frac{5}{8}$ -inch away from the bearing surface to be heated. The torches are aimed upward at an angle of about 45 degrees so the flames from the tips on opposite sides of the same bearing surface will not interfere with each other. In other words, the small flames from the tips strike the shaft at a point just below the center line, and at the same time are angled upward.

The shaft is placed in the machine by an overhead lifting mechanism and is chucked quickly into the headstock by means of a dowel pin, the other end riding in rollers on the tailstock. A motor drives the headstock and rotates the shaft at a predetermined speed—approximately 150 to 200 revolutions per minute.

A separate motor at the rear of the machine drives through reduction gears a camshaft which employs 16 cams to actuate all controls in the hardening and quench-

ing operations. As soon as the shaft is chucked in place and starts rotating, a cam opens valves to admit gas to the torches which are ignited by pilot burners above. The flames play on the bearing surfaces for about 1 minute, after which another cam shuts off the gas. Meanwhile four quench pipes have indexed forward directly over the heated bearing surfaces. When the flames are extinguished, a cam opens valves in these lines, admitting quench water under low pressure which falls directly on the bearings, while the shaft continues to rotate.

#### Rotation Overcomes Warpage

Flow of water and the time it is on are calculated to leave sufficient heat in the treated surface to draw back the hardness and to temper the metal just enough to avoid the likelihood of brittleness. Steady and continuous rotation overcomes danger of warpage.

The four torches are not lighted simultaneously because of the differing characteristics of each bearing surface. The center bearings have large flanges adjacent to them which help to conduct heat away from the bearing surface in contrast to the end bearings which have flanges on only one side. Thus, the two center pairs of torches are ignited first. After about 10 seconds the rear bearing torches come on, and in 4 or 5 seconds the front bearing torches. All are extinguished simultaneously.

Rapidity with which the flanges adjacent to the center bearings conduct heat away also called for some ingenuity in designing the torch tips. The bronze tips are drilled with 0.054-inch holes and vary from six

to eight holes per tip. If these holes, in two rows, were spaced equally across the face of the  $2\frac{1}{4}$ -inch tip, the center of the bearing face would show a depth of hardness penetration three times that obtained at the ends.

Hence, on the center bearings it was necessary to plug the center holes in the tips and to drill the end holes at an angle so the flame would be aimed directly into the fillet. Drilling these tips properly has been found to be the key to the achievement of uniform hardness penetration across the bearing face. The hardness zone does not extend clear to the extreme edges of the bearing face, but curves up and terminates about  $1/16$ -inch from the flanges.

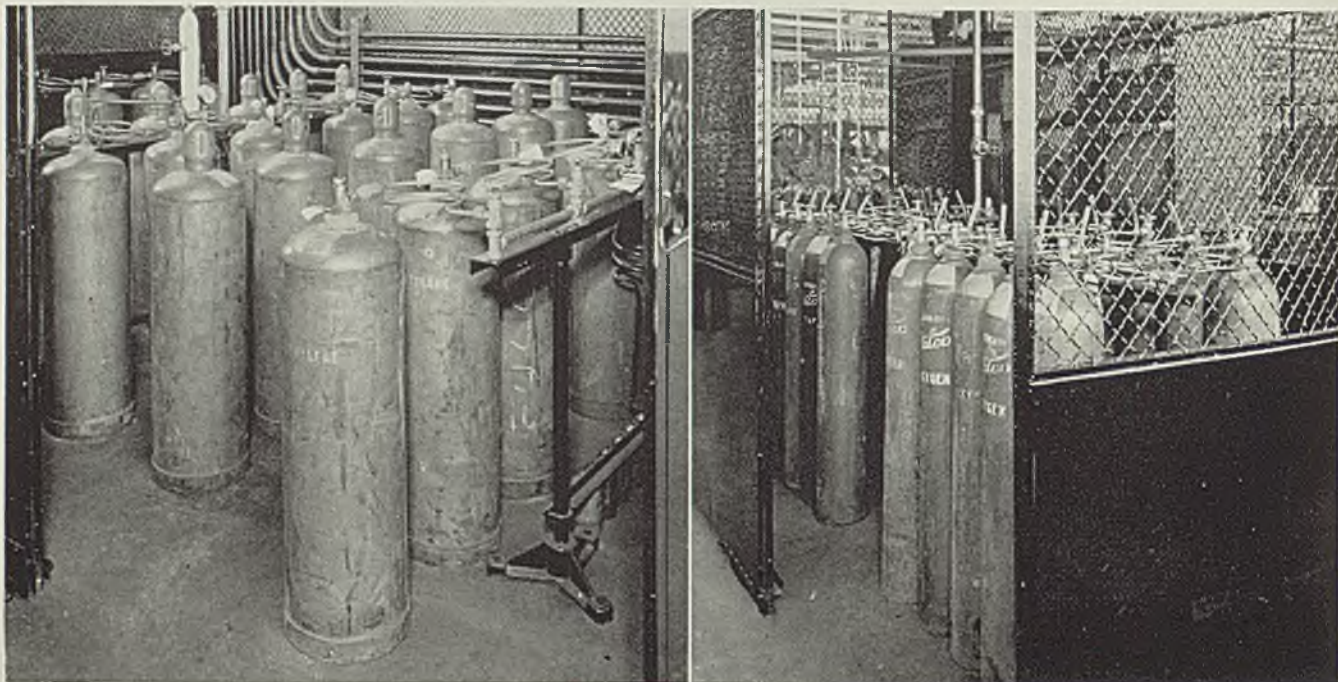
The tips and torches are set so the ends of the flames do not quite touch the bearing surface, being about  $1/32$ -inch away for the maximum effectiveness. The steel is heated to between 1425 and 1475 degrees Fahr. before being quenched. All eight torches, incidentally, are water cooled.

Oxygen is supplied to the system at 25 pounds pressure, acetylene at 11 pounds. These gases are piped from widely separated storage rooms to the hardening machine. The acetylene room, Fig. 3, is completely enclosed by a draft curtain and provided with steam pipes for maximum utilization of gas in colder weather. It houses three banks of six tanks each, manifolded together so a switch from

(Please turn to Page 78)

Fig. 3—Acetylene storage room, enclosed by draft curtain and steam pipes. Three banks of six tanks each one available, only one bank is needed at a time. Line pressure on acetylene is held at about 11 pounds

Fig. 4—Oxygen storage room houses 20 tanks with 10 manifolded for use at one time. Line pressure here is approximately 25 pounds



**PENNSALT CLEANER**  
**SAVES 37.5% ON CLEANING MATERIALS**  
**FOR AMERICAN FIXTURE AND MFG. CO.**



Beauty of finish has always distinguished fine furniture. And modern furniture, such as the Chromcraft dinette set illustrated, imposes even more exacting standards than is the case with traditional materials. With this fact uppermost in mind the American Fixture and Mfg. Co., of St. Louis, Mo., recently conducted tests with metal cleaners, adopting one of the Pennsalt Cleaners after it had demonstrated a clear superiority in actual service.

The results showed a 37.5% saving in cleaning materials over the cleaner formerly used, eliminated a sawdust cleaning operation, and a costly hand scrubbing operation as well. In producing these substantial savings, the Pennsalt Cleaner

prepares the surface of the metal properly for the exacting chrome finishing operations.

Orthosil was the original Pennsalt Cleaner—a product that brought outstanding new economies and improved results to heavy-duty metal cleaning operations in virtually every industry. Companion cleaners, meeting each need with laboratory precision, have been developed for varied and extreme requirements. Together they form the group known today as the Pennsalt Cleaners.

Their exceptional dissolving and emulsifying action, tremendous lasting power, and quick efficient cleaning ability fit one or more of them for a money-saving place in your processes. Why not give them a test? Write to Dept. E and we will gladly furnish full details. Pennsalt Cleaner Division, Pennsylvania Salt Manufacturing Company, Philadelphia, Pa.



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**CLEANERS FOR INDUSTRY**

**PENNSYLVANIA SALT**  
 MANUFACTURING COMPANY  
*Chemicals*

# Complicated Factors Accompany Use of Aluminum in Galvanizing

■ AT THE present time, the subject of aluminum in hot-dip galvanizing baths is receiving considerable attention. However, use of aluminum in this manner is accompanied by complicated results and numerous effects which must be given full consideration.

As far back as 1891 it was known that the diffusion of a small percentage of metallic aluminum throughout a melted zinc bath produces a more uniform deposit on the sheet. Also, the coating appears highly crystalline, is permanently

Abstract from paper presented at Cleveland meeting of American Hot Dip Galvanizers Association Inc., 903 American Bank building, Pittsburgh, Aug. 24 and 25, 1939.

By WALLACE G. IMHOFF

Technical Director of Research  
American Hot Dip Galvanizers  
Association Inc.  
Pittsburgh

brilliant, and has other desirable characteristics.

Aluminum is easily oxidized in the galvanizing bath. However, a high bath temperature tends to deplete quickly the amount of aluminum in the bath by burning or oxidizing it out in the form of blue aluminum oxide, which mixes in with the zinc ashes or zinc skimmings. Thus, more aluminum must be added to a

bath normally operated at a high temperature than to one normally operated at a low temperature. A galvanizing bath always carried around 850 degrees Fahr. will hold more aluminum in it than a bath operated at 880 degrees. A shift in bath temperature to accommodate production needs and to meet type of work being handled may be and often is also accompanied by a shortage of aluminum in the bath.

Surface area is another factor since aluminum in a hot-dip galvanizing bath gives the zinc coating a metallic skin. If the work being handled is light in weight and has a fairly large surface area, then a comparatively large amount of aluminum must be added to the bath. In addition to the surface area factor, temperature and other components act independently to pile up the variables and complicate the matter.

As a natural corollary to the surface area consideration, it is logical that the greater the production through the bath, the more aluminum will be required to condition the bath. Equally true is the opposite. That is, the lower the bath temperature and the smaller the surface area, the less aluminum is required; etc.

## Iron Speeds Production

The amount of iron in the bath has a decided influence on the amount of aluminum oxidized out. The higher the iron content in a bath, the faster the aluminum is oxidized out.

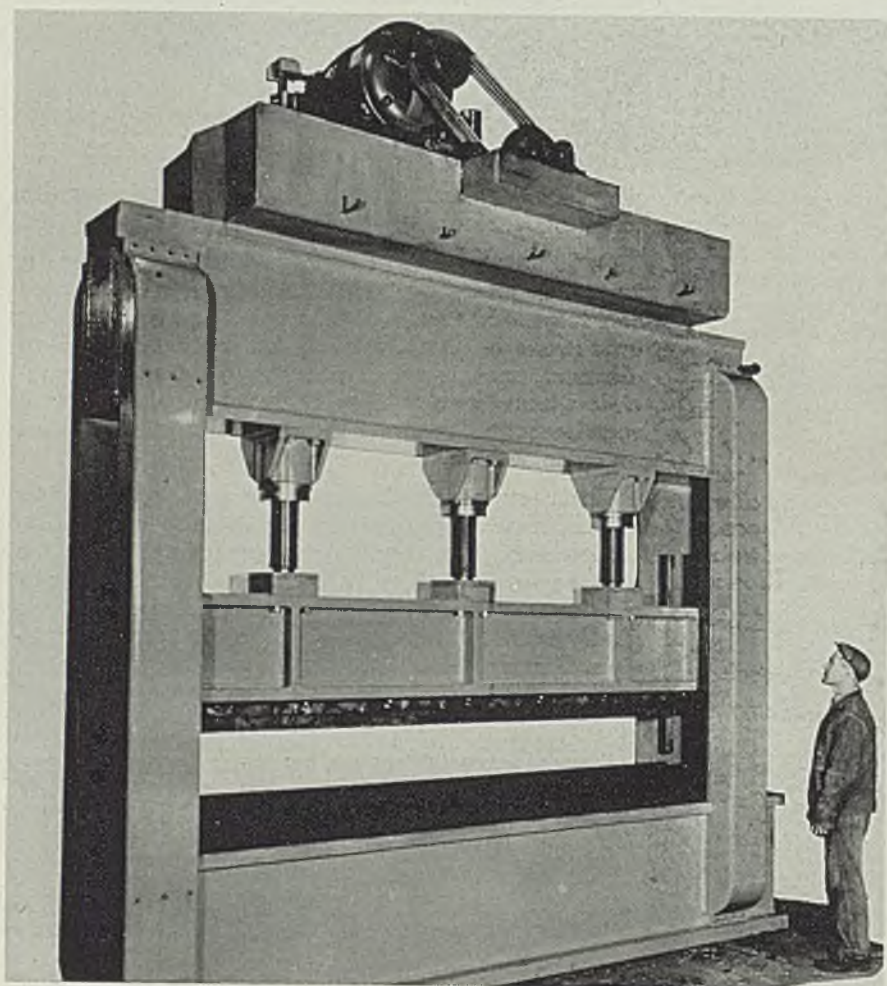
The amount of aluminum in a bath radically affects fluxing conditions. Main chemical reaction which takes place in fluxing forms zinc chloride, which is a liquid. However, when too much aluminum has been added to the bath, the aluminum has a stronger action than the zinc and instead of liquid zinc chloride, aluminum chloride is formed, which is a gas. Hence, with a heavy addition of aluminum, it is impossible to keep a flux on the bath.

Excess aluminum in the bath tends to increase greatly the amount of oxides and inclusions. Oxides and inclusions not only increase the difficulty of melting but also tend to give a poor quality zinc coating.

Aluminum tends to give the zinc coating its metallic skin. An extreme shortage of aluminum in a galvanizing bath often is accompanied by a finish with large white frosted areas where the zinc-iron alloy is present but no outer skin or spangles have formed. Often merely adding a piece of aluminum to the bath will overcome these white frosted areas.

Excess aluminum in the bath may cause a heavy scurf and dirt par-

## All Welded Steel Plate Forming Press



■ Arc welded throughout, this Bullpress introduced by Contract Welders Inc., 2545 East Seventy-ninth street, Cleveland, is for bending, forming, straightening and homing operations. It has a capacity for bending a 10-foot length of 1/2-inch mild steel plate, its ultimate strength being 60,000 pounds per square inch. Power is supplied by a 25-horsepower, special hoist-type motor. Beams, columns, ram and base are hollow sections fabricated from steel plate

ticles embedded in the coating. The correct amount of aluminum always gives a zinc ash or skimming that is yellow in color; excess aluminum in a bath tends to color the zinc ashes blue.

There are times when zinc coating is blemished with yellow stains either from "sour" flux or from an excess addition of tin or antimony. Here the addition of a small amount of aluminum will tend to eliminate these stains.

The term, "block spangle," has been given the crystallization effected by aluminum additions to the galvanizing bath. This is because the crystallization effect produced by aluminum is quite plain. It con-

sists of blocks that closely resemble ice cakes in ponds during the breaking up period in the spring.

When the zinc coating is not permitted to develop a spangle by quenching at the proper instant in a water bath, aluminum tends to cover the entire outside of the zinc coating and gives it a white silver metallic luster.

While aluminum sometimes is used alone in hot-dip galvanizing baths, it is used along with other metals such as tin, antimony, cadmium, etc., in many other instances. When these metals also are present, a large amount of aluminum can be used, as aluminum tends to combine with these other metals.

adjusting the hole detector and marker are in the boxes mounted at the end of the detector. An operator at the control desk has suitable instruments and control switches to manipulate properly the steel through the entire shearing line.

Fig. 1 shows a closeup view of the two control cabinets with various electronic tubes and control relays for operation of the detector. Cabinet on the left is the control panel for the hole detector itself. It consists of amplifier, relays and control circuit transformers. The cabinet at right contains necessary photoelectric tubes and relays for use in connection with the marking device. Detector may be adjusted for various types of work.

### Insulation Material

■ M. H. Detrick Co., 140 South Dearborn street, Chicago, announces, Thinsulite, a new insulation and refractory material. It is suitable for boiler walls, water wall backing, oil still heaters, stress relieving furnaces and all areas not exposed to actual abrasion. The material is light in weight, has a low heat loss and features permanent heat and air-tight construction.

## Hole Detector Simplifies Quality Production on Shearing Line

■ A PHOTOELECTRIC hole detector, spotting holes as small as 0.01-inch in sheet moving at speeds up to 1000 feet per minute, greatly simplifies quality production in a recently installed steel mill shearing line, according to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Traveling from right to left, as shown in Fig. 2, edges of steel strip are trimmed to uniform width before entering the hole detector between guides and hold-down blocks which guide the flying strip accurately through the machine. Two light sources are mounted in the enclosing cabinet overhead, and the phototube housing is mounted below the moving stream of metal sheet on a separate foundation to avoid vibration.

### Detects the Slightest Hole

Even the most minute break or hole in the steel strip lets the light through, actuating the phototube and marking device that scores the strip alongside the hole. The two control cabinets mounted on the side are for the detector unit and marker. Immediately beyond the pinhole detector is a machine which cuts the strip into exact lengths.

After leaving the flying shear, the strip goes to a classifier. This has a gate timed with the hole de-

detector to open and discharge all defective sheets to a pit below. Final process in the line is to pile the sheets into stacks for handling.

Control devices for operating and

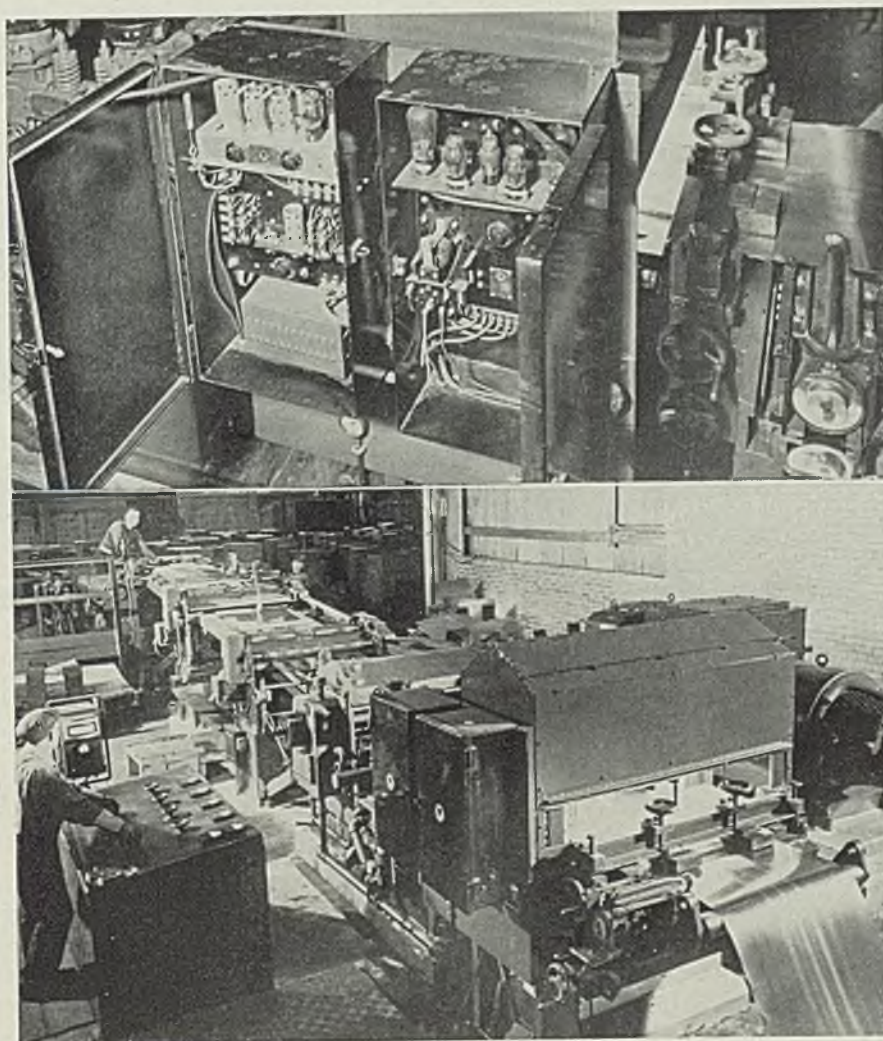
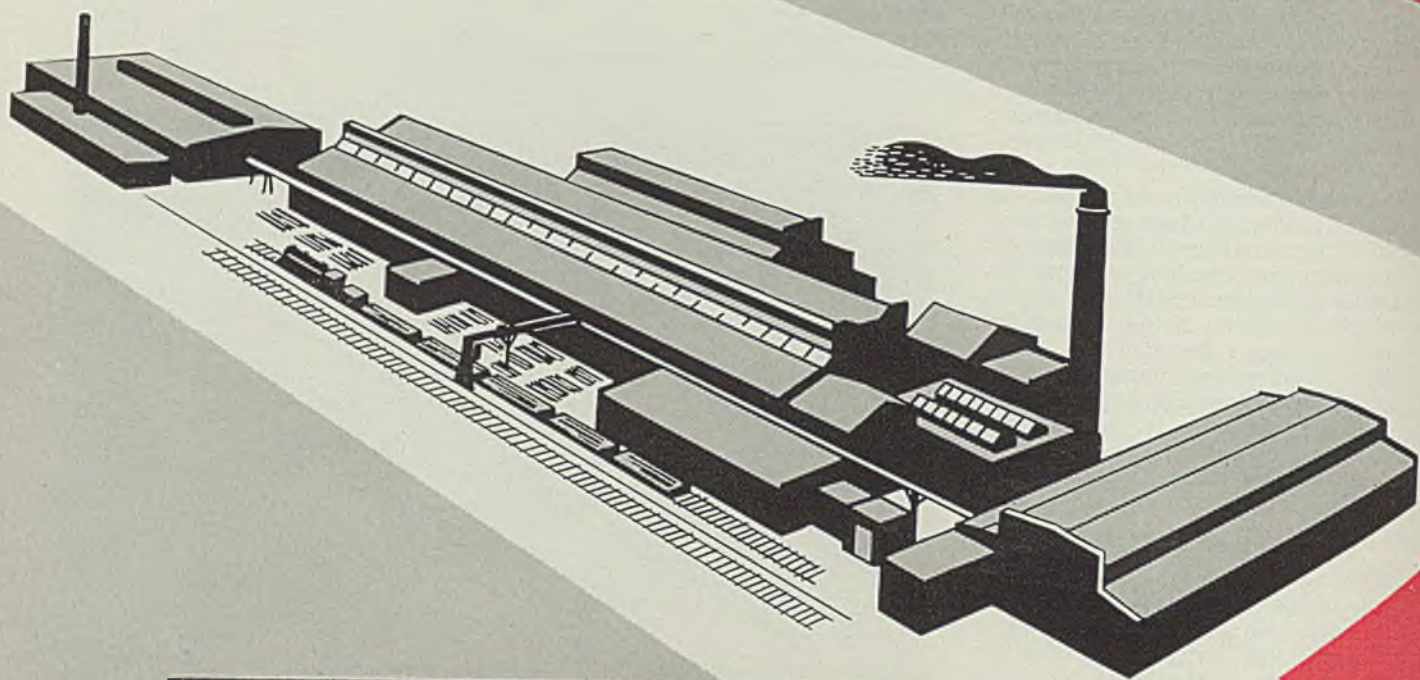
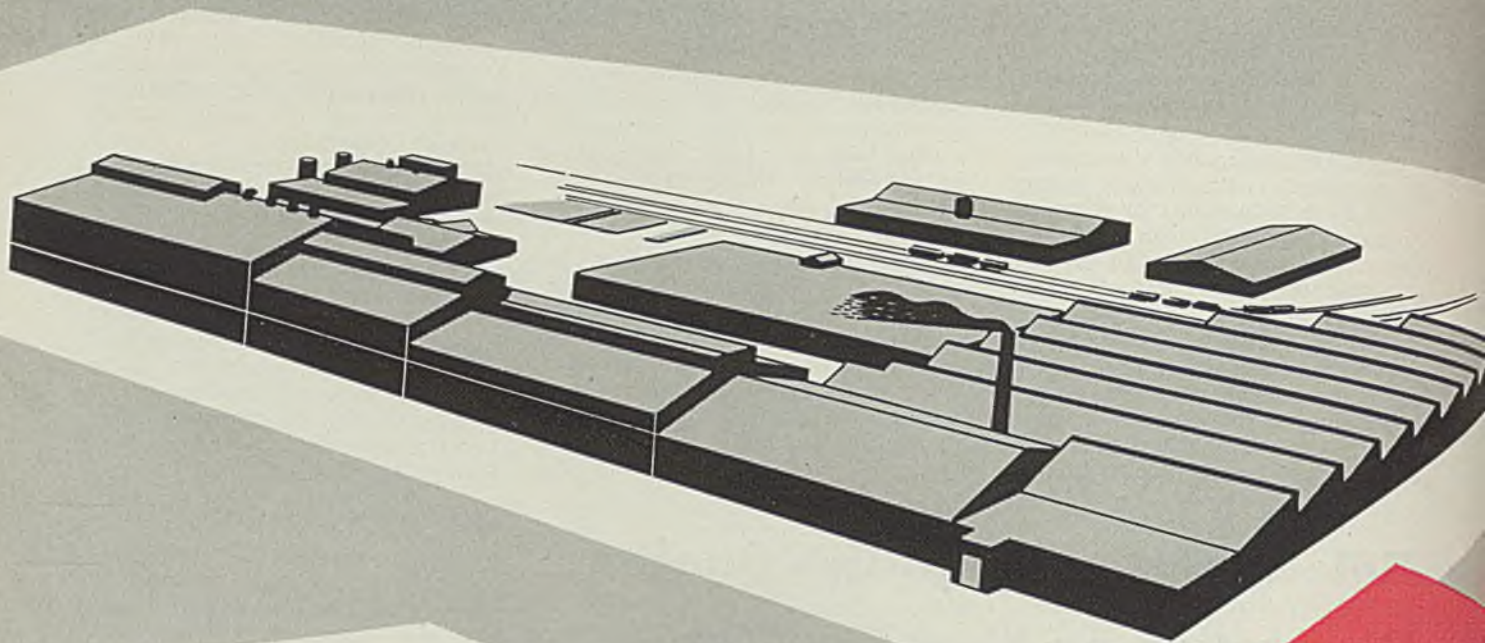


Fig. 1. (Top)—Closeup view of two control cabinets with various electronic tubes and control relays for operation of a hole detector installed on a steel sheet shearing line. Fig. 2. (Bottom)—General view of steel sheet shearing line equipped with a photoelectric hole detector and strip cutting machine



**AMFORGE NOW OPERATES TWO GREAT PLANTS**—The Drop Forge Plant (top) employs 350 skilled workmen and operates board and steam hammer equipment varying in weight from 1,000 to 10,000 lbs. falling weight. It has a modern heat-treating department and ample die-making facilities.

The Upset Plant, established in 1914, and since then continuously modernized and enlarged, employs 240 workers skilled in the Upsetting process. It operates 30 Forging Machines, from 1½" to 8" in size, capable of producing moderately small to the largest Upset Forgings ever made commercially.

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FORGING SERVICE**

**DROP  
FORGINGS**

**UPSET  
FORGINGS**

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Greatly Increased Facilities  
with the acquisition of  
Great Lakes Forge Plant**

Now, from one dependable and versatile source, you can obtain practically all your requirements for quality Drop Forgings as well as Upset Forgings.

With the acquisition of the Great Lakes Forge Company, AMFORGE combines two of the country's greatest commercial forge organizations, each known for high quality of craftsmanship and excellence of modern plant facilities.

For 25 years the Great Lakes Plant has been an outstanding one, furnishing Drop Forgings to large users whose acceptance standards are among the most rigid in Industry. With its background of quality work and wide range of modern equipment, it will ably supplement the aim of AMFORGE to supply your complete range of forgings. Another advantage is the reduction in freight cost possible through mixed carload shipments of both drop and upset forgings.

You can easily determine whether or not AMFORGE methods can effect worthwhile savings on the steel parts you use—just send finished dimensioned prints or sample parts and our engineers will promptly check them over and submit recommendations and prices on the quantities needed—without obligation of course.

**AMERICAN FORGE DIVISION**

*of The American Brake Shoe and Foundry Company*

2621 So. Hoyne Ave. • Chicago, Illinois



# Assembling Trucks

*Efficient order and production control system aids assembly operations by having all parts for subassemblies in on time. Trucks of many types assembled progressively at five stations*

■ MAKING some 37 different types of platform and fork trucks, Yale & Towne Mfg. Co., 4530 Tacony street, Philadelphia, finds it necessary to engineer each order as it comes to the factory. The many types sizes and infinite variations possible make stocking of trucks impractical and create a difficult problem in controlling production efficiently.

To be sure that parts for subassemblies and miscellaneous parts are ready to go to assembly floor at the same time, an efficient order and production control system has been developed. This system starts to operate as soon as an order is entered in the plant. After it has gone through engineering department, individual orders for castings and parts go to the various pro-

By E. R. NORDIN  
Foreman, Assembly Department  
Yale & Towne Mfg. Co.  
Philadelphia

duction departments and to foundries supplying the castings. As a good proportion of the parts are in the form of castings, an efficient follow-up with the foundries is a

Fig. 1. (Left)—Overhead monorail system extends length of each assembly line to aid in lifting parts into assemblies as shown here. Note use of welded steel horses to bring work to convenient level

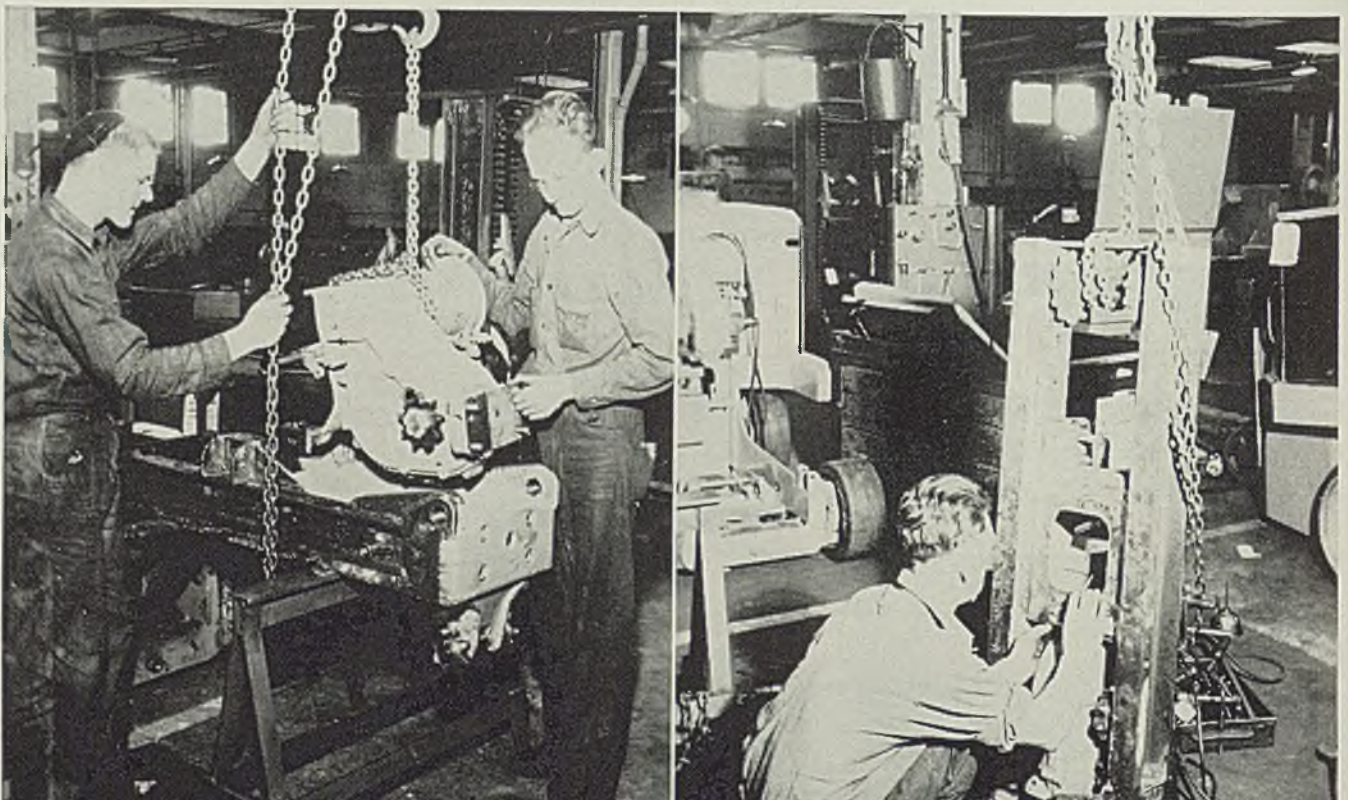
Fig. 2—As many subassemblies as possible are made up before the main assembly operation takes place. Illustration at right shows elevating mechanism and guides being put together

most important part of this system. When the order is in the engineering department, approximate date for delivery is set, and then each foreman ascertains the date when the order should pass through his department.

Careful checking all down the line prevents delays from some one part failing to arrive or being misplaced or lost in production.

As many parts as possible are mounted together to form subassemblies before the truck is put together on the main assembly floor. Drive units, for instance, have the cast parts machined, inspected and stored on the third floor of the plant. Then when ready for subassembly they are taken to the second floor, the hous-

(Please turn to Page 77)



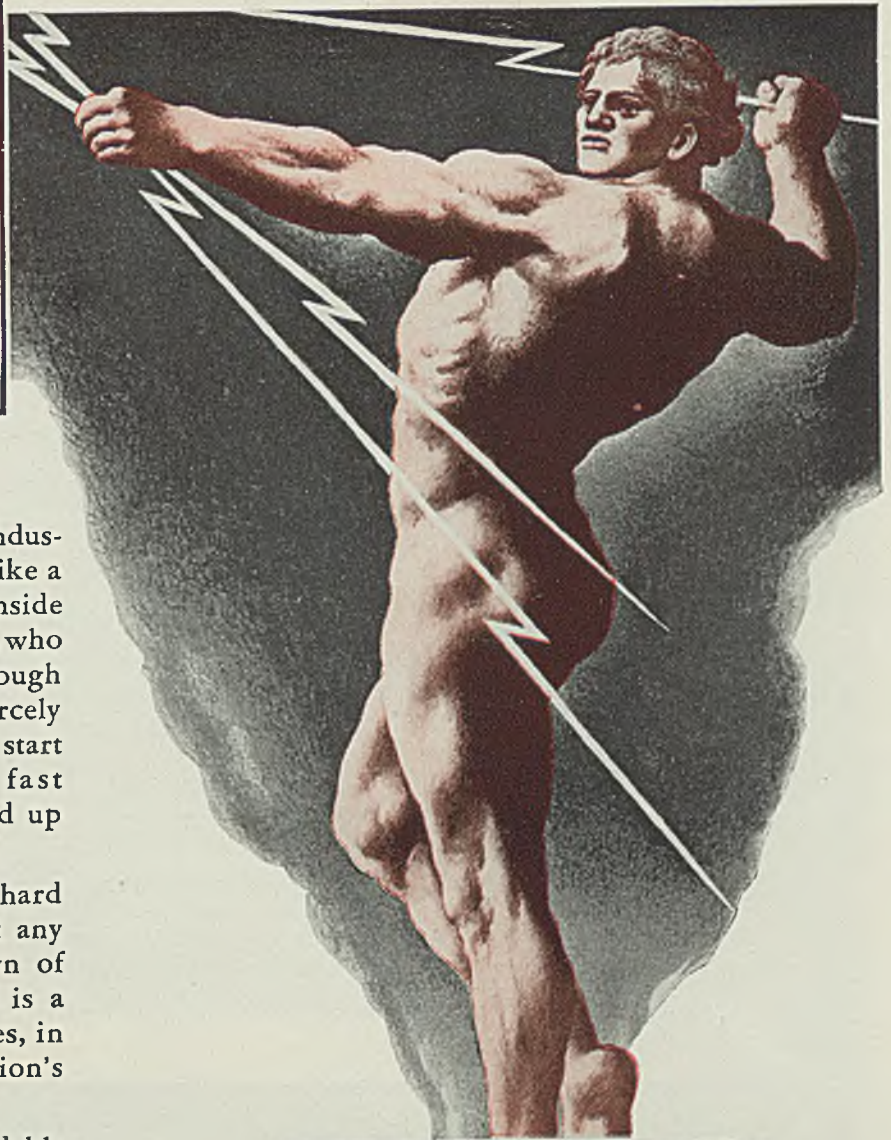
**The giant  
that lives  
in a box...**

**A**N EXIDE-IRONCLAD industrial truck battery looks very much like a box . . . but it is a box with a giant inside it. A giant of strength and endurance, who can propel a heavily loaded truck through a plant and up steep ramps while scarcely exerting himself. A giant who can start each morning, work hard and fast throughout a shift or turn, and end up just comfortably tired.

He is a durable giant, used to hard knocks and rough usage. Without any pampering he keeps the full brawn of youth far into a ripe old age. He is a willing, faithful worker, and he does, in fact, perform a large share of the nation's materials handling.

This giant—the tireless, dependable power of an Exide-Ironclad Battery—is waiting to speed up your handling service and production. He is confident through long experience . . . and eager to start work for you, beginning now. Write for new free booklet, "The Exide System for Better Material Handling."

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SEATTLE—1919 Smith Tower Bldg.  
WASHINGTON—1819 L Street, N.W.



# Pouring Practice

*Best practice determined by balancing gains from refinements against costs involved. Ingot design depends on equipment available to strip, manipulate and roll; ultimate section desired; steel grade specified*

■ WHEN the full ladle is pulled away from the furnace is a point in steel production where, until recently, everyone let go of the heat, leaving it to then non-too-gentle ministrations of the pouring-pit crew. When it was realized something should be done about it, the entire industry suffered a rash of new observation systems, all originally con-

centrated on observations covering pouring-pit conditions. Observer's reports brought to light immediately the necessity for improved pouring practice—better shutoff of stream, good centering of

By E. H. HOLLENBACK

Assistant Engineer  
of Tests  
Cambria Plant  
Bethlehem Steel Co.

centrated on observations covering pouring-pit conditions.

Observer's reports brought to light immediately the necessity for improved pouring practice—better shutoff of stream, good centering of

stream, avoiding the wide-open stream at first splash, control of so-called fan or umbrella streams and other of the more evident abuses.

Control of pouring conditions through observers reporting to the metallurgical department provided, in many cases, the stepping-stone by which these departments "moved in" on general open-hearth practice. At present it is not unusual for a metallurgist to control furnace and de-oxidation practice; holds in the ladle; nozzle sizes, shape and design; coalings; sinkhead practice; holding of ingots for solidification before movement; as well as heating and rolling practices in the breakdown and finishing mills.

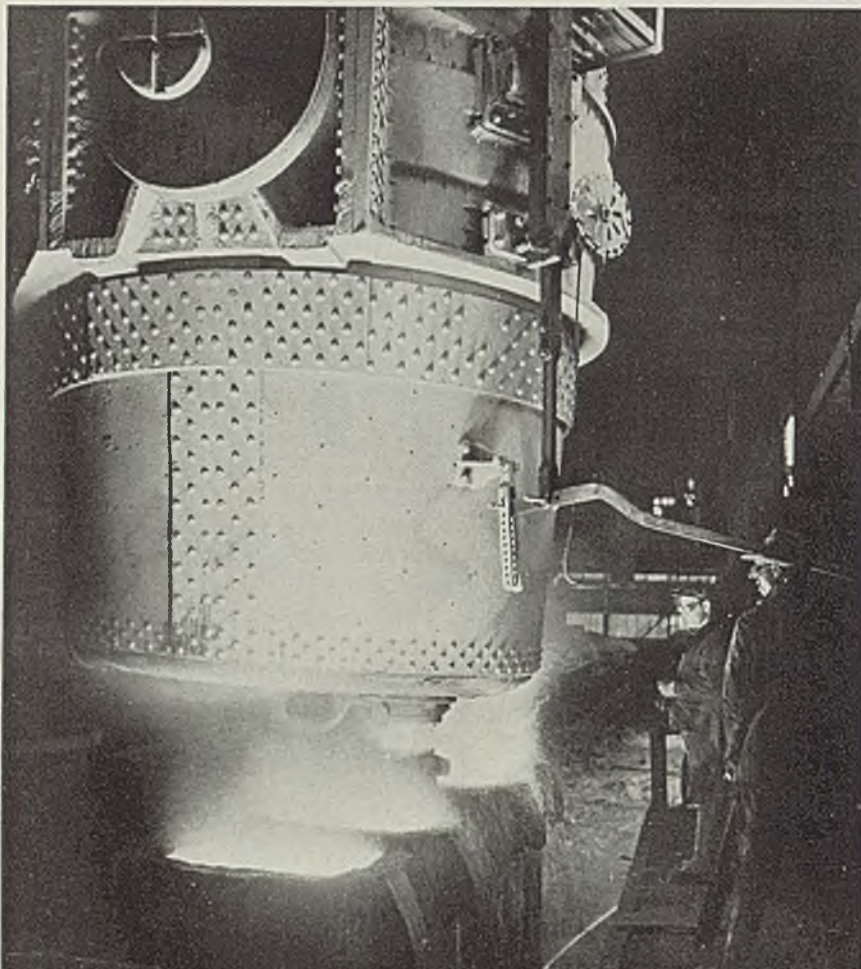
## No Interchangeable Practice

To my knowledge there is no one simple ideal pouring practice interchangeable between open-hearth shops. Possibly the reason is little-recognized differences in preliminary working of heats, raw material analysis or physical condition, slag volume or analysis, ratio of bath depths to bath areas, fuels, ladle heights, etc. These or similar obscure variables may make the results of identical pouring conditions quite dissimilar as to the physical properties produced in the ingot.

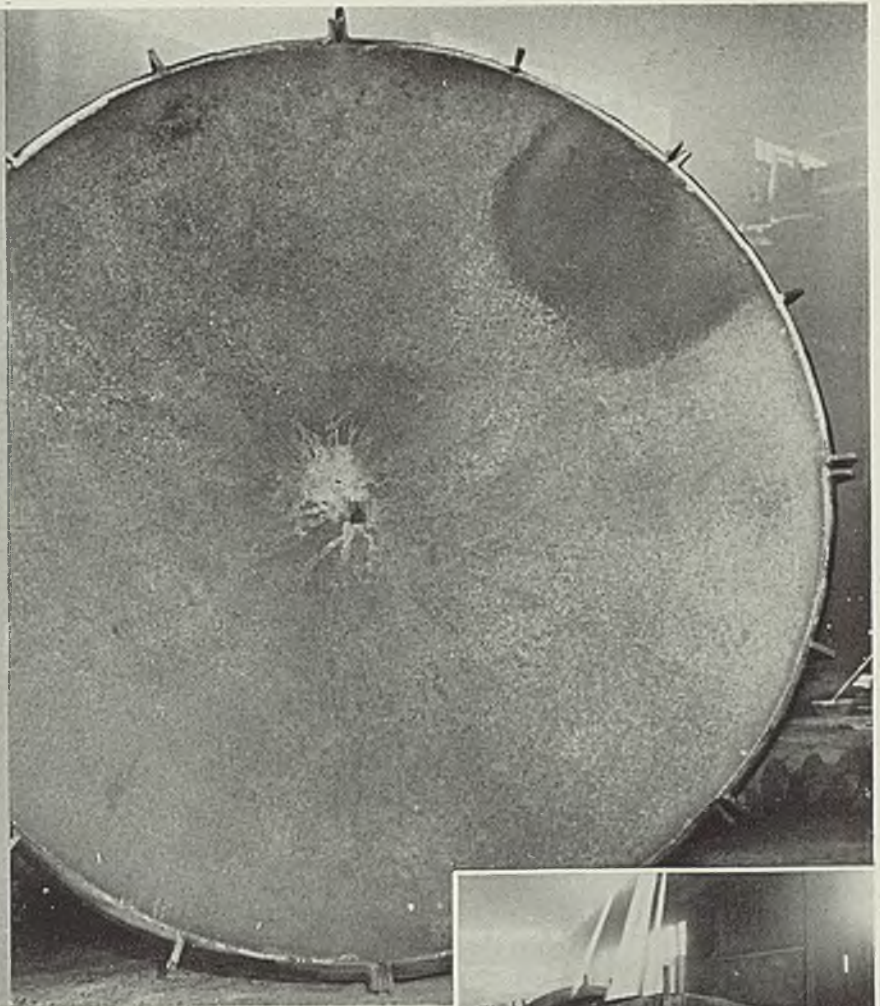
Pouring practice can be said to originate with the amount of time the ladle full of steel is held before the first mold is poured. It would be ideal to have this variable under control of trained metallurgical observers working with good accuracy and frequently calibrated pyrometers and holding heats on their own re-

(Please turn to Page 68)

Pouring steel ingots at plant of Bethlehem Steel Co.



# REFRACTORY CONCRETE SPEEDS LINING, CUTS HEAT LOSS ON THIS JOB!



● Inside and outside views of 12-ft. annealing furnace cover of this steel works, showing Refractory Concrete lining, made with Lumnite. This job was done quickly and easily. No joints to leak heat. Plenty of strength to resist the hard knocks these covers get.

**O**PERATORS in this steel works lined their circular annealing furnace covers with Refractory Concrete. Result? A quick, low-cost job. A monolithic lining with no joints to leak heat . . . and with plenty of strength to resist the hard knocks these covers get day in and day out.

This steel works has used Refractory Concrete made with Lumnite for 5 years on annealer roof sections, door linings for core ovens and heating furnaces, tops of annealing cars

—wherever they wanted to save time and money on refractories.

**What is Refractory Concrete?** It's a special-type concrete combining high cold-strength with structural strength even after long exposure to high furnace temperatures. Refractory Concrete is made by mixing Lumnite—a heat-resistant binder—with refractory, heat-resistant, or insulating aggregates—their choice depending on the need.

**How Refractory Concrete can save you money!** Lumnite Refractory Concrete is highly adaptable. It is easily placeable even in hard-to-get-at positions, thus cutting masonry costs. Refractory Concrete forms a solid one-piece wall. The smooth, streamlined surface cuts down erosion. No joints to catch and tear . . . to waste heat.

### *Why Use Refractory Concrete?*

1. Cast-in-place, monolithic, adaptable, cold-setting. Applied like concrete.
2. Heat losses reduced by elimination of joints. Result—fuel economy.
3. Insulating refractories at cost of ordinary refractories—or less.
4. Special shapes made in 24 hours. Precast shapes made as needed, cutting inventory expense.

Try Refractory Concrete made with Lumnite. You can get Lumnite from building supply dealers in all parts of the country. It comes to you in multi-wall, water-proofed paper bags.

For more facts on Lumnite, write Atlas Lumnite Cement Co. (United States Steel Corporation Subsidiary), Dept. S1, Chrysler Bldg., N. Y. C.

## LUMNITE FOR REFRACTORY CONCRETE

# How Gases and Oxides . . . . Affect Machinability

*Vacuum fusion extraction analyses turn up important differences in amount of gases and oxides. These differences are found to relate directly to performance of the steel in actual service*

■ FREQUENTLY routine chemical, metallurgical or physical tests do not supply a sufficiently conclusive answer to the characteristics of a steel under service conditions. More searching methods of analyzing the steel are needed in such instances if difficulties encountered are to be understood and corrected.

These deviations from expected performance of identical steels may occur even when they have the same chemical analysis. They may also occur even in different parts of the same heat.

An illustration of the practical problems which can be raised by such apparent idiosyncrasies in the behavior of steels of identical chemical characteristics is afforded in a recent experience in grinding crankshafts. Here a rather wide variation was encountered in the number of automotive crankshafts (SAE 1045 steel) which could be handled per tool grind.

The performance of steel taken from six supposedly identical heats gave the wide range of results shown in Table I.

Samples of the six heats were

Heat No.	Crankshafts per Tool Grind
1.....	60-65
2.....	30-40
3.....	75-100
4.....	30-40
5.....	75-100
6.....	35-40

submitted for an analytical study of the factors or combination of factors which might account for the variation in performance which, as indicated, ranged all the way from 30 to 100 pieces per tool grind.

The tests were performed in our general metallurgical laboratory in Massillon and included a fractional vacuum fusion extraction of gases

Macroetches, etched in hot hydrochloric acid. Left top, gave 60 to 65 crankshafts per tool grind; center, 75 to 100; bottom, 75 to 100. Right top, 30 to 40; center, 30 to 40; bottom, 35 to 40 crankshafts per tool grind

and oxides, a special analysis for aluminum and alumina, a nonmetallic rating, the McQuaid-Ehn test, a brinell hardness check, a macroetch of both center and rim showing microstructure at 100 magnifications and a study of the log of the six separate heats.

The fractional vacuum fusion extractions of gases and oxides in the steels were carried out at different temperatures to reduce the oxygen occurring as FeO, MnO, SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, individually or in complete mixtures. Such selectivity of extraction is extremely important in interpreting the performance of the steel. The low melting point oxides of iron and manganese do not offer any machining difficulty. In fact, a high FeO content may actually help machining.

It is the more refractory oxides of silicon and aluminum that are responsible for introducing machining difficulties into steel. Therefore, it seemed important to differentiate between these two general types of oxides as has been done in Table II where the results of the general examination of the six heats are set



TABLE II—General Examination of Six Heats

(Type SAE 1045)						
Heat No.	Routine Chemical Analysis					
	% C	% Mn	% P	% S	% Si	
1.....	0.42	0.75	0.020	0.052	0.166	
2.....	0.44	0.92	0.025	0.053	0.152	
3.....	0.44	0.88	0.020	0.056	0.182	
4.....	0.44	0.88	0.021	0.049	0.185	
5.....	0.41	0.82	0.025	0.055	0.189	
6.....	0.44	0.79	0.023	0.051	0.166	

Heat No.	Special Analysis		McQuaid-Ehn Test	
	% Al	% Al <sub>2</sub> O <sub>3</sub>	Center	Rim
1.....	0.011	0.011	3-1	5-2
2.....	0.032	0.017	Duplex	Duplex
3.....	0.014	0.012	1-4	1-4
4.....	0.021	0.015	Duplex	Duplex
5.....	0.010	0.013	4-5	4-2
6.....	0.019	0.017	Normal	Duplex

Heat No.	Silicon Oxide (2410° F.)			Aluminum Oxide (2900° F.)		
	Per cent Oxygen	Per cent Hydrogen	Per cent Nitrogen	Per cent Oxygen	Per cent Hydrogen	Per cent Nitrogen
1. Center	0.00145	0.00018	0.0006	0.00435	.....	0.0057
1. Rim	0.00414	0.00019	.....	0.00640	0.00023	0.0052
2. Center	0.00504	0.00016	.....	0.00924	0.0026	0.00735
2. Rim	0.00393	0.00004	0.0006	0.00458	0.00009	0.0019
3. Center	0.00264	0.00017	0.0008	0.00397	0.00022	0.0030
3. Rim	0.00430	0.00005	0.0015	0.00559	.....	0.0015
4. Center	0.00645	0.00040	0.0047	0.01560	0.00047	0.0085
4. Rim	0.00378	0.00005	.....	0.00870	0.00016	0.0051
5. Center	.....	.....	.....	.....	.....	.....
5. Rim	0.00664	0.00016	0.0014	0.01242	0.00036	0.0065
6. Center	0.00471	0.00027	.....	0.00942	0.00009	0.0019
6. Rim	0.00510	0.00029	.....	0.01450	0.00049	.....

Heat No.	Fractional Extraction of Gases and Oxides at Different Temperatures					
	Iron Oxide (1960° F.)			Manganese Oxide (2140° F.)		
	Per cent Oxygen	Per cent Hydrogen	Per cent Nitrogen	Per cent Oxygen	Per cent Hydrogen	Per cent Nitrogen
1. Center	0.00145	0.00018	.....	0.00182	0.00009	0.0038
1. Rim	0.00075	0.00019	.....	0.00226	0.00014	0.0007
2. Center	0.00168	.....	0.00735	0.00126	0.00016	.....
2. Rim	0.00065	0.0004	0.0019	0.00131	0.00013	.....
3. Center	0.00176	0.00017	0.0030	0.00264	0.00011	0.0015
3. Rim	0.00172	.....	.....	0.00129	0.00011	.....
4. Center	0.00373	0.00020	0.0103	0.00161	0.00007	.....
4. Rim	0.00126	0.00005	.....	0.00042	0.00016	0.0015
5. Center	.....	.....	.....	.....	.....	.....
5. Rim	0.00083	0.00083	.....	0.00332	0.00005	0.0051
6. Center	0.00434	0.00037	0.0019	0.00145	0.00032	.....
6. Rim	0.00460	.....	0.0048	0.00078	0.00049	.....

Heat No.	Non-Metallic Inclusions				Brinell Hardness from Corner to Corner Along Diagonal								
	Center	Oxide	Slag	Rim	Oxide	Slag	Corner 1	2	3	4	5	6	7
1.....	3	8	3	7	163	170	179	179	179	196	196	174	163
2.....	4	6	4	7	174	192	196	207	196	196	192	179	179
3.....	3	7	6	8	183	187	192	217	196	187	183	183	183
4.....	7	6	4	10	174	166	163	163	166	166	166	170	170
5.....	3	6	3	7	163	179	187	183	187	179	163	163	163
6.....	6	6	4	5	166	166	187	202	196	170	166	166	166

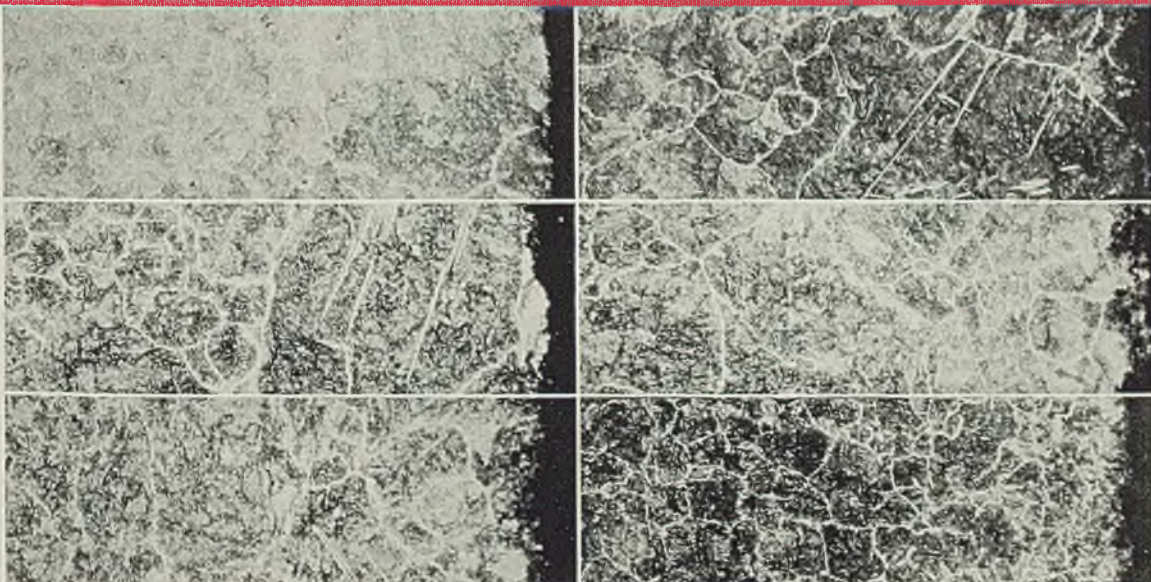
  

Heat No.	Total Content of Gases		
	% Oxygen	% Hydrogen	% Nitrogen
1.	0.00907	0.00045	0.0101

forth in some detail as will be seen. Samples were taken from center and rim to determine the extent of ingot cooling and its thermal and mechanical treatments on the distribution of oxides and gases in steel.

Grain size tests from rims (left) and centers (right) at 100 diameters. Left top, rim #5-2 duplex; center, rim #1-4 duplex; bottom, rim #4-2 duplex. Right top, center #3-1 duplex; center, #1-4; bottom, center #4-5 normal

Neither the results of the McQuaid-Ehn tests nor the nonmetallic inclusions analysis showed any marked difference between the rim and center sections of the steel, or between the several heats of the (Please turn to Page 75)





# Welded Axle Housings

*Special machine automatically arc welds metal varying in thickness along seam, part of seam made with 100 per cent penetration, remainder at 70 per cent. Output 114 per shift*

ALTHOUGH axle housings have been fabricated successfully for many years by electric arc welding, design and manufacture of the one here described presented many interesting problems.

Housing is made from two similar halves, joined together by four arc welded seams or joints, each seam being 25 inches long. Welding is done with two automatic heads. First, the two seams on one side are welded simultaneously; the housing then is turned over in the fixture and the welding operations repeated on the reverse side.

Thickness of metal varies through-

By J. W. MEADOWCROFT  
Assistant Works Manager  
Edward G. Budd Mfg. Co.  
Philadelphia

out the length of each seam requiring not only different travel speeds but different specifications of penetration as well. Moreover, the changes in the thickness are not abrupt but gradually taper toward housing ends. Due to shape of housing, it is practically impossible to have any kind of support under most of the length of the seam. Amount of weld penetration must

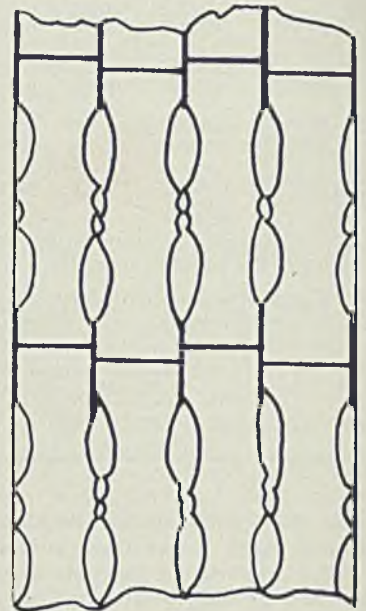
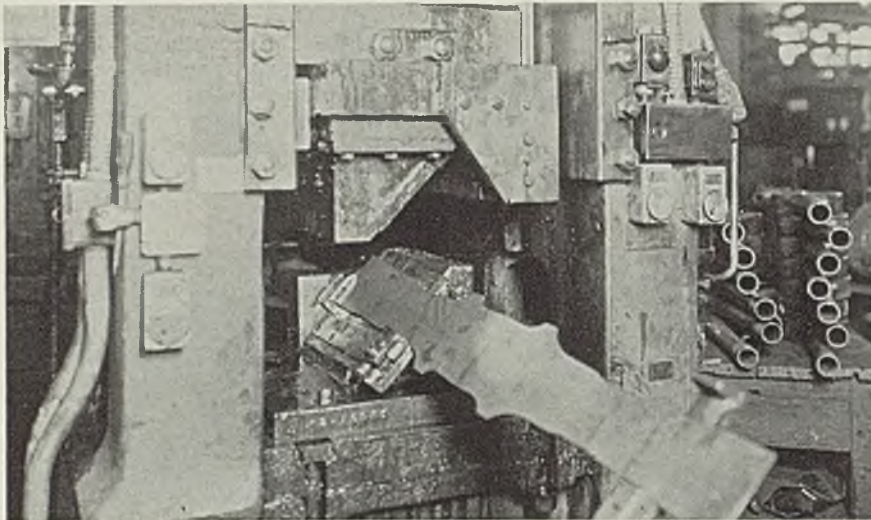


Fig. 1—Nesting blanks afford maximum economy of material



be held exactly to specifications throughout entire length of seam. No excess metal is permitted to run inside the housing.

Arc welding is done economically with a slightly fluxed wire. A completely nonporous weld is not necessary on this particular job. Since seams fall on neutral axis of housing, stress in the weld in service is small.

Because of necessity for careful consideration of these and other factors, the most delicate and accurate controls known to us in the field of automatic arc welding are used. Since these machines were perfect-

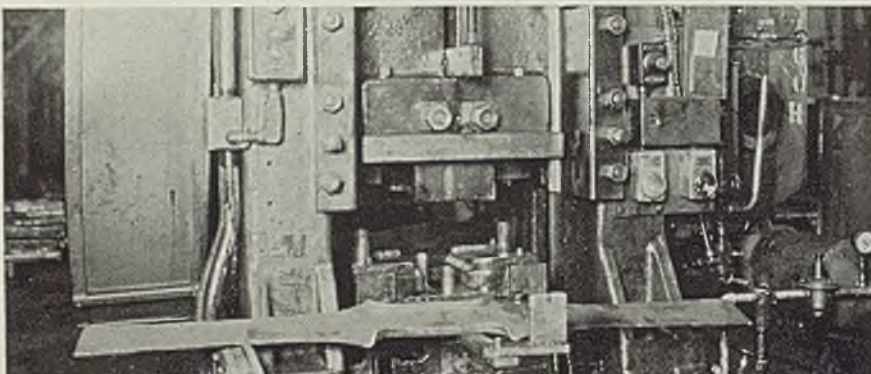
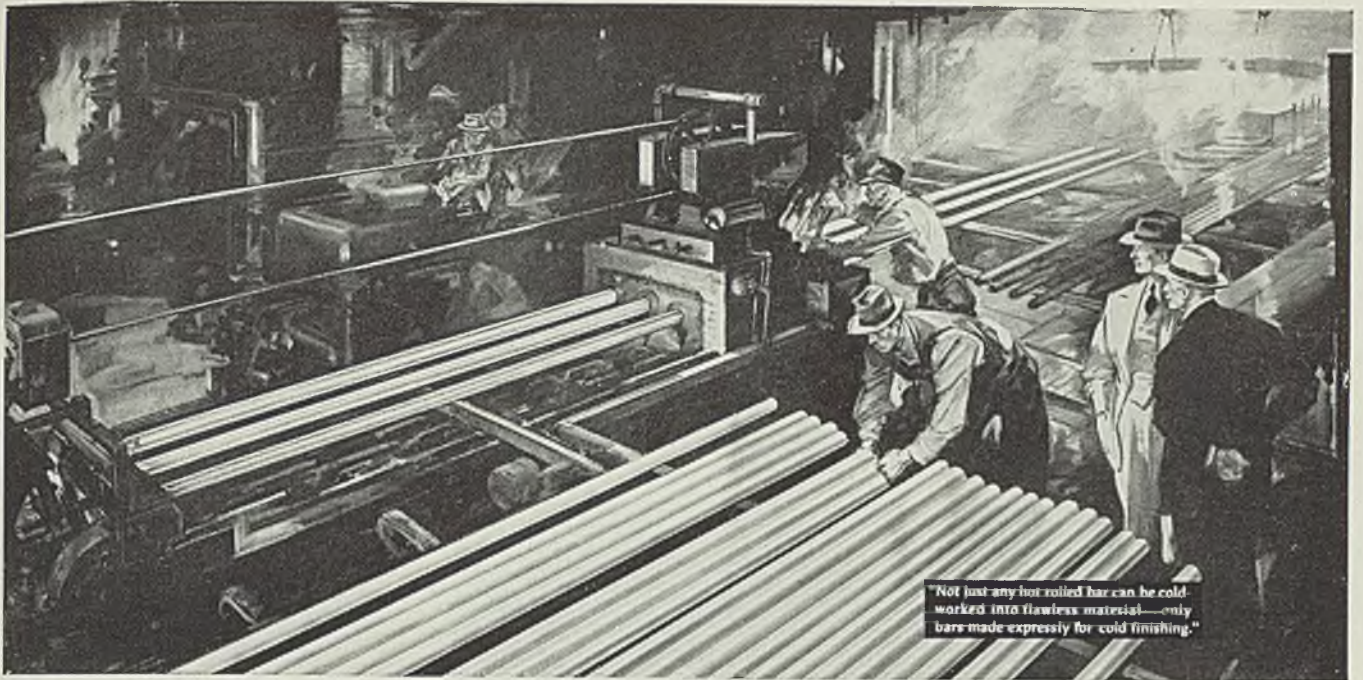


Fig. 2. (Upper)—Operation 2, upsetting the blank  
Fig. 3. (Lower)—Operation 3, the first forming work





Not just any hot-rolled bar can be cold-worked into flawless material—only bars made expressly for cold finishing.

COPYRIGHT 1940 — JONES & LAUGHLIN STEEL CORPORATION  
FROM AN ORIGINAL DRAWING BY ORISON MACPHERSON

## STEELS FOR COUNTLESS APPLICATIONS MADE IN J&L COLD FINISHING MILLS

*More important to mankind than precious metals are hard, glistening bars of cold finished steel — J & L Controlled Quality Steels*



"You have often heard of cold rolled steel. Well, that name for these bright, smooth bars you see being processed here comes from the original method of manufacture invented by J & L many years ago. Throughout these years, progress in better living owes much to the development and application of this 'ready-to-use' form of steel. Today there

isn't a machine you use, an appliance you buy, a bit of cloth you wear or food you eat that doesn't have in it the economic effect of the applications of cold finished steel—in agriculture, manufacturing, transportation, communications, distribution—truly the steel of countless applications.

"Here at J & L, craftsmen with generations of skill operate precision machines to cold-work steel by several different methods; by turning and grinding or polishing to make glistening precision shafting; by cold rolling to make wide, heavy flats; and by cold drawing bar shapes through dies to make smooth-finish rounds, squares,

hexagons, small flats, and a variety of unusual shapes.

"The operation you are watching now is cold drawing of bars — bars from J & L mills, each with a pedigree tracing back to our iron ore mines through many J & L Controlled Quality processes. Not just any hot rolled bar can be cold-worked into flawless material — only bars made expressly for cold finishing.

"The powerful jaws of that straining draw-bench pull and squeeze the cold steel bars through die holes slightly smaller than the bars themselves. In addition to acquiring a bright, smooth surface and size accuracy, the bars become stronger and harder and more resistant to wear. But most important — machinists find them easier to cut, drill, and shape. And, to make it still easier for automatic machine shops to turn out superior steel parts, often at a faster rate, there is Bessemer Flame Control — another J & L invention. By this process, new and revolutionary free-cutting steels are produced with uniform quality never before attainable — a contribution to bringing the strength, safety, and durability of steel into service for more people at lower costs."

# JONES & LAUGHLIN STEEL CORPORATION

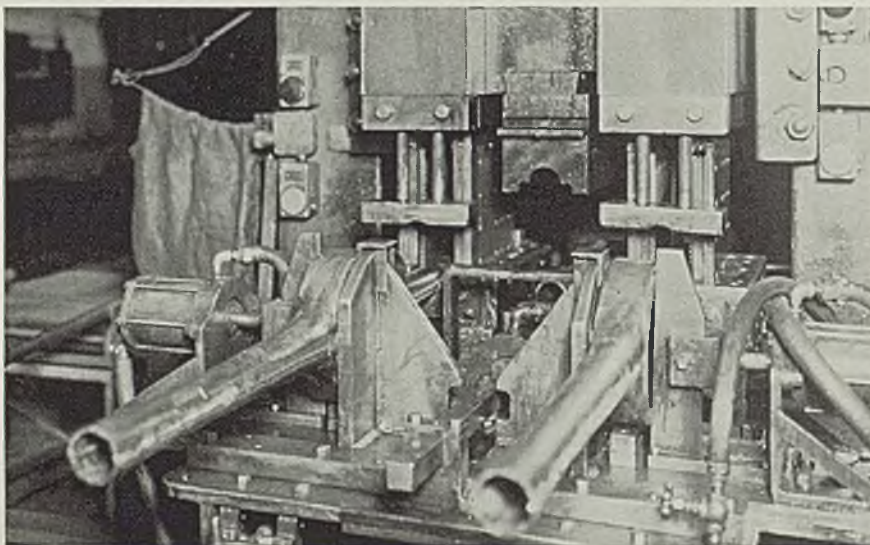
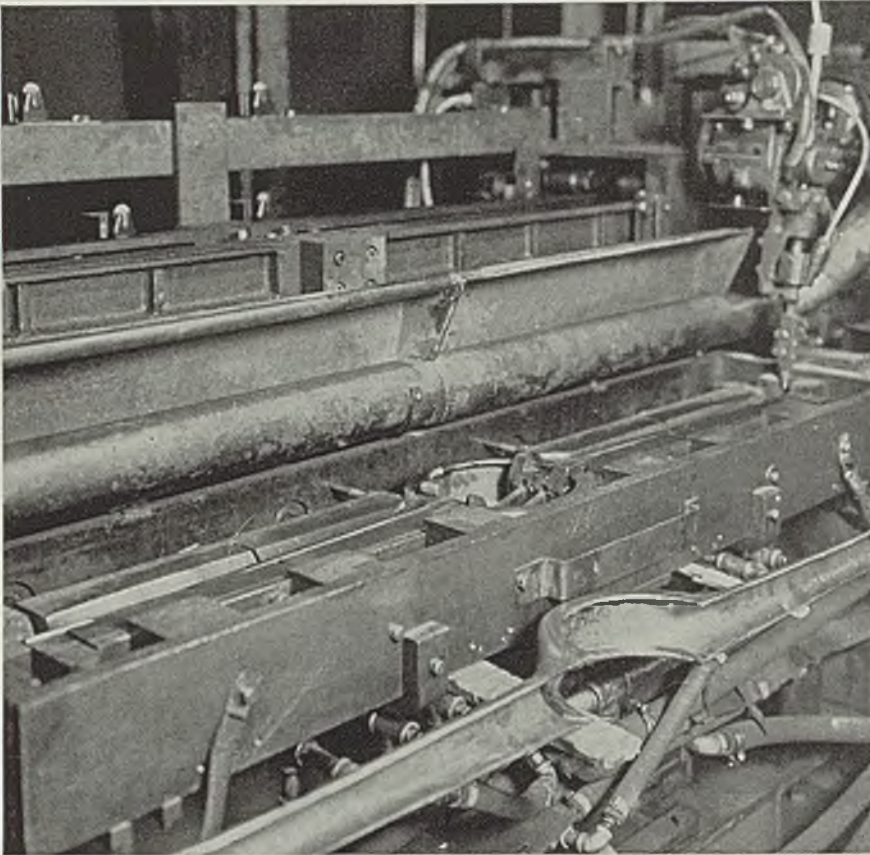
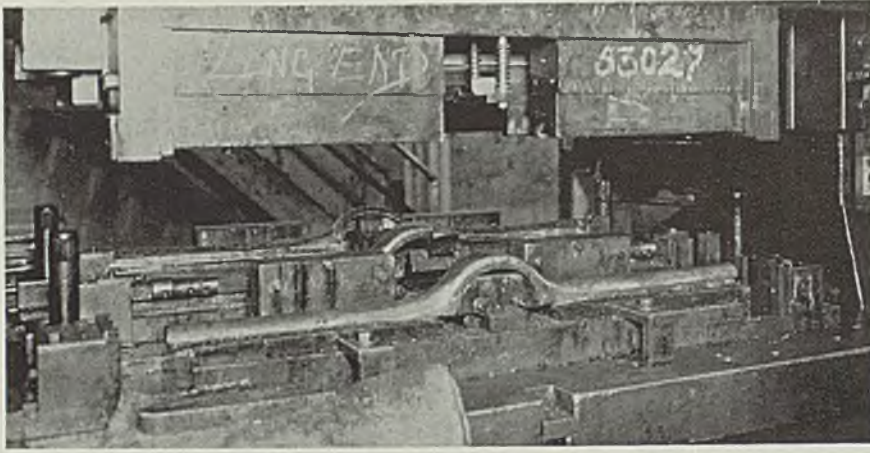
AMERICAN IRON AND STEEL WORKS

PITTSBURGH, PENNSYLVANIA



J & L — PARTNER IN PROGRESS TO AMERICAN INDUSTRY

April 29, 1940



ed, each one is producing 114 axle housings in a 7½-hour shift.

The line-up of operations for this job is as follows:

1. Blank
2. Upset ends
3. First form center
4. Second form center
5. Third form center
6. First form contour
7. Trim slides and ends (Double Die)
8. Flatten weld and rehit contour
9. Notch at center and flatten ends of banjo
10. Assemble and weld
11. Broach weld
12. Size spring seat diameter and flatten banjo
13. Inspect

**Operation 1.** The nesting design which permits the maximum yield of blanks from the stock is shown in diagram Fig. 1.

**Operation 2.** "Upsetting" the blank. To accommodate greater stress and to provide more metal for the bearing points near wheels at the extremities of the housing, it is not necessary to use heavy gage metal for the whole piece since this "upsetting" operation is used on each end to increase metal thickness where desired. This device, Fig. 2, exerts a force on top of blank when the press strikes, forcing the gage to increase from 0.15 to 0.18 inches.

**Operation 3.** First forming operation is shown in Fig. 3. In this operation, the flanges are turned up at the center to form edges of the differential housing and then are flattened out and the contour formed. Housing next is trimmed, sheared and the weld edge flattened, Fig. 4. This last operation is most important in preparing the part to secure sound welds. Excess metal is trimmed and edges sheared at 45 degrees. The beveled edge is then struck and partially flattened so the two edges to be welded will fit together to form a V.

This provides a groove for the filler to flow into and at the same time prevents excessive running through of the molten metal to the inside. In this form, housing is ready for welding. The two halves are clamped together by pneumatic clamps in the welding machine and arc welded, the filler metal flowing into the 90-degree V and fusing the two halves. Housing then is turned over and seams on the other side welded. This welding machine is shown in Fig. 5.

Where cover plate fits against  
(Please turn to Page 75)

Fig. 4. (Top)—Here pieces are trimmed, sheared and flattened

Fig. 5. (Center)—Arc welding is done in this special machine

Fig. 6. (Bottom)—Work is sized and broached here to accurate dimensions

# Stressproof News

T. M. REG. U. S. PAT. OFF.

Presenting News of a New Cold Finished Steel Bar

By LA SALLE STEEL COMPANY

Chicago, Illinois

**EXTRA! STRESSPROOF**  
No. 2 is the trade name for La Salle's new cold finished bar steel possessing remarkable wearability, high strength, free machinability, and non-warping qualities right in the bar. It requires no heat treating or carburizing.

## R.G. Haskins Uses New Bar Steel in Air Controlled Tapping Machine

### Famous Machine Tool Maker Turns to STRESSPROOF

From the files of the R. G. Haskins Company, Chicago, comes another dramatic account of what happens when a firm keeps a constant look-out for ways of maintaining and improving quality of product and holding down production costs.

The Haskins Company, it need hardly be said, is one of the Nation's leading manufacturers of high speed tapping machines and flexible shaft equipment. With a reputation like that to guard, Haskins' engineers naturally take a thorough look at every new development that might be of help. So when they heard about STRESSPROOF Cold Finished Bar Steel, they decided on a thorough investigation—particularly in view of certain difficulties with the shafting then being used in their high speed tapping machines.

The Heat Treated SAE 4140 used for pulley drive shaft (shown below) had been behaving badly. It warped excessively during machining and rejections because of cracks were running high. It machined slowly and was tough on tools. STRESSPROOF looked like a "natural" and was

given a trial. Here are the results:

Machinability was immediately increased 25 surface feet per minute. Even cutting in the spline was accomplished without frequent sharpening of the hob. Warpage during machining—and therefore several straightening operations—was eliminated. And together with all these qualities—a high degree of machinability, resistance to warpage, a lower material cost—the strength of the STRESSPROOF shafts was more than sufficient to carry the strain of high speed, heavy duty tapping.

### Case Hardening Eliminated

A second example where STRESSPROOF Cold Finished Steel Bars solved a cost and quality problem for this company was the splined drive shaft (shown in the illustration below). Here the use of SAE X-1314 left much to be desired in the way of accuracy and straightness. To get the necessary wearing qualities, the part was, of course, case carburized. This caused distortion in the shaft, which in turn made necessary several costly straightening steps.

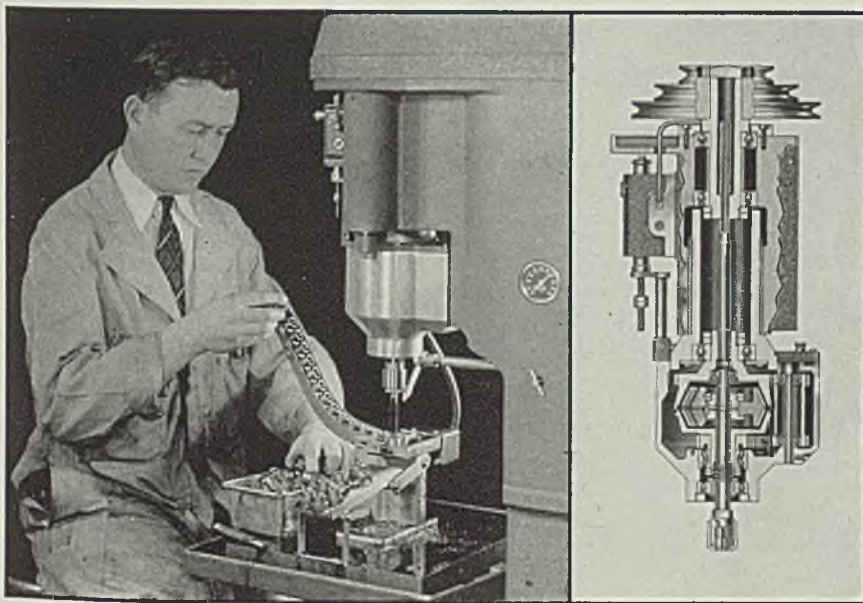
When STRESSPROOF was substituted, straight shafts were produced without difficulty. With a high degree of resistance to abrasive wear right in the bar as re-

ceived, case hardening and subsequent straightening and cleaning were naturally no longer required. Broaching and splining were reported as excellent. And the savings in time and reduction of rejects lowered parts costs beyond all expectations!

### New Steel Solves Problem

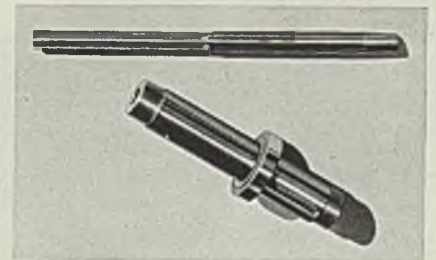
Haskins reports finding in STRESSPROOF the solution to still another problem—this time in connection with their flexible shaft machines. The shafts on this equipment take a terrific beating at the high speeds—often up to 7,500 R. P. M.—at which machines are operated. The core ends of shafts were the seat of the trouble. With the steel formerly used, SAE X-1112, core ends got so hot that they turned purple, and virtually twisted off. Because of thinness of the section the use of heat treated or hardened steels with greater torsional shear stress values was out of the question. With such steels warpage would invariably occur.

A trial of STRESSPROOF No. 2 on this killing application soon proved this new all-purpose steel could stand the gaff. With its minimum yield point of 100,000 lbs. p.s.i. and tensile strength of 125,000 lbs. p.s.i., it proved to be the *only* steel with the required torsional shear stress values that could be satisfactorily used in this application. The STRESSPROOF core ends didn't twist. And the freedom from warpage experienced with STRESSPROOF eliminated all worry about distortion.



LEFT: Haskins Air Controlled Tapping Machine in operation. Machines like this are in use all over the world. By replacing steels formerly used for shafts with STRESSPROOF the Haskins Company maintained rigid standards of quality at substantial production savings.

RIGHT: Cut-away view of the tap head of Haskins Tapping Machine. The two shafts indicated are currently being made of STRESSPROOF.



Close-up views of shafts used in tap head of Haskins equipment. The top one is the splined drive shaft, formerly made of Carburized X-1314; the bottom one is the pulley drive shaft, formerly made of Heat Treated 4140. Both steels were replaced with STRESSPROOF.

*La Salle*

**STEEL COMPANY**

Manufacturers of the Most Complete Line of Cold Finished Steel Bars in America

Address: Dept. 4A, Box 6800-A  
CHICAGO, ILL.

## Pouring Practice

(Continued from Page 60)

sponsibility to meet a desired pouring temperature previously determined for various grades and uses to which the steel is to be put. Obviously it would be wrong to use one temperature for such widely different grades as steels for cold-upsetting, deep-drawing, machining or axle and crankshaft grades.

The factor of nozzle size should be considered. Larger nozzles in general mean faster pouring speeds, more cracking on killed steels, thinner skins on high carbon rimmed steels but less scabs than smaller nozzles because of the faster resolution of splashes due to faster metal rise with the larger nozzle. In many cases, trial and error methods may prove necessary to determine proper nozzle for a certain mold area and given grade.

### Coatings Improve Surface

Mold coatings with an earthy base have been charged in the past with formation of subsurface inclusions. Coatings of tar or pitch were for a time looked on with suspicion for expected carbon impregnation, snakes and ingot cracks. It is now rather generally recognized that some form of mold coating is necessary to improve ingot surface.

Now consider the "dry" shutoff, shutting off the stream while moving the ladle to the next empty mold. For a dry shutoff, stoppage of the stream should be so complete an observer could place his hand below the nozzle with safety. This appears

too strict in that it goes beyond any point where effects can be noted on the ingot or in the rolled product.

It has two points of merit, however. First, an observer is not called upon to use his judgment as to the point where the drip has gone far enough to merit a markdown from a clean pour standard. Further, some additional effort is called for on the part of the pit foreman charged with maintenance of a high performance rating. Well publicized records of shutoff performance over a period of months and years have been found to pay excellent dividends, both in terms of improved steel quality as well as increased pride in the men themselves for a good job, well done.

### Mold Size Least Standardized

Other factors essential for clean pouring involve maintenance of a well-centered stream, free of cant or inclination from true vertical, cylindrical in form and timed properly as to lever manipulation. This last is to prevent overfilling the mold with the danger of hanging, or underfilling, which makes a second shutoff necessary for a good seal in the case of sinkhead molds. Improved stopper rod, nozzle and ladle refractories are making the shutoff problems more easily met, even in the face of greater restrictions in practice.

Matters of mold size, shape and design lend themselves to wide latitude between plants and probably are the least standardized items in steelmaking equipment. There are a number of reasons. Those who favor and use the corrugated round

big-end-up sinkhead ingot argue that tool steel and high-alloy steel makers have in large part gone to this type of mold, evidence that it is the best for quality steels. On the other hand, square or rectangular designs with either plain-sided or some corrugated contour are still holding their own, indication enough that mold design and size may be overstressed.

Good usage, as indicated by numerous navy and large forging manufacturers' specifications, appears to call for an ingot large enough in cross-section to permit forging or rolling reductions to meet a certain minimum ratio. Combined with that enough taper to permit progressive solidification from the bottom upwards, and cap with a sinkhead of suitable size, shape and material to provide a proper reservoir of still-molten steel to feed the pipe as it is formed, and you have the basic design for a metallurgically correct ingot.

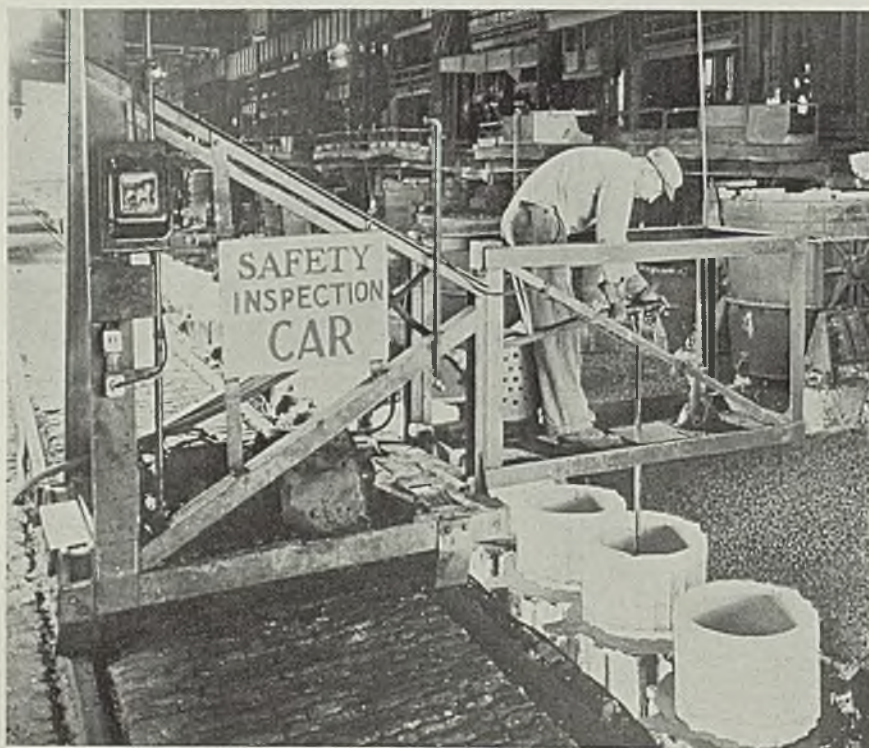
### Design Should Conform to Use

Such questions as to whether the ingot should be round, square or rectangular—should it be designed with plain sides or with one of a number of proven corrugation designs—can only be answered by metallurgists and operators of individual plants with a thought to their stripping, manipulating and rolling equipment; the ultimate section to be produced; the grade and quality called for; and the use to which the finished steel is to be put. Proceeding logically, the next factor for discussion should be sinkheads or hot-tops and their insulating covers. No doubt we have tried all types and makes at some period with several retained, all seem to have some specific application.

In general, there must be enough metal within the refractory portion to feed truly the pipe cavity as it is formed. The best hot-top, placed on a mold with insufficient taper for its length, cannot produce a metallurgically sound ingot.

The same general statements apply to use of hot-top insulating materials. Properly used, these insulators can find a place for themselves in a shop employing sound sinkhead practices. Lacking sound sinkhead practice, the insulator will doubtless prove of little value.

Consider methods used to determine the value of a sinkhead insulator. Metallurgical department of one plant reported that, with any insulator, better segregation checks were obtained on top cuts than had been their experience with their



Safety inspection car affords maximum protection to operators handling this hazardous work

standard practice in which a heavy covering of insulating material had been used. While this statement was true, later research indicated that a new high point of segregation had appeared some little distance below the sinkhead joint in the bare sinkhead practice. Of course, use of insulating material was resumed immediately.

While we practice top-casting, omission of comments on bottom-pouring is hardly fair. Not long ago, all quality steel was cast through runners discharging into bottom of the ingot mold. Advantages of this practice include: Elimination of splash of top-pouring, thickening of a rimmed-ingot primary skin, minimizing of cracking in screw stocks. The latter two properties are considered result of a slower metal rise when pouring ingots in groups.

But with our present knowledge, we recognize as a fallacy that bottom-poured steel is of better quality merely because it has been bottom poured. Close temperature limits and control of refractory quality are necessary to avoid a steel that may well be dirtier than would have been the case had that heat been top

poured. With control of variables mentioned, bottom-pouring holds its own in production of steels for a fairly definite use, including steels for machining, cold upsetting and flanging.

In my opinion, the right type of metallurgist may well be called an engineer of economics. It is his job to determine the standards of quality necessary to satisfy his customers' requirements. With that as his end-point, he must then determine whether to use sinkheads with a certain resultant yield, insulators at a certain premium, bottom casting with its extra hazards and losses.

In all of this he must balance in cold figures the gains to be obtained by the use of refinements against the operating costs involved. Only after such a study can he recommend the correct practice to be followed. A plant's equipment, location, raw materials and methods all properly are parts of such studies. Since these differ so widely between plants, this discussion has been confined to the variables themselves rather than attempting to outline an ideal practice.

## Refractory Tubes Used In Heat Treating Furnace

■ A REFRACTORY radiant heating tube has been developed by Gas Machinery Co., 16100 Waterloo road, Cleveland, for a furnace annealing steel packs in plant of Follansbee Bros. Co., Follansbee, W. Va. Furnace is of the cannonball type and has an interior 15 feet 6 inches long, 11 feet wide and 5 feet 6 inches high. Tubes have ten to twelve times conductivity of fire clay refractory and are fully comparable to conventional alloy tubes as transmitters of radiant heat. Temperatures considerably in excess of 2500 degrees Fahr. have been found safe with this tube.

Tubes are fired with low-pressure natural gas in special diffusion-type burners. Gas within tubes is at sub-atmospheric pressures to preclude possibility of leakage into heating chamber under normal operating conditions.

Uniform temperature distribution can be maintained in each tube from end to end of furnace, over a wide range of operating temperatures.

To provide positive control of heat-

Because of the high temperatures required for pack annealing of steel sheet for electrical purposes this furnace is fired entirely with refractory radiant tubes

ing from top to bottom of charge, tubes are positioned horizontally so any tube or combination of tubes can be shut off as required. Temperature uniformity throughout all parts of sheet pack is under extremely close and constant control.

Usual procedure when charge approaches soaking temperature is to shut off upper tubes and confine heat application to lower portion. A considerable degree of flexibility of

heat application is therefore possible for a range of annealing cycles. Operating results have been very satisfactory and seem to hold promise for refractory heating tubes in annealing furnaces.

## New Departure Offers New Book on Bearings

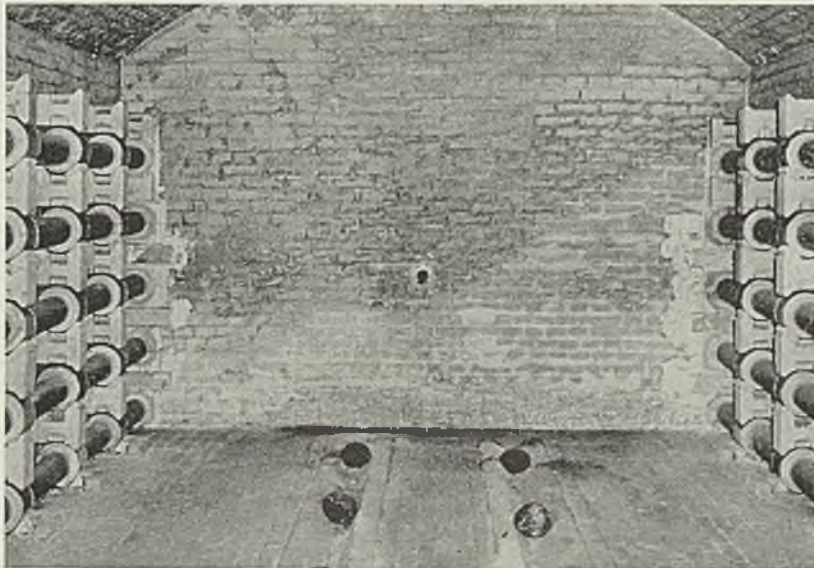
■ "Why Anti-Friction Bearings" is the title of a new 112-page book being offered free by New Departure, division General Motors Sales Corp., Bristol, Conn. It covers, in an impartial discussion, factors to be considered in the selection of antifriction bearings, supplementing the discussion with many illustrations. The book is intended to be used as a text in engineering colleges, and to be helpful to those interested in factors affecting the efficiency and performance of machines through use of these bearings.

## Light Armor Plate Protects Plane Pilots

■ One of the latest developments in application of steel to wartime purposes is use of light armor plate for protection of airplane pilots from machine gun and anti-aircraft fire, according to Jessop Steel Co., Washington, Pa.

These plates are placed so as to afford protection from below and from the rear. Both pieces are curved to provide comfort to pilot. Furthermore, bullets ricochet off curved surfaces.

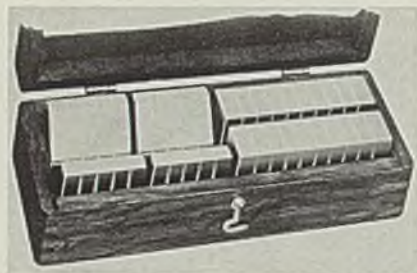
This armor plate was specially heat-treated to procure maximum ballistic resistance to penetration. As a result, it was possible to use a comparatively thin gage steel, thus reducing the weight to the minimum.





## Magnetic Parallels

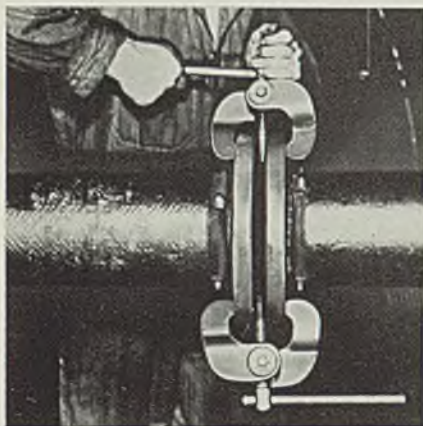
■ George Scherr Co. Inc., 128 Lafayette street, New York, has placed on the market Magne-Blox set of magnetic parallels and V blocks for use with magnetic chucks. Made



of alternate laminations of brass and iron of high magnetic capacity, set consists of 2 parallels measuring  $1 \times 1\frac{3}{4} \times 3\frac{3}{4}$  inches and 2 V blocks measuring  $1\frac{3}{4} \times 2\frac{1}{2} \times 1\frac{1}{2}$  inches.

## Flange-Jack

■ Garlock Packing Co., Palmyra, N. Y., has placed on the market Flange-Jacks to open flanges on pipe

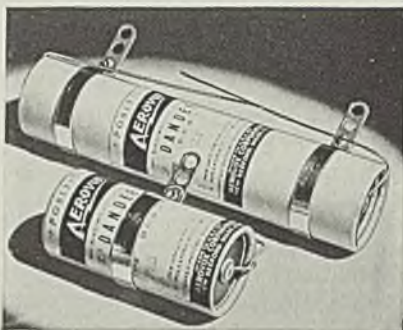


lines for renewal of gaskets. These tools are said to open joints quickly even when space is limited. Jaws

of tool are heavy 1-piece steel forgings. In tests joints have been opened against a load of 15 tons without damage to jacks or flanges. Units are always used in pairs and are available in three sizes.

## Electrolytics

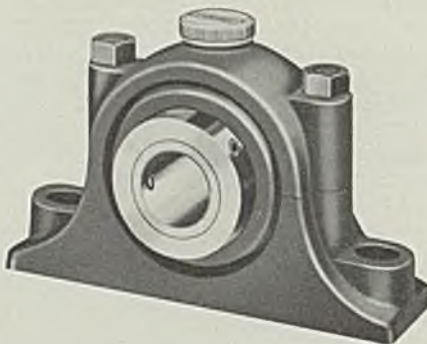
■ Aerovox Corp., New Bedford, Mass., announces high-capacity low-voltage midget metal can electro-



lytics ranging in capacities from 1000 to 3000 microfarads, with working voltages of 6, 12 and 15 direct current. Metal can is fully protected and insulated by a paper sleeve extending full length and rolled over can edges. Units are supplied with mounting straps.

## Pillow Block

■ Dodge Mfg. Corp., Mishawaka, Ind., announces a double interlock pillow block for simplified mount-

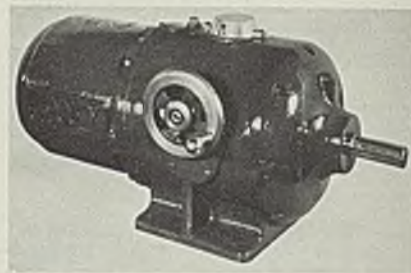


ing on ordinary commercial shafting where no heavy loads are to be carried. It incorporates special duplex Timken roller bearing with long extended inner race-ring extending completely through housing. To secure bearing to shaft on which it is mounted, collars with two set screws spaced at 120 degrees are placed on the outside of each end of extended inner race-ring. Pillow block is made in both expansion and nonexpansion types. In the nonexpansion type, inner unit is mounted in a 2-piece cast iron housing with the inside ma-

chined spherical to fit outside of the inner unit. In the expansion type, inner unit is mounted in a 2-piece cast iron outer housing with inside machined with a straight cylindrical bore to fit the outside of the inner unit. Cap and base are machined at the joint to insure an accurate fit. Adequate labyrinth seals are provided to retain lubricant and to protect bearing against foreign material.

## Speed Transmission

■ Lenney Machine & Mfg. Co., Warren, O., has introduced its redesigned infinite variable speed transmission. It has a speed range of 225 to 925 revolutions per minute, when driven by a 1750 revolutions per minute motor, and an automatic pressure regulating clutch. Design was changed to eliminate practically all thrust in



cross shaft and bearings. Speed indicator dial on top of machine allows operator to select speeds accurately. Oil is sealed within case and lubrication is insured by splash method.

## Pneumatic Die Cushion

■ Dayton Rogers Mfg. Co., 2830 South avenue, Minneapolis, announces its model H pneumatic telescoping die cushion adapted to all press applications, including inclinables and straight sides. It may be used singly or in multiples. Telescoping cylinders make it possible to mount cushion on a press without providing a pit. Each cushion is complete with regulator and gage, surge tank and all other necessary

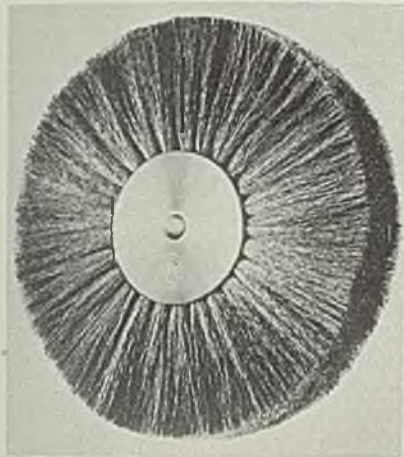


equipment, ready to install. When cushions are not needed, such as for blanking and piercing work, and when it is not under air pressure, cylinder may be bled, allowing pin

plate to drop down to bottom of the maximum drawing capacity—thus allowing blanks and slugs to drop through the free opening in the bolster plate. On an inclinable press, they will drop off the pin pressure pad automatically, into receivers below press.

## Scratch Brushes

■ Hanson-Van Winkle-Munning Co., Matawan, N. J., has perfected a new scratch brush, called Metl-Hub, for



metal finishing work. It has a one-piece circular metal hub of light weight alloy. Face of hub permits drilling of holes for the brush tufts close to edge of the block. Hub is of smaller size and, because of its strength, permits use of an oversize arbor hole.

All of the holes for the tufts are spaced automatically, drilled and countersunk by machine to give the tuft a firm seat in the metal block. Tuft holes also can be set closer together. Brushes will handle all types of wet work and are made in all diameters with any number of rows, and in a variety of hub and arbor hole sizes.

## Spray Nozzles

■ Spraying Systems Co., 4021 West Lake street, Chicago, has introduced corrosion resistant Whirljet non-clogging spray nozzles. They are

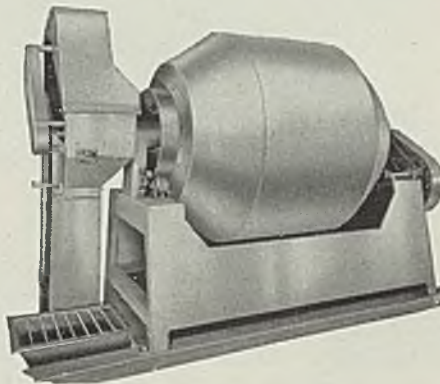


available in brass, iron, hardened steel, stainless steel, monel metal, lead, hard rubber and other mate-

rials. Pipe connection of each is 3/8-inch male. Capacities range from 0.5 to 2.5 gallons per minute at ten pounds pressure and nozzles produce a hollow uniform spray. They may be used for industrial and chemical processes as well as for air conditioning.

## Horizontal Mixer

■ Prater Pulverizer Co., 1829 South Fifty-fifth avenue, Chicago, has placed on the market a new dual spiral horizontal mixer which is built to handle the shocks and strain of heavy-duty service with a continuously shifting load. Drum is shaped for maximum strength, and is of heavy-gage steel, welded throughout. Pouring edges of baffles are reinforced. Slow-speed shafts are carried in bronze bearings; all other, in self-aligning, dust-tight ball bearings. Course of the material in the mixing cycle is interrupted and changed 26 times per minute. Mixing and lifting baffles are offset, so they alternately collect their loads from opposite ends of the drum and feed them evenly back to the dual spirals. These spirals revolving in opposite directions again



divide the load, and each spiral carries its portion to the opposite end of the drum.

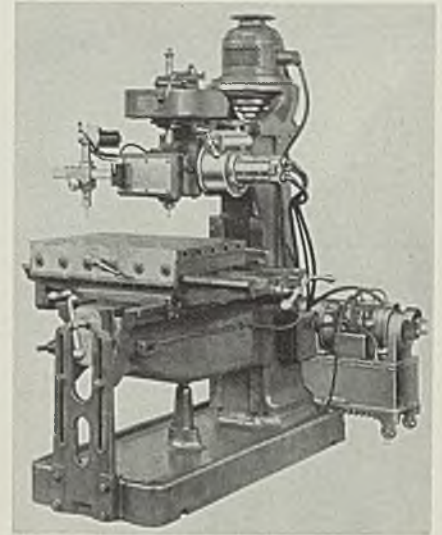
## Grinding Wheel

■ Atlantic Abrasive Corp., South Braintree, Mass., announces a new type abrasive wheel for weld grinding and snagging. Designated as type AK, it utilizes company's patented synthetic bonding material to permit maximum working speed and pressure without danger of burning.

## Duplicating Control

■ Detroit Universal Duplicator Co., 1312 Mt. Eliot street, Detroit, has introduced a low-cost duplicating control and drive mechanism, fea-

turing faster production in duplicating dies, molds, etc. Sensitivity of control is provided through a new drive and an improved duplicator

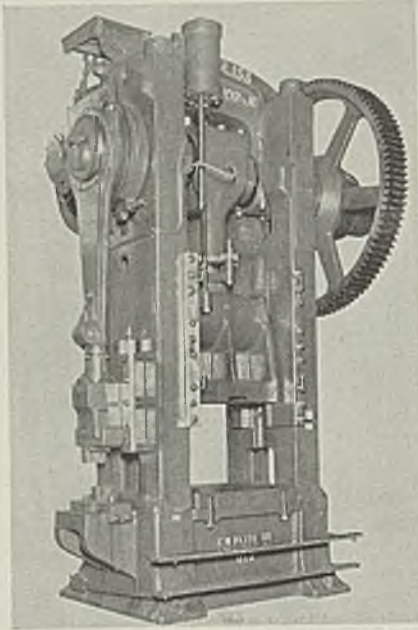


including a superimposed impulse mechanism. By making head feed control an independent unit, usefulness of duplicator proper as a universal unit interchangeably applicable to a wide variety of machine tools such as lathes, shapers, planers, boring mills, etc., is retained. In addition, control is so designed that it does not interfere with use of a milling machine. Drive, mounted on milling machine head, actuates vertical feed faster and with more accuracy. It consists of a hydraulic motor to which is connected the down feed through a 300 to 1 reduction gearing. Two flexible hydraulic cables supply fluid from the duplicator unit for operation. Hand crank provides manual movement of head down feed when setting up work. Feed control is broken down into minute steps, permitting working to accuracies as high as 0.0015-inch. When unit is to be used with lathes, shapers, horizontal milling machines, boring mills, etc., flexible cables are disconnected and plugged. Fluid from control valve then goes to hydraulic motor and machine tool feed is then controlled through a drive shaft coupled to duplicator and machine tool feed mechanism.

## Trimming Press

■ E. W. Bliss Co., Brooklyn, N. Y., announces a new line of trimming presses for use in the forge shop and other kindred industries. Illustrated is No. 209 1/2—a straight-sided single crank press, one of the presses in this line. It is equipped with an outside slide or cut-off attachment for cutting the flash from the bars, punching holes and trimming. Press

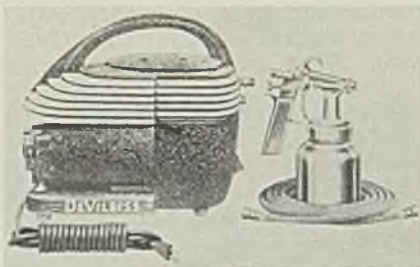
is of tie rod construction with steel tension rods shrunk-in at 100 per cent over press rating. Other fea-



tures include fast rolling key clutch, V-belt motor drive, extra wide bed and slide and air counterbalance for the slide. Press has floor line lubrication system which reaches main bearings and other points through pressure fittings. It operates at 25 strokes per minute.

### Paint Sprayers

■ DeVilbiss Co., Toledo, O., announces a new series of NCB small spray painting outfits built around a ¼-horsepower electric motor driven air compressing unit. Three spray outfits of the line are of the



cup gun type and two include a pressure feed paint tank of 2-gallon capacity. Air compressing unit is composed of a ball bearing, piston type compressor, connected to a motor. These together with the air strainer, crank case and pulsation chamber form an integral unit.

### Dust Collector

■ Fox Grinders Inc., Oliver building, Pittsburgh, has developed a

swing grinder frame to which a dust collector device is attached as an integral part. Air laden with sparks and dust particles is forced through water which removes all dust and grit. The swing frame grinder is available for wheel sizes from 16 to 24 inches. Dust collecting apparatus is in a welded steel box bolted to frame. An adjustable funnel at the front end follows the wear of the wheel. The stream of sparks is drawn through this funnel and into a chute at a velocity of approximately 6000 cubic feet per minute.

At the far end of the chute the heavy particles fall into a dry chamber. The fines are drawn over a baffle and through a water box. It is claimed the exhausted air is discharged free from all foreign inclusions. It is also claimed that, with the exception of certain unusual applications, the box does not interfere with the balance of the grinders.

### Electric Sander

■ Syracuse Guildtool Co., Syracuse, N. Y., has added to its line type G-3 portable electric sander which uses standard 3 x 42-inch abra-

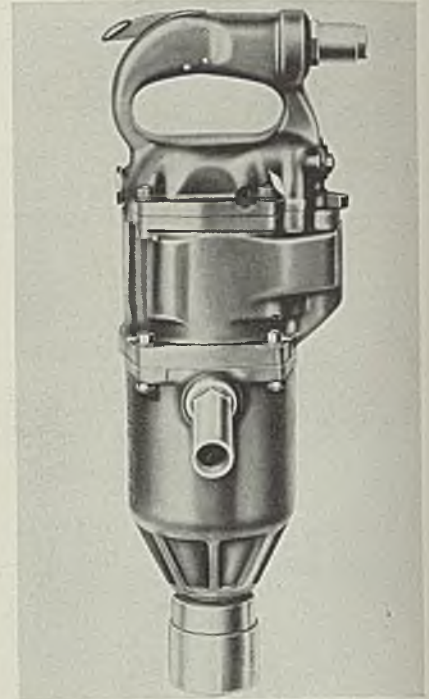


sive belts. With a belt speed of 1350 feet per minute, tool is suitable for sanding and surfacing operations on wood, metal, marble, slate, plastics and other composition materials. It has a ½-horsepower motor, and operates on any 110 volt alternating or direct-current line. All moving parts of sander, including drive and idler pulleys, are equipped with ball bearings. Belt aligning control insures belt traction regardless of motion used. Another feature is its quick belt change latch. It weighs 15 pounds.

### Reversible Wrench

■ Chicago Pneumatic Tool Co., 6 East Forty-fourth street, New York, has placed on the market type CP 365-R pneumatic reversible wrench useful in many industries. It employs a show-speed rotary motor and has no gears or resilient member in the driving unit. Its light weight and

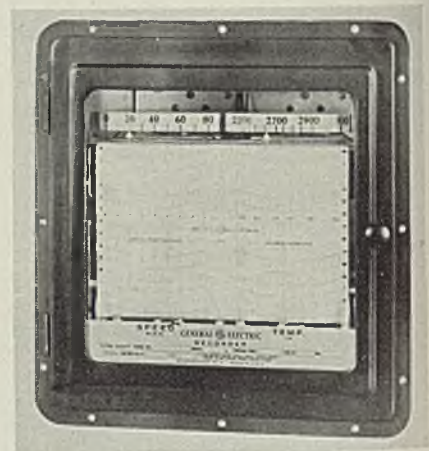
short overall length make it easy to handle. Closed handle with outside trigger and hexagon socket for nuts 1 ½ inches across the flats are fur-



nished as standard equipment. Also offered is wrench No. 375-R, similar to that described above except that it is of larger capacity.

### Duplex Recorder

■ General Electric Co., Schenectady, N. Y., has introduced a new duplex recorder for recording simultaneously, kilowatts and reactive kilovolt-amperes, kilowatts and frequency or volts and amperes. In-



strument is available with any two of the elements formerly supplied singly in type CD instruments. Recorder consists of two separate CD instruments placed side by side in one case and arranged to record

(Please turn to Page 76)



# RESEARCH...

## Another Phase of NORTON SERVICE

LET THE distributor's representative who calls on you bring your grinding problems to the Norton Service organization. See other side.



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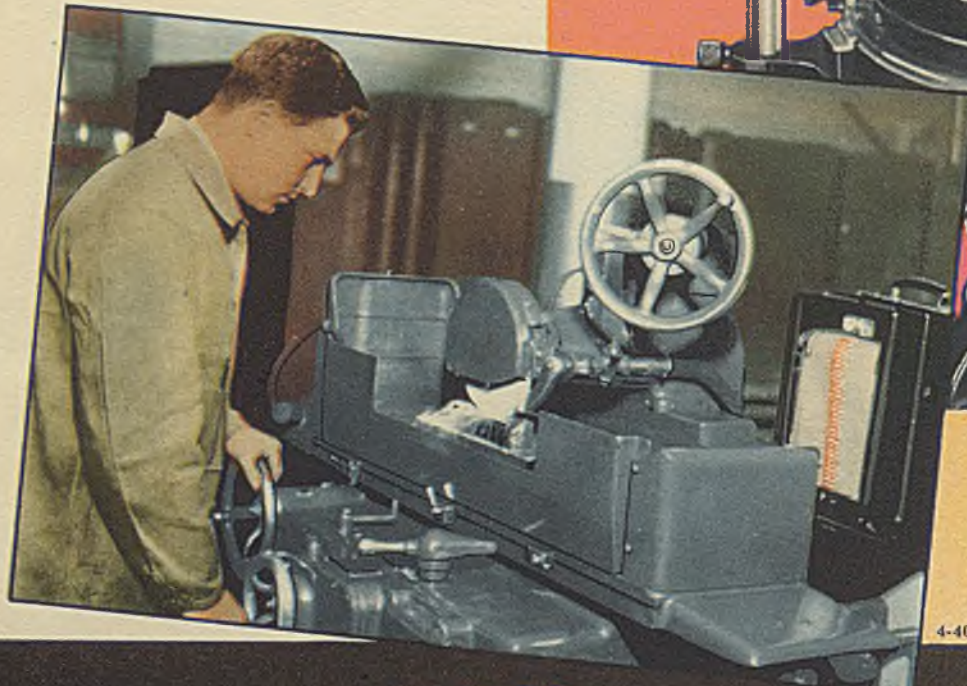
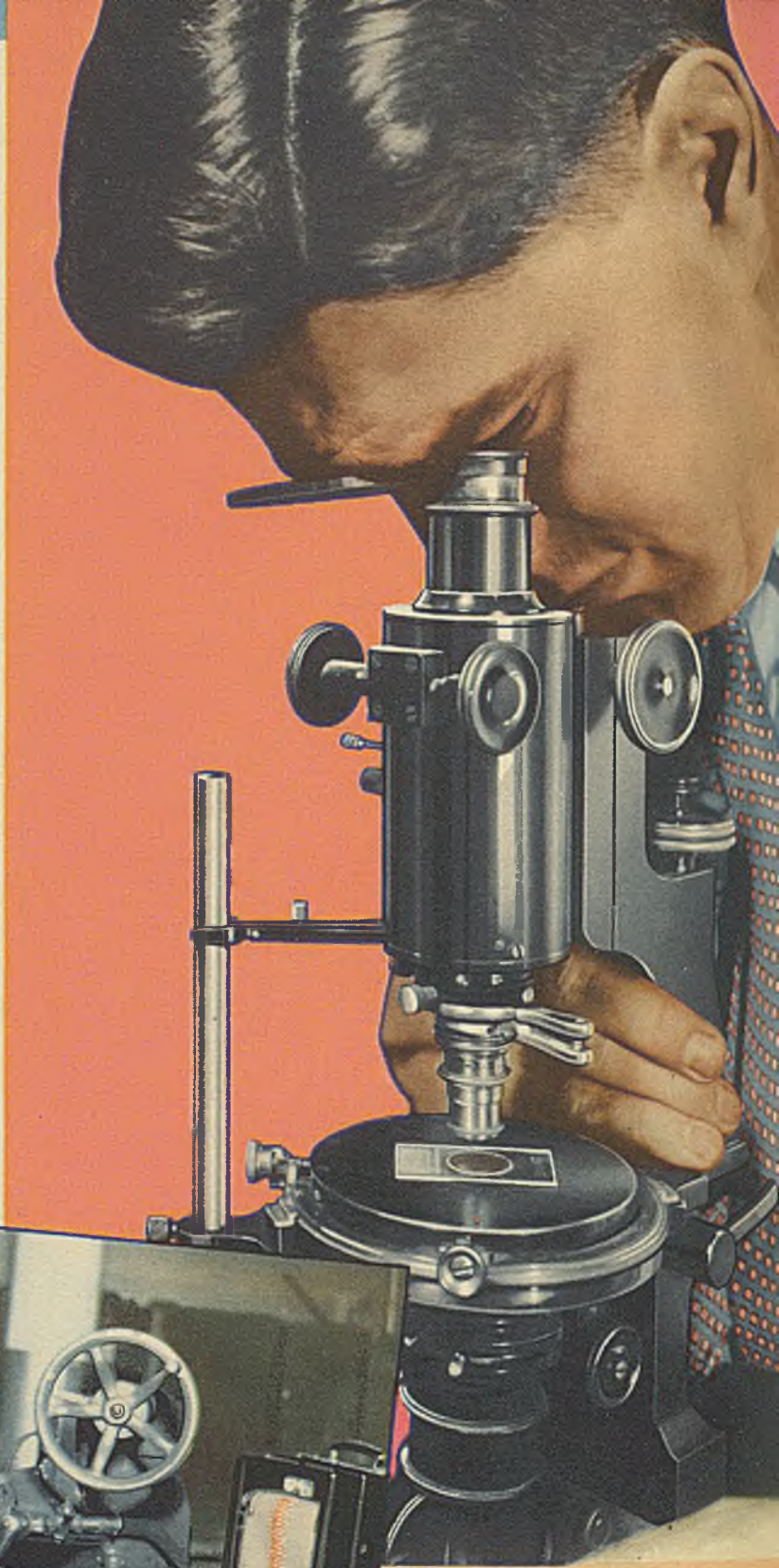
## *Product Improvement*

Many of the fifty trained scientists and technicians in the Norton Laboratories are thinking chiefly of the future — are busy developing new abrasives, new bonds and improved manufacturing processes that you may have better grinding wheels tomorrow. It is their vision and skill that gave the grinding industry B-E bond, controlled structure, diamond wheels, I-R Crystolon abrasive, Norbide (Norton Boron Carbide) and many other outstanding Norton developments.

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4-40

# NORTON SERVICE

## Gases and Oxides

(Concluded from Page 63)

steel. The brinell hardness values were found to be somewhat higher in the center of the samples than at their edges. The macroetches showed numerous widely distributed pinholes while the microstructures displayed a general banding of ferrite.

An analysis of the logs showed the good heats had lower percentages of charged limestone; FeO in slag was higher; interval between addition of silicon pig to addition of ferromanganese was shorter; aluminum addition was higher, and with one exception ore charged and additions were higher.

### Analysis Interesting

Furnace additions of 15 per cent silicon pig and ferromanganese did not vary from heat to heat, with a single exception which had SiMn addition. FeMn to tap did not indicate any difference between good and bad heats.

An analysis of the distribution of the gases and oxides in the good and bad heats showed interesting differences, however. Whereas the average iron oxides, average silicon oxide, average aluminum oxide, and aluminum and alumina were lower in good heats than they were in bad, exactly the reverse was true of the average manganese oxides and the hydrogen and nitrogen content. All three of the latter were higher in the good heats than in the bad.

Distribution of gases and oxides in rim and center samples showed equally interesting differences. The iron oxide, manganese oxide and nitrogen generally were higher in the

More grain size tests. Left top, rim #2 normal; center, rim #5-4 normal; bottom, rim #5-4 normal. Right top, center #4-2 duplex; center, center #5-3 duplex; bottom, center #6-5 normal

center than in the rim samples. In three of the six heats the silicon oxide and aluminum oxide, both contributory to machining difficulties, were higher in rim samples.

It must be acknowledged, of course, that many variables which enter into the making of steel may affect the machining results adversely. Therefore, care must be taken not to draw too sweeping conclusions from the foregoing analysis of what, after all, were a relatively small number of heats. However, the significant fact remains that, using the fractional vacuum fusion extraction methods of determination of gases and oxides, it was possible to turn up important differences in the amount of both gases and oxides in the several heats tested and to relate these differences very directly to the varying grades of steel performance.

## Welded Axle Housings

(Concluded from Page 66)

center of housing, the surface is milled to assure an absolutely tight fit with the cover plate. This section of the seam is welded by hand since it cannot be backed up during the automatic welding. If the machine were to weld this short section at the end, undue running through and an unreliable weld would result.

Next the assembled housing is sized and excess metal at each end broached, Fig. 6, to assure roundness and a perfect fit.

The automatic arc welding equipment was especially designed and built for this work. Several unusual features were incorporated in it. To insure sufficient strength and to provide enough metal for a machined bearing seat, the pieces are welded with 100 per cent penetration at the ends, the weld going completely

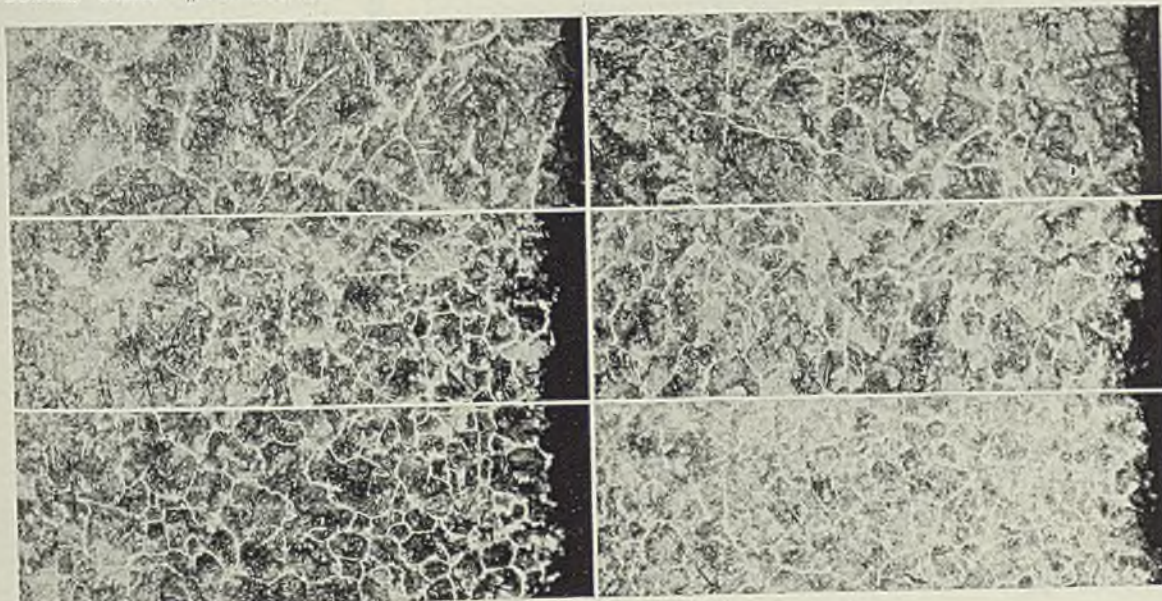
through the metal. To obtain such a weld, the housing must be backed up from the reverse side to prevent molten metal from running through. It is only possible to reinforce the material at the extremities, however. This is done by inserting plugs at each end. Greater portion of the seam is welded at 70 per cent penetration.

Beside obtaining these different penetrations, it was necessary to compensate for changes in thickness of housing. This was accomplished by changing the travel speed of the welding heads. Each head is driven by a variable speed motor automatically controlled to provide different travel speeds for the various thicknesses.

Filler material is a knurled wire electrode lightly coated with a deoxidizing agent. This is fed down automatically through the head from 200-pound reels mounted over the machine. About 12 ounces of wire are used per housing. Power for welders is from a direct-current compound generator which supplies 1100 amperes at 60 volts. At full load this drives four heads on two machines, supplying each with about 275 amperes at 25 volts.

Milling machine which mills the face of the differential housing is operated pneumatically and runs through an automatic cycle. It is of our own design and has a capacity of 180 pieces an hour. It can carry the full output of all five welding machines.

Before housings enter the assembly line, the ends are bored out to fit the wheel bearings precisely. As bearing surface must be oil tight and these arc welds are slightly porous, it is necessary to gas weld a short section of the seams at these points. This assures a tight smooth surface. As a further precaution, random specimens are selected and X-rayed as a check.



## New Equipment

(Concluded from Page 72)

on a single chart. Timed by a Tel-echron motor, chart carriage feeds paper at 1, 2 or 3 inches per hour. Metal pins on each end of timing drum, engaging in holes on each side of the record paper, assure positive drive. Each element, equipped with a conventional pan and inkwell, is calibrated for a 4-inch ruled section of the 10-inch wide record roll. Instead of a single wide chart, a separate standard CD chart-carriage and chart is available for each element. Two lamps

provide internal illumination and improve visibility greatly.

## Automatic Brake

■ Fred J. Swaine Mfg. Co., 1306 North Seventh street, St. Louis, has developed an automatic brake to brake momentum of crank shaft of a power press or other machine. It also is used to retard inclination of drawing devices such as springs, rubber bumpers or air cushions from too rapid expansion. Brake consists of disk with two members or bands, one of which is connected to pin or screw in side of press to

keep members from rotating. Bands are connected by bolts in rear and a special bolt in front containing an opening through which a cam on lever shaft works. Bolts in bands are adjusted for a very light tension equal to that sufficient to overcome momentum of shaft when running on normally light work.

## Photoelectric Alarm

■ Rehtron Corp., 2159 Magnolia avenue, Chicago, has announced improved model R-102 photoelectric robot for commercial burglar alarm installers. Robot acts as secondary protection in existing or new central office or local alarm closed circuit systems. This installation is said to eliminate expensive wiring systems for blank walls, ceilings and floors. With light beam focused on receiving cell robot relay contacts are closed. When light beam is intercepted contacts open only during the period of interception, causing alarm circuit relay to drop out and sound alarm. Robot is not affected by power line dips or complete failures. The battery powered alarm circuit relay is in full control of alarm signal at all times. It operates on 110-120 volts, 50-60 cycle alternating current only. It does not get hot under continuous operation and consumes approximately 6 watts.

## Shaft Spader

■ Sullivan Machinery Co., Michigan City, Ind., announces M-2 spaders for shaft sinking and trench work. They are very easy on the operator.

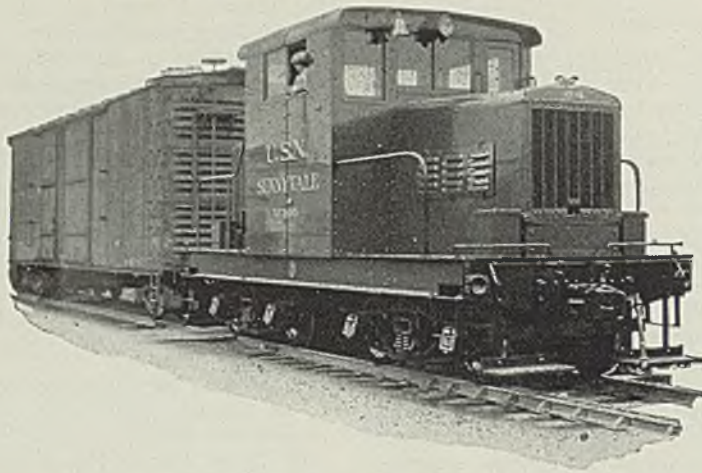
Handle grips fit the hand, and air cushion at end of cylinder relieves jar. Exhaust ports are arranged to deflect exhaust away from operator. Units are constructed with strong, protected joint connection to maintain alignment, and a heat-treated steel retainer to resist wear from spade.

## Horizontal Conveyor

■ Stephens-Adamson Mfg. Co., Aurora, Ill., announces a new Redler conveyor which assures absolute cleanliness. It is available in horizontal closed circuit type and features driving chain moving in a compartment separate from the compartment handling conveyed material.

Its construction is said to eliminate metal-to-metal contact in the carrying run, preventing possibility of dirt or lubricant from contaminating material. Conveyed material also is free from contact of sprockets and chain, or chain and casing. Conveyor is available in either 90 or 180-degree type.

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for every conceiv-  
able Purpose.

# THE ATLAS CAR & MFG. CO.

Engineers . . . Manufacturers

CLEVELAND, OHIO

## Assembling Trucks

(Concluded from Page 58)

ing mounted on a stand, the motor attached, brake mounted, spur gears inserted, steering knuckles attached, wheels put in place, shafts put through them to engage the gears, drive flange installed, wheels aligned and cross steering rod adjusted. These units feature a unique wheel shaft assembly where the shaft does not support any of the vertical load on the wheels but simply transmits torque from the drive to the wheels. This has been found to give an extremely sturdy and very reliable unit.

After being completely assembled, the drive unit is painted, guard for wiring placed and serial number stamped on the unit which then is sent on its way to the assembly floor.

The hoist unit with its motor and gears is assembled in a similar manner. Inside of all these housings is painted with a special preparation which is not affected by oil.

There are two separate assembly lines on the main assembly floor. The first handles platform trucks, and the second accommodates fork trucks. Each line in turn is divided into five assembly or work stations.

### Drive Unit Mounted First

At the first position, the drive unit is assembled into the frame, the electric controller and resistor bank attached, and the hoist unit mounted in place. Fig. 2 shows placing of hoist unit in position on frame of a truck. Hand hoists operate on an overhead monorail line, greatly facilitating placing of these comparatively heavy sections.

Note in Fig. 1 the welded steel supports which are used to place the assemblies at a convenient working level. The monorail system extends the full length of both assembly lines where a number of hand hoists are available to operators at the various points along the line.

At the second station, the rear wheels are assembled onto the frame.

At the third position, the electric drive, controller, resistors and other electric units are wired.

At the fourth station, the operator's controls are assembled and steering linkage is hooked up and wheels are aligned.

At the fifth and last station, the load platform is attached, chain or other elevating mechanism hooked up, elevators, tilts and other devices attached to finish the assembly operation.

From this station the now completely assembled truck is moved to a level block where all limit switch stops are set and the load

platform leveled and all parts given final alignment.

From here the truck is tested with an actual load, and speed tests are made to check lifting and traveling speeds.

Next truck passes to inspection department where everything is carefully rechecked.

From here the truck receives finish coat which is sprayed on. This is touched up after drying and the unit is ready for shipment.

Before assembly, the entire frame is spray painted using a primer first, which is followed by a finish coat of synthetic enamel which air dries in 3 hours.

## Bulletin on Hairlining Steel Enamels Issued

■ Bulletin No. 5 entitled, "Hairlining of Sheet Steel Enamels" by B. J. Swego has been issued by Ferro Enamel Corp., Keith building, Cleveland.

The publication embodies a report of an investigation conducted by the company's research laboratories.

It covers in 20 pages such topics as test and test methods, experimental work and observations, cracking of a fired coat and commercial application.

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the  
**EASILY SERVICED**  
**HOIST**

A-E-CO  
**LO-HED**  
*Time-tested*  
**HOISTS**

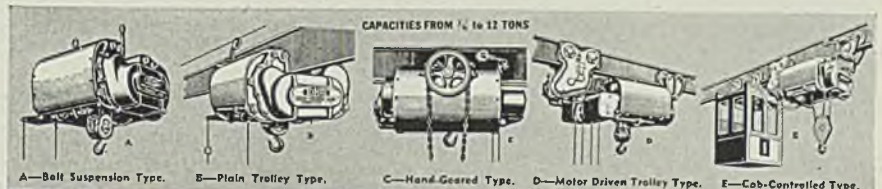
one of its many thoroughly time-tested features.

Look-over the open-view of the Lo-Hed Hoist pictured here. Note carefully these other worthwhile, time-tested points: Heavy duty hoist type motor, automatic lowering brake, anti-friction bearings, stub tooth spur gears, plow-steel cable, 100% positive automatic upper limit stop, dust and moisture-proof controller. (Construction varies slightly for classes of Lo-Heds.)

Investigate Lo-Hed time-tested construction. Write today for the complete Lo-Hed catalog shown below.

The more you use a hoist the more money you save. But the harder and longer the use, the more apt you are to require some servicing. The Lo-Hed Hoist is built to bear hard use and abuse with little servicing. Yet if it should ever need an adjustment or replacement you can make it easily. A screw driver removes both hoist covers, exposing motor, holding brake and drum. A wrench lets you get at gears, bearings, shafts and lowering brake. The easy-to-service advantage of the Lo-Hed Hoist is only

### THERE'S A LO-HED ELECTRIC HOIST FOR EVERY PURPOSE



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(Please print plainly)

MAIL THIS COUPON NOW

## Crankshaft Hardening

(Concluded from Page 52)

one bank to another can be made quickly.

The oxygen storage room, Fig. 4, has 20 tanks with ten manifolded for use at one time. Tank pressure is 1500 to 2000 pounds so this must be valved down considerably for line pressure of 25 pounds.

With a production of 160 shafts per 8-hour day, gas consumption averages six tanks of acetylene and ten tanks of oxygen daily.

Because mixtures of oxygen and acetylene are highly explosive and

constitute a plant hazard, elaborate precautions are taken to prevent backfires from the torches into the gas system. Two separate blowoffs are installed near the point where gas is fed to the torches, and there are further blowoff valves on the acetylene tanks. These blowoff lines run up through the roof of the plant. As yet there has been no occasion to test their efficiency, since no explosions have occurred. However, they are designed to handle considerably in excess of any backfires which might develop. As a further precaution, an automatic shutoff is provided on the machine. Then in event of power failure, the

entire system is closed immediately.

Speed of heating and quenching is essential in the process if heat wastage through absorption in flanges and counterbalances of the shaft and excessive hardness penetration in the bearing surfaces are to be avoided. This explains why two burners are used per bearing surface, permitting all four surfaces to be heated in 60 seconds or under. Automatic features of the machine, such as the complete cam control of the heating and quenching cycle, preclude against nonuniformity of results. Hardness inspection after this treatment comprises a Rockwell test, on about 10 per cent of the hardened surfaces. If a reading of 50 to 60 Rockwell C is maintained, the hardness cycle is functioning correctly.

One operator can handle the entire operations, except for changing gas supply tanks.

## Steel Hardening Methods

(Concluded from Page 49)

issue of STEEL, p. 42. During the past year, the first commercial installation of the process was made in the Worcester plant of American Steel & Wire Co., and a full description of this was presented in STEEL, Sept. 4, 1939, p. 42.

Mr. Legge's discourse followed closely the information set forth in these two articles, but he amplified it with a demonstration with numerous samples which had been given the austempering heat treatment. As yet, the full range of applications is not known, but new ones are being found as the process becomes better known. It is being used for parts as small as formed gears for typewriters.

The day's sessions were concluded with a brief review by E. E. Thum, editor of *Metal Progress*, Cleveland, as to the behavior of metals. The speaker emphasized that in spite of present metallurgical knowledge we know little as to why metal atoms stick together, that is, as to their cohesiveness.

## Chart Illustrates New Chip Breaker Design

■ Handy wall instruction chart illustrating a practical new type of chip breaker design for steel-cutting carbide tools, has been issued by McKenna Metals Co., Latrobe, Pa.

Design which is a shallow groove only 0.004-0.008 inch deep, serves to convert steel chips into short, coiled pieces which are easily shoveled up. Reverse side of chart shows how this shallow groove may be ground by hand on a silicon carbide wheel.



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# Price Move Seen Spur To Steel Production

*Restoration May 1 of former levels on sheets, strip to speed deliveries next 60 days. Third quarter prices named*

■ PROSPECTS for sustained or slightly higher steel production have been enhanced by decision of mills to withdraw, May 1, recent price concessions on leading sheet and strip grades.

Many buyers already have made commitments covering requirements through at least the remainder of this quarter. With what additional bookings are received by May 1, flat-rolled steel producers will have accumulated comfortable backlogs for delivery through June.

While restoration of higher sheet and strip quotations is coming sooner than expected, delay of another month would have complicated producers' problem of preventing shipments of low-price material from extending beyond mid-year. With two months now available for clearing such orders, a better opportunity is provided to re-establish the market on its former basis with the opening of third quarter. However, part of the stimulus given shipments the next 60 days will be at the expense of normal July and August business.

Announcement that sheet and strip prices of \$4 a ton above present levels, together with current quotations on other products, will apply on third quarter business has been made earlier than usual. This advanced date is not without precedent, since on a few past occasions quotations were named more than the customary 30 days prior to the opening of a quarter, but in view of world-wide conditions establishment of prices five months ahead is somewhat surprising.

Most changes in steelmaking last week were upward, but a 4½-point drop to 57 per cent at Chicago held the national average rate steady at 61½ per cent. Production a year ago was off 1½ points to 49 per cent. Reductions in other areas last week were 3 points to 57 per cent in New England, 7½ points to 42½ at Cincinnati and 2½ points to 42½ at St. Louis.

Offsetting these losses were gains of 1 point to 57 in eastern Pennsylvania, 2 points to 45 at Youngstown, 7 points to 80 at Wheeling, 5 points to 70 at Cleveland, 2 points to 44 at Buffalo and 2 points to 83 at Birmingham. Pittsburgh held at 55, with Detroit unchanged at 72.

Iron and steel export business continues active, but

## MARKET IN TABLOID ★

### *Demand*

*Heavier, topped by flat-rolled products.*

### *Prices*

*Sheets and strip up \$4 May 1. Scrap stronger.*

### *Production*

*Unchanged at 61½ per cent.*

loss of Scandinavian trade is a retarding influence. March shipments abroad of 457,052 gross tons set a new peak since the last war, comparing with 436,585 tons in February and 162,098 tons a year ago. First quarter deliveries of 1,289,701 tons, valued at \$98,735,419, were almost three times as large as the 431,663 tons moved the corresponding 1939 period and exceeded shipments for the full year 1936. In 1917, the industry's most active export year, the foreign movement averaged 1,737,000 tons per quarter.

By contrast, scrap exports in March totaled 206,928 tons, compared with 312,262 tons a year ago. United Kingdom and Italy pushed ahead of Japan last month as leading outlets for scrap from the United States. Italy and some Balkan countries are active in the American pig iron market, the former being reported to have closed recently on 25,000 tons, with other purchases pending.

Demand for finished steel products other than sheets and strip generally is steady or tending upward, although gains are slight. Structural shapes still are relatively slow despite gains in private construction. Reinforcing bar business includes a large number of industrial projects, most of which are small, however. Some mills are fairly busy in production of railroad material and equipment parts, but new business is light. The Rock Island has ordered 210 hopper cars.

Automobile production continues to fluctuate only moderately, last week's output of 101,405 units being off 2320 from the week before but comparing with 86,640 a year ago. Farm equipment builders, particularly tractor interests, are maintaining good operations. Brisk schedules of machine tool, aircraft and armament builders are providing heavy demand for alloy steel.

Shipbuilding contracts placed recently or actively pending involve 125,000 tons of steel, about two-thirds of which is plates. Shipyards face heavy production for many months.

Scrap prices are slightly firmer and point to at least a temporary halt to the steady decline which has prevailed since last fall. The composite is up 4 cents to \$16 on a small rise at Chicago.

# COMPOSITE MARKET AVERAGES

	Apr. 27	Apr. 20	Apr. 13	One Month Ago Mar., 1940	Three Months Ago Jan., 1940	One Year Ago Apr., 1939	Five Years Ago Apr., 1935
Iron and Steel . . . . .	\$36.57	\$36.56	\$36.56	\$36.83	\$37.09	\$36.34	\$32.29
Finished Steel . . . . .	55.50	55.50	55.50	56.10	56.10	56.50	54.00
Steelworks Scrap . . . . .	16.00	15.96	15.96	16.47	17.48	14.64	10.05

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, sheets, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

## COMPARISON OF PRICES

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

Finished Material	Apr. 27,	Mar.	Jan.	Apr.	Pig Iron	Apr. 27,	Mar.	Jan.	Apr.
	1940	1940	1940	1939		1940	1940	1940	1939
Steel bars, Pittsburgh . . . . .	2.15c	2.15c	2.15c	2.25c	Bessemer, del. Pittsburgh . . . . .	\$24.34	\$24.34	\$24.34	\$22.34
Steel bars, Chicago . . . . .	2.15	2.15	2.15	2.25	Basic, Valley . . . . .	22.50	22.50	22.50	20.50
Steel bars, Philadelphia . . . . .	2.47	2.47	2.47	2.57	Basic, eastern, del. Philadelphia . . . . .	24.34	24.34	24.34	22.34
Iron bars, Chicago . . . . .	2.25	2.25	2.30	2.15	No. 2 foundry, Pittsburgh . . . . .	24.21	24.21	24.21	22.21
Shapes, Pittsburgh . . . . .	2.10	2.10	2.10	2.10	No. 2 foundry, Chicago . . . . .	23.00	23.00	23.00	21.00
Shapes, Philadelphia . . . . .	2.215	2.215	2.215	2.215	Southern No. 2, Birmingham . . . . .	19.38	19.38	19.38	17.38
Shapes, Chicago . . . . .	2.10	2.10	2.10	2.10	Southern No. 2, del. Cincinnati . . . . .	22.89	22.89	22.89	20.89
Plates, Pittsburgh . . . . .	2.10	2.10	2.10	2.10	No. 2X, del. Phila. (differ. av.) . . . . .	25.215	25.215	25.215	23.215
Plates, Philadelphia . . . . .	2.15	2.15	2.15	2.15	Malleable, Valley . . . . .	23.00	23.00	23.00	21.00
Plates, Chicago . . . . .	2.10	2.10	2.10	2.10	Malleable, Chicago . . . . .	23.00	23.00	23.00	21.00
Sheets, hot-rolled, Pittsburgh . . . . .	1.90	2.10	2.10	2.15	Lake Sup., charcoal, del. Chicago . . . . .	30.34	30.34	30.34	28.34
Sheets, cold-rolled, Pittsburgh . . . . .	2.85	3.05	3.05	3.20	Gray forge, del. Pittsburgh . . . . .	23.17	23.17	23.17	21.17
Sheets, No. 24 galv., Pittsburgh . . . . .	3.50	3.50	3.50	3.50	Ferromanganese, del. Pittsburgh . . . . .	105.33	105.33	105.33	85.33
Sheets, hot-rolled, Gary . . . . .	1.90	2.10	2.10	2.15					
Sheets, cold-rolled, Gary . . . . .	2.85	3.05	3.05	3.20					
Sheets, No. 24 galv., Gary . . . . .	3.50	3.50	3.50	3.50					
Bright bess., basic wire, Pitts. . . . .	2.60	2.60	2.60	2.60					
Tin plate, per base box, Pitts. . . . .	\$5.00	\$5.00	\$5.00	\$5.00					
Wire nails, Pittsburgh . . . . .	2.55	2.55	2.55	2.45					

### Semifinished Material

Sheet bars, Pittsburgh, Chicago. . . . .	\$34.00	\$34.00	\$34.00	\$34.00
Slabs, Pittsburgh, Chicago . . . . .	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh . . . . .	34.00	34.00	34.00	34.00
Wire rods, No. 5 to 3/8-inch, Pitts. . . . .	2.00	2.00	2.00	1.92

### Scrap

Heavy melt, steel, Pitts. . . . .	\$16.25	\$17.05	\$18.15	\$15.50
Heavy melt, steel No. 2, E. Pa. . . . .	15.50	15.90	16.80	13.05
Heavy melting steel, Chicago . . . . .	15.25	15.50	16.45	13.35
Rails for rolling, Chicago . . . . .	18.75	18.25	19.05	17.25
Railroad steel specialties, Chicago . . . . .	18.25	18.35	18.50	15.35

### Coke

Connellsville, furnace, ovens . . . . .	\$4.75	\$4.75	\$4.75	\$3.75
Connellsville, foundry, ovens . . . . .	5.75	5.75	5.75	5.00
Chicago, by-product dry., del. . . . .	11.25	11.25	11.25	10.50

## STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

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

### Sheet Steel

Hot Rolled		Black Plate, No. 29 and Lighter		Enameling Sheets	
				No. 10	No. 20
Pittsburgh . . . . .	1.90c	Pittsburgh . . . . .	3.05c	Pittsburgh . . . . .	2.55c
Chicago, Gary . . . . .	1.90c	Chicago, Gary . . . . .	3.05c	Chicago, Gary . . . . .	2.55c
Cleveland . . . . .	1.90c	Granite City, Ill. . . . .	3.15c	Granite City, Ill. . . . .	2.65c
Detroit, del. . . . .	2.00c	Long Ternes No. 24 Unassorted	3.60c	Youngstown, O. . . . .	2.55c
Buffalo . . . . .	1.90c	Pacific Coast . . . . .	4.30c	Cleveland . . . . .	2.55c
Sparrows Point, Md. . . . .	1.90c			Middletown, O. . . . .	2.55c
New York, del. . . . .	2.14c			Pacific Coast . . . . .	3.15c
Philadelphia, del. . . . .	2.07c				
Granite City, Ill. . . . .	2.00c				
Middletown, O. . . . .	1.90c				
Youngstown, O. . . . .	1.90c				
Birmingham . . . . .	1.90c				
Pacific Coast points . . . . .	2.40c				
Cold Rolled					
Pittsburgh . . . . .	2.85c				
Chicago, Gary . . . . .	2.85c				
Buffalo . . . . .	2.85c				
Cleveland . . . . .	2.85c				
Detroit, delivered . . . . .	2.95c				
Philadelphia, del. . . . .	3.17c				
New York, del. . . . .	3.19c				
Granite City, Ill. . . . .	2.95c				
Middletown, O. . . . .	2.85c				
Youngstown, O. . . . .	2.85c				
Pacific Coast points . . . . .	3.45c				

### Galvanized No. 24

Pittsburgh . . . . .	3.50c
Chicago, Gary . . . . .	3.50c
Buffalo . . . . .	3.50c
Sparrows Point, Md. . . . .	3.50c
Philadelphia, del. . . . .	3.67c
New York, delivered . . . . .	3.74c
Birmingham . . . . .	3.50c

### Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.		Chrome-Nickel	
		No. 302	No. 304
Bars . . . . .	24.00	24.00	25.00
Plates . . . . .	27.00	27.00	29.00
Sheets . . . . .	34.00	34.00	36.00
Hot strip . . . . .	21.50	21.50	23.50
Cold strip . . . . .	28.00	28.00	30.00
Straight Chromes			
	No.	No.	No.
	410	430	442
Bars . . . . .	18.50	19.00	22.50

Plates . . . . .	21.50	22.00	25.50	30.50
Sheets . . . . .	26.50	29.00	32.50	36.50
Hot strip . . . . .	17.00	17.50	24.00	35.00
Cold stp. . . . .	22.00	22.50	32.00	52.00

### Steel Plate

Pittsburgh . . . . .	2.10c
New York, del. . . . .	2.29c
Philadelphia, del. . . . .	2.15c
Boston, delivered . . . . .	2.46c
Buffalo, delivered . . . . .	2.33c
Chicago or Gary . . . . .	2.10c
Cleveland . . . . .	2.10c
Birmingham . . . . .	2.10c
Coatesville, Pa. . . . .	2.10c
Sparrows Point, Md. . . . .	2.10c
Claymont, Del. . . . .	2.10c
Youngstown . . . . .	2.10c
Gulf ports . . . . .	2.45c
Pacific Coast points . . . . .	2.60c

### Steel Floor Plates

Pittsburgh . . . . .	3.35c
Chicago . . . . .	3.35c
Gulf ports . . . . .	3.70c
Pacific Coast ports . . . . .	3.95c

### Structural Shapes

Pittsburgh . . . . .	2.10c
Philadelphia, del. . . . .	2.21 1/2 c
New York, del. . . . .	2.27c
Boston, delivered . . . . .	2.41c
Bethlehem . . . . .	2.10c
Chicago . . . . .	2.10c
Cleveland, del. . . . .	2.30c

### Tin and Terne Plate

Tin Plate, Coke (base box)	
Pittsburgh, Gary, Chicago . . . . .	\$5.00
Granite City, Ill. . . . .	5.10
Mfg. Terne Plate (base box)	
Pittsburgh, Gary, Chicago . . . . .	\$4.30
Granite City, Ill. . . . .	4.40

### Bars

Soft Steel	
(Base, 20 tons or over)	
Pittsburgh . . . . .	2.15c
Chicago or Gary . . . . .	2.15c
Duluth . . . . .	2.25c
Birmingham . . . . .	2.15c
Cleveland . . . . .	2.15c
Buffalo . . . . .	2.15c
Detroit, delivered . . . . .	2.25c
Philadelphia, del. . . . .	2.47c
Boston, delivered . . . . .	2.52c
New York, del. . . . .	2.49c
Gulf ports . . . . .	2.50c
Pacific Coast points . . . . .	2.75c

### Rail Steel

(Base, 5 tons or over)	
Pittsburgh . . . . .	2.05c
Chicago or Gary . . . . .	2.05c
Detroit, delivered . . . . .	2.15c
Cleveland . . . . .	2.05c



Buffalo .....	2.05c
Birmingham .....	2.05c
Gulf ports .....	2.40c
Pacific Coast points.....	2.65c

**Iron**

Chicago .....	2.25c
Philadelphia .....	2.37c
Pittsburgh, refined.....	3.50-8.00c

**Reinforcing**

<i>New Billet Bars, Base</i>	
Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt., Pitts. ....	1.70-1.90c
Gulf ports .....	2.05-2.25c
Pacific Coast ports..	2.05-2.25c

**Rail Steel Bars, Base**

Pittsburgh, Gary Chicago, Buffalo, Cleveland, Birm. ....	1.70-1.90c
Gulf ports .....	2.05-2.25c
Pacific Coast ports..	2.05-2.25c

The above represent average going prices. Last quotations announced by producers were 2.15c, mill base, for billet bars and 2.00c for rail steel.

**Wire Products**

<i>Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads</i>	
Standard and cement coated wire nails ....	\$2.55

(Per pound)

Polished fence staples..	2.55c
Annealed fence wire...	3.05c
Galv. fence wire .....	3.30c
Woven wire fencing (base C. L. column) ....	67
Single loop bale tier. (base C.L. column) ..	56
Galv. barbed wire, 80-rod spools, base column .....	70
Twisted barbless wire, column .....	70

To Manufacturer's Trade Base, Pitts. - Cleve. - Chicago - Birmingham (except spring wire)

Bright bess., basic wire..	2.60c
Galvanized wire .....	2.60c
Spring wire .....	3.20c
Worcester, Mass., \$2 higher on bright basic and spring wire.	

**Cut Nails**

Carload, Pittsburgh, keg. .	\$3.85
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**Cold-Finished Bars**

	Carbon	Alloy
Pittsburgh .....	2.65c	3.35c
Chicago .....	2.65c	3.35c
Gary, Ind. ....	2.65c	3.35c
Detroit .....	2.70c	*3.45c
Cleveland .....	2.65c	3.35c
Buffalo .....	2.65c	3.35c

\* Delivered.

**Alloy Bars (Hot)**

(Base, 20 tons or over)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem .....	2.70c	
Detroit, delivered .....	2.80c	
<i>Alloy</i>		
S.A.E. Diff. S.A.E. Diff.		
2000 .....	0.35 3100 .....	0.70
2100 .....	0.75 3200 .....	1.35
2300 .....	1.55 3300 .....	3.80
2500 .....	2.25 3400 .....	3.20
4100 0.15 to 0.25 Mo. ....		0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni. ....		1.10
5100 0.80-1.10 Cr. ....		0.45
5100 Cr. spring flats .....		0.15
6100 bars .....		1.20
6100 spring flats .....		0.85
Cr. N., Van. ....		1.50
Carbon Van. ....		0.85
9200 spring flats .....		0.15
9200 spring rounds, squares 0.40		

Electric furnace up 50 cents.

**Strip and Hoops**

(Base, hot strip, 1 ton or over; cold, 3 tons or over)

<b>Hot Strip, 12-inch and less</b>	
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham .....	1.90c
Detroit, del. ....	2.00c
Philadelphia, del. ....	2.22c
New York, del. ....	2.26c
Pacific Coast points..	2.50c
Connerage hoop, Youngstown, Pitts., Chicago, Birm. ....	2.20c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown Chicago .....	2.60c
Detroit, del. ....	2.70c
Worcester, Mass. ....	2.80c
Carbon Cleveland, Pitts. 0.26-0.50 .....	2.60c
0.51-0.75 .....	4.30c
0.76-1.00 .....	6.15c
Over 1.00 .....	8.35c
Worcester, Mass. \$4 higher.	

<b>Commodity Cold-Rolled Strip</b>	
Pitts.-Cleve.-Youngstown	2.75c
Chicago .....	2.85c
Detroit, del. ....	2.85c
Worcester, Mass. ....	3.15c
Lamp stock up 10 cents.	

**Rails, Fastenings**

(Gross Tons)

Standard rails, mill. ....	\$40.00
Relay rails, Pittsburgh 20-100 lbs. ....	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham. ....	\$40.00
Do., rerolling quality. ....	39.00
<i>Cents per pound</i>	
Angle bars, billet, mills. ....	2.70c
Do., axle steel .....	2.35c
Spikes, R. R. base .....	3.00c
Track bolts, base .....	4.15c
Car axles forged, Pitts., Chicago, Birmingham. ....	3.15c
Tie plates, base .....	2.15c
Base, light rails 25 to 60 lbs., 20 lbs., up \$2; 16 lbs. up \$4; 12 lbs. up \$8; 8 lbs. up \$10. Base railroad spikes 200 kegs or more; base plates 20 tons.	

**Bolts and Nuts**

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

<b>Carriage and Machine</b>	
1/2 x 6 and smaller .....	68.5 off
Do. larger, to 1-in. ....	66 off
Do. 1 1/2 and larger .....	64 off
Tire bolts .....	52.5 off

**Stove Bolts**  
In packages with nuts separate 72.5 off; with nuts attached add 15%; bulk 83.5 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts .....	60 off
Plow bolts .....	68.5 off

<b>Nuts</b>			
Semifinished hex. U.S.S. S.A.E.			
1/2-inch and less. ....	67	70	
3/4-1-inch .....	64	65	
1 1/4-1 1/2-inch .....	62	62	
1 1/2 and larger .....	60		

<b>Hexagon Cap Screws</b>	
Upset, 1-in., smaller .....	70.0 off
<b>Square Head Set Screws</b>	
Upset, 1-in., smaller .....	75.0 off
Headless set screws .....	64.0 off

**Piling**

Pitts., Chgo., Buffalo .....	2.40c
Gulf ports .....	2.85c
Pacific coast ports .....	2.90c

**Rivets, Washers**

<i>F.o.b. Pitts., Cleve., Chgo., Bham.</i>	
Structural .....	3.40c

3/4-inch and under . . . . 65-10 off

Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. \$5.40; c.l. \$5.75 off

**Welded Iron Steel Pipe**

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2 1/2 and 1 1/2 less, respectively. Wrought pipe, Pittsburgh base.

<b>Butt Weld Steel</b>			
In.	Blk.	Galv.	
1/2 .....	63 1/2	54	
3/4 .....	66 1/2	58	
1-3 .....	68 1/2	60 1/2	
<b>Iron</b>			
1/2 .....	30	13	
1-1 1/4 .....	34	19	
1 1/2 .....	38	21 1/2	
2 .....	37 1/2	21	

<b>Lap Weld Steel</b>			
2 .....	61	52 1/2	
2 1/2-3 .....	64	55 1/2	
3 1/2-6 .....	66	57 1/2	
7 and 8 .....	65	55 1/2	
9 and 10 .....	64 1/2	55	
11 and 12 .....	63 1/2	54	

<b>Iron</b>			
2 .....	30 1/2	15	
2 1/2-3 1/4 .....	31 1/2	17 1/2	
4 .....	33 1/2	21	
4 1/2-8 .....	32 1/2	20	
9-12 .....	28 1/2	15	

<b>Line Pipe Steel</b>			
1 to 3, butt weld .....	67 1/2		
2, lap weld .....	60		
2 1/2 to 3, lap weld .....	63		
3 1/2 to 6, lap weld .....	65		
7 and 8, lap weld .....	64		
10-inch lap weld .....	63 1/2		
12-inch, lap weld .....	62 1/2		

<b>Iron</b>			
1/2 butt weld .....	Blk.	Galv.	
1 and 1 1/2 butt weld .....	25	7	
1 1/2 butt weld .....	29	13	
2 1/2 butt weld .....	33	15 1/2	
1/2 lap weld .....	32 1/2	15	
1 1/2 lap weld .....	23 1/2	7	
2 lap weld .....	25 1/2	9	
2 1/2 to 3 1/2 lap weld .....	26 1/2	11 1/2	
4 lap weld .....	28 1/2	15	
4 1/2 to 8 lap weld .....	27 1/2	14	
9 to 12 lap weld .....	23 1/2	9	

**Boiler Tubes**

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

<b>Lap Welded</b>			
Sizes	Gage	Steel	Charcoal Iron
1 1/2 "O.D. ....	13	\$ 9.72	\$23.71
1 3/4 "O.D. ....	13	11.06	22.93
2" O.D. ....	13	12.38	19.35
2 1/4 "O.D. ....	13	13.79	21.68
2 3/4 "O.D. ....	12	15.16	.....
3" O.D. ....	12	16.58	26.57
3 1/2 "O.D. ....	12	17.54	29.00
4" O.D. ....	12	18.35	31.36
4 1/2 "O.D. ....	11	23.15	39.81
5" O.D. ....	10	28.66	49.90
5 1/2 "O.D. ....	9	44.25	73.93
6" O.D. ....	7	68.14	.....

<b>Seamless</b>			
Sizes	Gage	Hot Rolled	Cold Drawn
1 "O.D. ....	13	\$ 7.82	\$ 9.01
1 1/4 "O.D. ....	13	9.26	10.67
1 1/2 "O.D. ....	13	10.23	11.79
1 3/4 "O.D. ....	13	11.64	13.42

2" O.D. ....	13	13.04	15.03
2 1/4 "O.D. ....	13	14.54	16.76
2 1/2 "O.D. ....	12	16.01	18.45
2 3/4 "O.D. ....	12	17.54	20.21
3" O.D. ....	12	18.59	21.42
3 1/2 "O.D. ....	12	19.50	22.48
3 3/4 "O.D. ....	11	24.62	28.37
4" O.D. ....	10	30.54	35.20
4 1/2 "O.D. ....	10	37.35	43.04
5" O.D. ....	9	46.87	54.01
6" O.D. ....	7	71.96	82.93

**Cast Iron Pipe**

<i>Class B Pipe—Per Net Ton</i>	
6-in. & over, Birm. ....	\$45.00-46.00
4-in., Birmingham ..	48.00-49.00
4-in., Chicago .....	56.80-57.80
6-in. & over, Chicago	53.80-54.80
6-in. & over, east fdy. ....	49.00
Do., 4-in. ....	52.00

Class A Pipe \$3 over Class B Std. fits., Birm., base \$100.00

**Semifinished Steel**

<b>Rolling Billets, Slabs</b>	
<i>(Gross Tons)</i>	
Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young., Birm., Sparrows Point. ....	\$34.00
Duluth (billets) .....	36.00
Detroit, delivered .....	36.00

<b>Forging Quality Billets</b>	
Pitts., Chi., Gary, Cleve., Young., Buffalo, Birm. ....	40.00
Duluth .....	42.00

<b>Sheet Bars</b>	
Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago ..	34.00
Detroit, delivered .....	36.00

<b>Wire Rods</b>	
Pitts., Cleveland, Chicago, Birmingham No. 5 to 3/4-inch incl. (per 100 lbs.)	\$2.00
Do., over 3/4 to 1 1/4-in. incl. ....	2.15
Worcester up \$0.10; Galveston up \$0.25; Pacific Coast up \$0.45.	

<b>Skelp</b>	
Pitts., Chi., Youngstown, Coatesville, Sparrows Pt. ....	1.90c

**Coke**

<i>Price Per Net Ton</i>	
<b>Beehive Ovens</b>	
Connellsville, fur. ....	\$4.35- 4.60
Connellsville, fdry. ....	5.00- 5.75
Connell, prem. fdry. ....	5.75- 6.25
New River fdry. ....	6.25- 6.50
Wise county fdry. ....	5.50- 6.50
Wise county fur. ....	5.00- 5.25

<b>By-Product Foundry</b>	
Newark, N. J., del. ....	11.38-11.85
Chicago, outside del. ....	10.50
Chicago, delivered. ....	11.25
Terre Haute, del. ....	10.75
Milwaukee, ovens .....	11.25
New England, del. ....	12.50
St. Louis, del. ....	11.75
Birmingham, ovens. ....	7.50
Indianapolis, del. ....	10.75
Cincinnati, del. ....	10.50
Cleveland, del. ....	11.05
Buffalo, del. ....	11.25
Detroit, del. ....	11.00
Philadelphia, del. ....	11.15

**Coke By-Products**

<i>Spot, gal., freight allowed east of Omaha</i>	
Pure and 90% benzol. ....	16.00c
Toluol, two degree .....	25.00c
Solvent naphtha .....	27.00c
Industrial xylol .....	27.00c
<i>Per lb. f.o.b. Frankford and St. Louis</i>	
Phenol (less than 1000 lbs.) .....	14.75c
Do. (1000 lbs. or over)	13.75c
<i>Eastern Plants, per lb.</i>	
Naphthalene flakes, balls, bbls. to jobbers .....	6.75c
<i>Per ton, bulk, f.o.b. port</i>	
Sulphate of ammonia .....	\$28.00

## 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 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Foundry	Malleable	Basic	Bessemer
Bethlehem, Pa.	\$24.00	\$24.50	\$23.50	\$25.00
Birdsboro, Pa.	24.00	24.50	23.90	25.00
Birmingham, Ala.	19.38	.....	18.38	24.00
Buffalo	23.00	23.50	22.00	24.00
Chicago	23.00	23.00	22.50	23.50
Cleveland	23.00	23.00	22.50	23.50
Detroit	23.00	23.00	22.50	23.50
Duluth	23.50	23.50	.....	24.00
Erie, Pa.	23.00	23.50	22.50	24.00
Everett, Mass.	24.00	24.50	23.50	25.00
Granite City, Ill.	23.00	23.00	22.50	23.50
Hamilton, O.	23.00	23.00	22.50	.....
Neville Island, Pa.	23.00	23.00	22.50	23.50
Provo, Utah	21.00	.....	.....	.....
Sharpville, Pa.	23.00	23.00	22.50	23.50
Sparrow's Point, Md.	24.00	.....	23.50	.....
Swedeland, Pa.	24.00	24.50	23.50	25.00
Toledo, O.	23.00	23.00	22.50	23.50
Youngstown, O.	23.00	23.00	22.50	23.50

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

### Delivered from Basing Points:

Akron, O., from Cleveland	24.39	24.39	23.89	24.89
Baltimore from Birmingham	24.78	.....	23.66	.....
Boston from Birmingham	24.12	.....	.....	.....
Boston from Everett, Mass.	24.50	25.00	24.00	25.50
Boston from Buffalo	24.50	25.00	24.00	25.50
Brooklyn, N. Y., from Bethlehem	26.50	27.00	.....	.....
Canton, O., from Cleveland	24.39	24.39	23.89	24.89
Chicago from Birmingham	23.22	.....	.....	.....
Cincinnati from Hamilton, O.	23.24	24.11	23.61	.....
Cincinnati from Birmingham	23.06	.....	22.06	.....
Cleveland from Birmingham	23.32	.....	22.82	.....
Mansfield, O., from Toledo, O.	24.94	24.94	24.44	24.44
Milwaukee from Chicago	24.10	24.10	23.60	24.60
Muskegon, Mich., from Chicago, Toledo or Detroit	26.19	26.19	25.69	26.69
Newark, N. J., from Birmingham	25.15	.....	.....	.....
Newark, N. J., from Bethlehem	25.53	26.03	.....	.....
Philadelphia from Birmingham	24.46	.....	23.96	.....
Philadelphia from Swedeland, Pa.	24.84	25.34	24.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and \$1.24 freight.			
Saginaw, Mich., from Detroit	25.31	25.31	24.81	25.81

St. Louis, northern	23.50	23.50	23.00	.....
St. Louis from Birmingham	23.12	.....	22.62	.....
St. Paul from Duluth	25.63	25.63	.....	26.13

†Over 0.70 phos.

### Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., \$28.50, base; \$29.74 delivered Philadelphia.

Gray Forge	Charcoal	
Valley furnace	\$22.50 Lake Superior fur.	\$27.00
Pitts. dist. fur.	do., del. Chicago	30.34
	Lyles, Tenn.	26.50

### †Silvery

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

### Bessemer Ferrosilicon†

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

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

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

## Refractories

Per 1000 f.o.b. Works, Net Prices	Ladle Brick (Pa., O., W. Va., Mo.)	
Fire Clay Brick	Dry press	\$28.00
Super Quality	Wire cut	\$26.00
Pa., Mo., Ky.	Magnesite	
First Quality	Domestic dead - burned grains, net ton f.o.b.	
Pa., Ill., Md., Mo., Ky.	Chewelah, Wash., net ton, bulk	22.00
Alabama, Georgia	net ton, bags	26.00
New Jersey	Basic Brick	
Second Quality	Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.	
Pa., Ill., Ky., Md., Mo.	Chrome brick	\$50.00
Georgia, Alabama	Chem. bonded chrome	50.00
New Jersey	Magnesite brick	72.00
Ohio	Chem. bonded magnesite	61.00
First quality		
Intermediate		
Second quality		
Malleable Bung Brick	Fluorspar	
All bases	Washed gravel, duty pd., tide, net ton	\$25.00-\$26.00
Silica Brick	Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail.	22.00
Pennsylvania	Do, barge	22.00
Joliet, E. Chicago	No. 2 lump	22.00
Birmingham, Ala.		

## Ferroalloy Prices

Ferromanganese, 78-82%, lump and bulk, carlots tide., duty pd.	\$100.00	carlots	11.00c	Do, spot	145.00	¾-in., lb.	14.00c
Ton lots	110.00	Do., ton lots	11.75c	Do, contract, ton lots	145.00	Do., 2%	12.50c
Less ton lots	113.50	Do., less-ton lots	12.00c	Do, spot, ton lots	150.00	Spot ¼c higher	
Less 200 lb. lots	118.00	67-72% low carbon:		15-18% ti., 3-5% carbon, carlots, contr., net ton	157.50	Silicon Briquets, contract carloads, bulk, freight allowed, ton	\$69.50
Do., carlots del. Pitts.	105.33	Car-loads		Do, spot	160.00	Ton lots	79.50
Spiegelisen, 19-21% dom.		loads		Do, contract, ton lots	160.00	Less-ton lots, lb.	3.75c
Palmerton, Pa., spot	32.00	2% carb.	17.50c	Do, spot, ton lots	165.00	Less 200 lb. lots, lb.	4.00c
Do., 26-28%	39.50	1% carb.	18.50c	Alsilfer, contract carlots, f.o.b. Niagara Falls, lb.	7.50c	Spot ¼-cent higher.	
Ferrosilicon, 50% freight allowed, c.l.	69.50	0.10% carb.	20.50c	Do, ton lots	8.00c	Manganese Briquets, contract carloads, bulk freight allowed, lb.	5.00c
Do., ton lot	82.00	0.20% carb.	19.50c	Do, less-ton lots	8.50c	Ton lots	5.50c
Do., 75 per cent.	126.00	Spot ¼c higher	20.75c	Spot ¼c lb. higher		Less-ton lots	5.75c
Do. ton lots	142.00	Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb.	0.95	Chromium Briquets, contract, freight allowed, lb. spot carlots, bulk	7.00c	Spot ¼c higher	
Spot, \$5 a ton higher.		Calcium molybdate, lb. molyb. cont., f.o.b. mill	0.80	Do., ton lots	7.50c	Zirconium Alloy, 12-15%, contract, carloads, bulk, gross ton	\$97.50
Silicomanganese, c.l., 2½ per cent carbon	103.00	Ferrotitanium, 40-45% ti., con. ti., f.o.b. Niagara Falls, ton lots	\$1.23	Do., less-ton lots	7.75c	Do, spot	102.50
2% carbon, 108.00; 1%, 118.00		Do., less-ton lots	1.25	Do., less 200 lbs.	8.00c	34-40%, contract, carloads, lb., alloy	14.00c
Contract ton price \$12.50 higher; spot \$5 over contract.		20-25% carbon, 0.10 max., ton lots, lb.	1.35	Spot, ¼c higher.		Do, ton lots	15.00c
Ferrotungsten, stand., lb. con. del. cars	1.90-2.00	Do, less-ton lots	1.40	Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb.	\$2.50	Do, less-ton lots	16.00c
Ferrovanadium, 35 to 40%, lb., cont.	2.70-2.80-2.90	Spot 5c higher		Do., smaller lots	2.60	Spot ¼c higher	
Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, \$3 unitage, 58.50; electric furn., per ton, c. l., 23-26% f.o.b. Mt. Pleasant, Tenn., 24% \$3 unitage	75.00	Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls	\$2.25	Vanadium Pentoxide, contract, lb. contained	\$1.10	Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb.	\$2.60
		Do., less-ton lots	2.30	Do, spot	1.15	Do, 100-200 lb. lots	2.75
		Spot is 10c higher		Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome	84.00c	Do, under 100-lb. lots	3.00
		Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill	0.80	Do., spot	89.00c	Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant	80.00c
		Ferro-carbon-titanium, 15-18% ti., 6-8% carb., carlots, contr., net ton	\$142.50	88% chrome, contract	83.00c		
				Do., spot	88.00c		
				Silicon Metal, 1% iron, contract, carlots, 2 x			

# WAREHOUSE STEEL PRICES

*Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials*

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets			Cold Rolled Strip	Cold Drawn Bars		
							Hot Rolled	Cold Rolled	Galv. No. 24		Carbon	SAE 2300	SAE 3100
Boston	3.98	3.96	4.96	3.85	3.85	5.66	3.51	4.48	4.86	3.26	4.13	8.63	7.23
New York (Met.)	3.84	3.76	3.76	3.76	3.75	5.56	3.38	4.40	4.50	3.31	4.09	8.59	7.19
Philadelphia	3.85	3.75	4.25	3.55	3.55	5.25	3.35	4.05	4.75	3.31	4.06	8.56	7.16
Baltimore	3.95	4.05	4.45	3.70	3.70	5.25	3.55	4.05	5.05	3.31	4.05	8.56	7.16
Norfolk, Va.	4.15	4.25	4.25	3.90	3.90	5.45	3.75	4.05	5.40	3.31	4.15	8.56	7.16
Buffalo	3.35	3.62	3.62	3.62	3.40	5.25	3.05	4.30	4.45	3.22	3.75	8.15	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	4.05	4.75	3.35	3.65	8.15	6.75
Cleveland	3.25	3.30	3.30	3.40	3.58	5.18	3.15	4.05	4.72	3.20	3.75	8.15	6.75
Detroit	3.43	3.23	3.48	3.60	3.65	5.27	3.23	4.30	4.84	3.20	3.80	8.45	7.05
Omaha	3.90	3.80	3.80	3.95	3.95	5.55	3.45	4.05	5.00	3.31	4.42	8.56	7.16
Cincinnati	3.60	3.67	3.67	3.65	3.65	5.28	3.42	4.37	4.67	3.45	4.00	8.50	7.10
Chicago	3.50	3.40	3.40	3.55	3.55	5.15	3.05	4.10	4.60	3.30	3.75	8.15	6.75
Twin Cities	3.75	3.65	3.65	3.80	3.80	5.40	3.30	4.35	5.00	3.63	4.34	8.84	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.18	4.23	4.73	3.54	3.88	8.38	6.98
St. Louis	3.62	3.52	3.52	3.47	3.47	5.07	3.18	4.12	4.87	3.41	4.02	8.52	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	4.05	5.00	3.31	4.30	8.56	7.16
Indianapolis	3.60	3.76	3.76	3.70	3.70	5.30	3.51	4.05	4.76	3.31	3.97	8.56	7.16
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	4.05	5.25	3.31	4.31	8.56	7.16
Chattanooga	3.80	4.00	4.00	3.85	3.85	5.68	3.75	4.05	5.00	3.31	4.39	8.56	7.16
Tulsa, Okla.	4.44	4.34	4.34	4.33	4.33	5.93	3.99	4.05	5.71	3.31	4.69	8.56	7.16
Birmingham	3.50	3.10	3.10	3.30	3.30	5.05	3.45	4.05	4.75	3.31	4.43	8.56	7.16
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	4.05	4.80	5.00	4.60	8.56	7.16
Houston, Tex.	4.05	6.20	6.20	4.05	4.05	5.75	4.20	4.05	5.25	3.31	4.60	8.56	7.16
Seattle	4.00	3.85	5.20	3.40	3.50	5.75	3.70	6.50	4.75	3.31	5.75	8.56	7.16
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	4.75	3.31	5.75	8.56	7.16
Los Angeles	4.15	4.40	6.25	4.00	4.00	6.40	4.10	6.30	5.25	3.31	6.60	10.65	9.80
San Francisco	3.50	4.00	6.00	3.30	3.35	5.60	3.40	6.40	5.15	3.31	6.80	10.65	9.80

—SAE Hot-rolled Bars (Unannealed)—  
1035-1050 Series    2300 Series    3100 Series    4100 Series    6100 Series

Boston	4.18	7.50	6.05	5.80	7.90
New York (Met.)	4.04	7.35	5.90	5.65	7.90
Philadelphia	4.10	7.31	5.86	5.61	8.56
Baltimore	4.10	7.31	5.86	5.61	8.56
Norfolk, Va.	4.10	7.31	5.86	5.61	8.56
Buffalo	3.55	7.10	5.65	5.40	7.50
Pittsburgh	3.40	7.20	5.75	5.50	7.60
Cleveland	3.30	7.30	5.85	5.85	7.70
Detroit	3.48	7.42	5.97	5.72	7.19
Cincinnati	3.65	7.44	5.99	5.74	7.84
Chicago	3.70	7.10	5.65	5.40	7.50
Twin Cities	3.95	7.45	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.82	7.47	6.02	5.77	7.87
Seattle	5.85	8.00	8.00	7.85	8.65
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.40	8.55	8.40	9.05
San Francisco	5.00	9.65	8.80	8.65	9.30

### BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland, Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Kansas City and St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 300-4999 in San Francisco, Portland; any quantity in Twin Cities; 300-1999 in Los Angeles.

Galvanized Sheets: Base, any quantity in New York, 150-1499 pounds in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-4999 in Portland, Seattle, San Francisco; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 1500 and over in Chattanooga, Philadelphia; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

## CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, April 25

Export Prices f.o.b. Port of Dispatch—

*By Cable or Radio*

Domestic Prices at Works or Furnace—

*Last Reported*

	British gross tons U. K. ports		Continental Channel or North Sea ports, gross tons		French Francs	Belgian Francs	Reich \$Mar						
	Quoted in dollars at current value	Quoted in gold pounds sterling	Quoted in dollars at current value	Quoted in gold pounds sterling									
Foundry, 2.50-3.00 Sl.	\$21.12	6 0 0	\$33.23	3 18 0	£19.54	788	\$32.02	950	\$25.33	63			
Basic bessemer					£18.39	5 4 6(a)	30.33	900	27.94	(b)69.50			
Hematite, Phos. .03-.05	22.00	6 5 0			£5.57	1 11 8	4.50	225	11.12	330	7.64	19	
Billets			\$31.95	3 15 0	£33.00	9 7 6	23.26	1,163	42.97	1,275	38.79	96.50	
Wire rods, No. 5 gage			\$5.58	6 17 6	£1.75	11 3 0	1.43	1,588	2.06c	1,375	2.38c	132	
Standard rails			\$48.99	5 15 0	£2.20	14 0 0††	1.31c	1,454	2.06c	1,375	1.98c	110	
Merchant bars					£1.95c	12 8 0††	1.27c	1,414	2.06c	1,375	1.93c	107	
Structural shapes					Plates, ½-in. or 5 mm.	1.97c	12 10 6††	1.66c	1,848	2.42c	1,610	2.29c	127
Plates, ½ in. or 5 mm.					Sheets, black	2.75c	17 10 0‡	1.97c	2,193‡	2.85c	1,900‡	2.59c	144‡
Sheets, black, 24 gage					Sheets, galv., corr., 24 ga. or 0.5 mm.	3.27c	20 16 3	3.23c	3,588	4.80c	3,200	8.86c	370
or 0.5 mm.	2.67c	17 0 0	3.00c	7 18 0*	Plain wire	3.07c	19 10 0	2.11c	2,340	3.00c	2,000	3.11c	173
Sheets, gal., 24 ga., corr.	3.19c	20 6 3	3.91c	10 6 0	Bands and strips	2.32c	14 15 0††	1.47c	1,632	2.18c	1,450	2.29c	127
Bands and strips			2.86c	7 0 0									
Plain wire, base			3.15c	8 6 3									
Galvanized wire, base			3.75c	9 17 6									
Wire nails, base			3.56c	9 7 6									
Tin plate, box 103 lbs.	\$ 5.63	1 12 0											

British ferromanganese \$100.00 delivered Atlantic seaboard duty-paid.

\*Gold pound sterling not quoted. ‡Last prices, no current quotations.

# IRON AND STEEL SCRAP PRICES

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

### HEAVY MELTING STEEL

Birmingham, No. 1	15.00
Bos. dock No. 1 exp.	15.00
New Eng. del. No. 1	14.00
Buffalo, No. 1	16.00-16.50
Buffalo, No. 2	14.50-15.00
Chicago, No. 1	15.00-15.50
Chicago, auto, no alloy	14.00-14.50
Chicago, No. 2 auto	12.00-12.50
Cincinnati dealers	12.25-12.75
Cleveland, No. 1	15.50-16.00
Cleveland, No. 2	14.50-15.00
Detroit, No. 1	12.75-13.25
Detroit, No. 2	11.75-12.25
Eastern Pa., No. 1	16.50-17.00
Eastern Pa., No. 2	15.50
Federal, Ill. No. 2	12.50-13.00
Granite City, R. R. No. 1	13.50-14.00
Granite City, No. 2	12.50-13.00
Los Ang., No. 1, net	11.50-12.00
Los Ang., No. 2, net	10.50-11.00
N. Y. dock No. 1 exp.	13.75
Pitts., No. 1 (R. R.)	17.25-17.75
Pittsburgh, No. 1	16.00-16.50
Pittsburgh, No. 2	15.00-15.50
St. Louis, No. 1	13.50-14.00
St. Louis, No. 2	12.25-12.75
San Fran., No. 1, net	11.50-12.00
San Fran., No. 2, net	10.50-11.00
Seattle, No. 1	14.50-15.50
Toronto, dlrs., No. 1	11.00
Valleys, No. 1	16.00-16.50

### COMPRESSED SHEETS

Buffalo, new	15.00-15.50
Chicago, factory	14.50-15.00
Chicago, dealers	13.00-13.50
Cincinnati, dealers	11.75-12.25
Cleveland	15.00-15.50
Detroit	13.50-14.00
E. Pa., new mat.	16.50-17.00
E. Pa., old mat.	14.00-14.50
Los Angeles, net	9.00-9.50
Pittsburgh	16.00-16.50
St. Louis	10.00-10.50
San Francisco, net	9.00-9.50
Valleys	15.50-16.00

### BUNDLED SHEETS

Buffalo, No. 1	14.50-15.00
Buffalo, No. 2	13.00-13.50
Cleveland	11.00-11.50
Pittsburgh	15.00-15.50
St. Louis	9.00-9.50
Toronto, dealers	9.75

### SHEET CLIPPINGS, LOOSE

Chicago	10.50-11.00
Cincinnati, dealers	7.75-8.25
Detroit	10.00-10.50
St. Louis	8.00-8.50
Toronto, dealers	9.00

### BUSHING

Birmingham, No. 1	13.00
Buffalo, No. 1	14.00-14.50
Chicago, No. 1	14.00-14.50
Cincin., No. 1, deal.	8.75-9.25
Cincin., No. 2 deal.	2.75-3.25
Cleveland, No. 2	9.50-10.00
Detroit, No. 1, new	12.75-13.25
Valleys, new, No. 1	14.75-15.25
Toronto, dealers	5.50-6.00

### MACHINE TURNINGS (Long)

Birmingham	5.00
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Buffalo	10.00-10.50
Chicago	9.00-9.50
Cincinnati, dealers	4.75-5.25
Cleveland, no alloy	8.50-9.00
Detroit	7.50-8.00
Eastern Pa.	9.00-9.50
Los Angeles	4.00-5.00
New York	6.50-7.00
Pittsburgh	10.00-10.50
St. Louis	6.50-7.00
San Francisco	5.00
Toronto, dealers	7.00-7.25
Valleys	10.00-10.50

### SHOVELING TURNINGS

Buffalo	12.00-12.50
Cleveland	9.50-10.00
Chicago	9.50-10.00
Chicago, spel, anal.	12.50-13.00
Detroit	8.00-8.50
Pitts., alloy-free	12.00-12.50

### BORINGS AND TURNINGS

<i>For Blast Furnace Use</i>	
Boston district	4.00-4.50
Buffalo	9.50-10.00
Cincinnati, dealers	3.50-4.00
Cleveland	9.50-10.00
Eastern Pa.	9.00-9.50
Detroit	7.75-8.25
New York	15.25-15.75
Pittsburgh	8.75-9.25
Toronto, dealers	6.75

### AXLE TURNINGS

Buffalo	15.50-16.00
Boston district	8.00-8.50
Chicago, elec. fur.	16.00-16.50
East. Pa. elec. fur.	16.00-16.50
St. Louis	9.25-9.75
Toronto	6.00-6.50

### CAST IRON BORINGS

Birmingham	7.50
Boston dist. chem.	8.25-8.50
Buffalo	9.50-10.00
Chicago	9.00-9.50
Cincinnati, dealers	3.50-4.00
Cleveland	9.50-10.00
Detroit	7.75-8.25
E. Pa., chemical	14.50-15.00
New York	17.00
St. Louis	5.00-5.50
Toronto, dealers	6.75

### RAILROAD SPECIALTIES

Chicago	18.00-18.50
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### ANGLE BARS—STEEL

Chicago	18.50-19.00
St. Louis	14.75-15.25

### SPRINGS

Buffalo	19.50-20.00
Chicago, coil	19.00-19.50
Chicago, leaf	17.50-18.00
Eastern Pa.	20.00-20.50
Pittsburgh	21.50-22.00
St. Louis	16.25-16.75

### STEEL RAILS, SHORT

Birmingham	16.50
Buffalo	21.50-22.00
Chicago (3 ft)	19.00-19.50
Chicago (2 ft.)	19.50-20.00
Cincinnati, dealers	17.75-18.25
Detroit	19.50-20.00
Pitts., 3 ft. and less	21.50-22.00
St. Louis, 2 ft. & less	18.00-18.50

### STEEL RAILS, SCRAP

Birmingham	16.00
Boston district	14.50-15.00

Buffalo	18.00-18.50
Chicago	16.50-17.00
Cleveland	18.50-19.00
Pittsburgh	18.00-18.50
St. Louis	15.00-15.50
Seattle	18.00-18.50

### PIPE AND FLUES

Chicago, net	10.50-11.00
Cincinnati, dealers	9.50-10.00

### RAILROAD GRATE BARS

Buffalo	13.00-13.50
Chicago, net	10.50-11.00
Cincinnati, dealers	8.25-8.75
Eastern Pa.	15.00-15.50
New York	10.50-11.00
St. Louis	9.50-10.00

### RAILROAD WROUGHT

Birmingham	14.00
Boston district	9.50-10.00
Eastern Pa., No. 1	18.00-18.50
St. Louis, No. 1	10.00-10.50
St. Louis, No. 2	12.50-13.00

### FORGE FLASHINGS

Boston district	10.00-10.25
Buffalo	14.00-14.50
Cleveland	14.50-15.00
Detroit	12.50-13.00
Pittsburgh	15.00-15.50

### FORGE SCRAP

Boston district	7.00
Chicago, heavy	18.50-19.00

### LOW PHOSPHORUS

Cleveland, crops	21.50-22.00
Eastern Pa. crops	21.00-21.50
Pitts., billet, bloom, slab crops	21.50-22.00

### LOW PHOS. PUNCHINGS

Buffalo	19.50-20.00
Chicago	18.00-18.50
Cleveland	17.00-17.50
Eastern Pa.	21.00-21.50
Pittsburgh	20.50-21.00
Seattle	15.00
Detroit	13.75-14.25

### RAILS FOR ROLLING

5 feet and over

Birmingham	16.50
Boston	15.75-16.00
Chicago	18.50-19.00
New York	15.50-16.00
Eastern Pa.	20.00-20.50
St. Louis	17.50-18.00

### STEEL CAR AXLES

Birmingham	18.00
Boston district	16.00-16.50
Chicago, net	20.00-20.50
Eastern Pa.	22.00
St. Louis	18.50-19.00

### LOCOMOTIVE TIRES

Chicago (cut)	18.50-19.00
St. Louis, No. 1	14.75-15.25

### SHAFTING

Boston district	17.00-17.50
New York	18.00-18.50

Eastern Pa.	22.50-23.00
St. Louis, 1 1/4-3 1/4"	16.50-17.00

### CAR WHEELS

Birmingham, iron	13.00
Boston dist., iron	13.00-13.25
Buffalo, steel	21.00-21.50
Chicago, iron	16.50-17.00
Chicago, rolled steel	18.00-18.50
Cincin., iron, deal.	16.25-16.75
Eastern Pa., iron	20.00-20.50
Eastern Pa., steel	20.00-20.50
Pittsburgh, iron	19.00-19.50
Pittsburgh, steel	21.50-22.00
St. Louis, iron	14.50-15.00
St. Louis, steel	15.50-16.00

### NO. 1 CAST SCRAP

Birmingham	15.50
Boston, No. 1 mach.	15.00-15.50
N. Eng. del. No. 2	14.00-14.50
N. Eng. del. textile	16.00-17.00
Buffalo, cupola	17.50-18.00
Buffalo, mach.	18.50-19.00
Chicago, agri. net.	12.50-13.00
Chicago, auto net.	15.00-15.50
Chicago, railroad net	14.00-14.50
Chicago, mach. net.	14.75-15.25
Cincin., mach. deal.	15.75-16.25
Cleveland, mach.	20.00-21.00
Detroit, cupola, net.	15.50-16.00
Eastern Pa., cupola	20.00-20.50
E. Pa., No. 2 yard.	16.50
E. Pa., yard fdry.	16.50-17.00
Los Angeles	16.50-17.00
Pittsburgh, cupola	17.50-18.00
San Francisco	14.50-15.00
Seattle	14.00-16.00
St. Louis, breakable	14.00-14.50
St. Louis, agri. mach.	15.75-16.25
St. L., No. 1 mach.	16.25-16.75
Toronto, No. 1 mach., net dealers	18.00-18.50

### HEAVY CAST

Boston dist. break.	12.75-13.25
New England, del.	14.50-15.00
Buffalo, break	15.00-15.50
Cleveland, break, net	15.25-15.75
Detroit, auto net.	16.00-16.50
Detroit, break	13.00-13.50
Eastern Pa.	18.50
Los Ang., auto, net.	13.00-14.00
New York break	14.00
Pittsburgh, break	15.00-15.50

### STOVE PLATE

Birmingham	10.00
Boston district	10.50-11.00
Buffalo	14.00-14.50
Chicago, net	9.50-10.00
Cincinnati, dealers	8.00-8.50
Detroit, net	9.50-10.00
Eastern Pa.	15.00-15.50
New York fdry.	10.75-11.25
St. Louis	10.50-11.00
Toronto dealers, net	12.00-12.50

### MALLEABLE

New England, del.	21.00
Buffalo	19.00-19.50
Chicago, R. R.	19.00-19.50
Cincin., agri., deal.	13.00-13.50
Cleveland, rail	20.50-21.00
Eastern Pa., R.R.	20.50-21.50
Los Angeles	12.50
Pittsburgh, rail	21.50-22.00
St. Louis, R. R.	16.00-16.50

### Manganese Ore

<i>Including war risk but not duty, cents per unit cargo lots.</i>	
Caucasian, 50-52%	48.00-50.00
So. African, 50-52%	49.00-50.00
Indian, 49-50%	nom
Brazilian, 48-52%	46.00-48.00
Cuban, 50-51%, duty free	61.20
<b>Molybdenum</b>	
Sulphide conc., per lb. Mo. cont., mines	\$0.75

## Ores

<b>Eastern Local Ore</b>	
<i>Cents, unit, del. E. Pa.</i>	
<b>Lake Superior Iron Ore</b>	
<i>Gross ton, 51 1/2 %</i>	
<i>Lower Lake Ports</i>	
Old range bessemer	\$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

<b>Foreign Ore</b>	
<i>(Prices nominal)</i>	
<i>Cents per unit. c.i.f. Atlantic ports</i>	
<b>Manganiferous ore,</b>	
4%-5% Fe., 6-10% Mn.	15.00

<b>North African low phos.</b>	
	16.00
<b>Spanish, No African basic, 50 to 60%.</b>	
	16.00
<b>Chinese wolframite, short ton unit, duty paid</b>	
	\$23.50-24.00
<b>Scheelite, imp.</b>	
	\$25.00
<b>Chrome ore, Indian, 48% gross ton, c.i.f.</b>	
	\$26.00-28.00

## Steel Prices Set to Oct. 1

Withdrawal as of May 1 of recent price reductions of \$4 a ton on various flat-rolled products was announced last Thursday by Carnegie-Illinois Steel Corp. Other leading producers promptly followed suit, accompanied by similar action by American Steel & Wire Co. on cold-rolled strip.

In addition to restoring sheet and strip prices to levels prevailing before April 11, it was also announced that these quotations, as well as current prices of other steel products, would be extended to domestic business for shipment to and including Sept. 30, 1940. Establishment of third quarter prices at this time was somewhat unexpected; such announcements in the past generally have been made 30 days before the opening of a quarter.

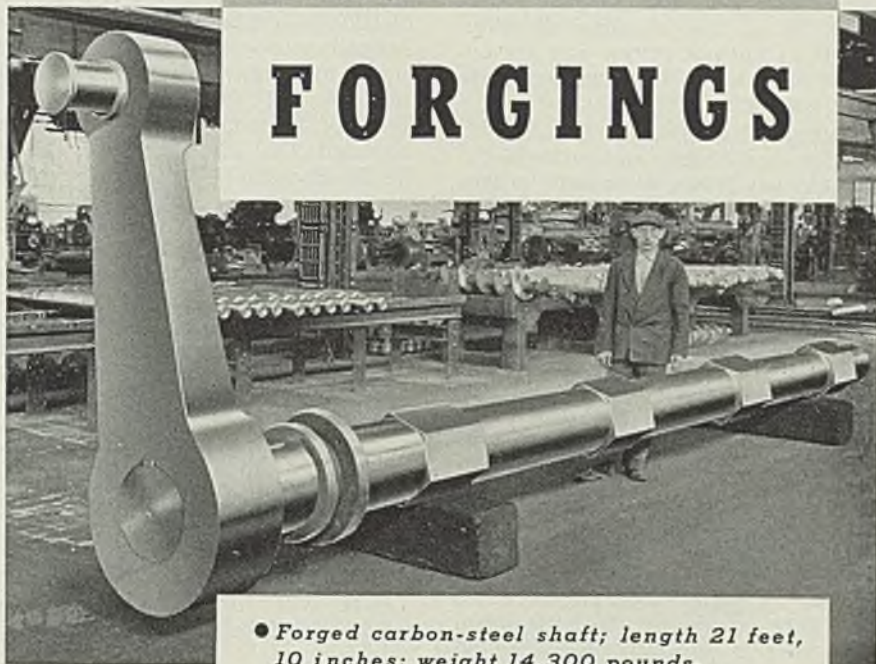
## Sheets, Strip

Sheet & Strip Prices, Pages 80, 81

**Pittsburgh**—Decision of sheet and strip producers to defer until May 1 restoration of former prices of various grades affected by recent cuts gives buyers time to cover forward needs at the lower quotations. This action is expected to bring some buying which had been deferred because users did not look for immediate withdrawal of the \$4 concessions. Sheet production until lately had continued the slow decline which started last December. Operations since that time have dropped about 35 points to 50 per cent. Galvanized sheet buying and production are seasonally light, with operations of 46 per cent comparing with 62 per cent a year ago.

**Cleveland**—Further impetus to the improved buying which appeared in sheets and strip shortly after price cuts of two weeks ago, is looked for with the coming withdrawal of lower quotations. Indications are mill operations will expand the next 60 days, although part of the coverage at reduced prices will be at the expense of future business.

**Chicago**—Volume has tapered following large blanket orders placed last week at reduced prices, but bookings continue and are higher than before price reduction of April 11. About 95 per cent of new orders do not carry specifications, but these must be received in time for mills to make shipment by June 30 or such orders will be canceled



*Made-to-Order*

**FORGINGS**

• Forged carbon-steel shaft; length 21 feet, 10 inches; weight 14,300 pounds.

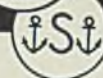
**S**tandard Steel Works Company specializes on forgings of unusual design or size to meet the special requirements of the customer.

Good steel, long experience and close control of every step in manufacture, from open-hearth to finished product, assure the satisfactory quality of every Standard forging.

CASTINGS • FORGINGS • WELDLESS RINGS • WROUGHT STEEL WHEELS

**STANDARD STEEL WORKS CO.**

*Subsidiary of* THE BALDWIN LOCOMOTIVE WORKS  
P H I L A D E L P H I A



or carry prices applying on date of shipment.

**Philadelphia**—Scheduled reinstatement of former prices on sheets and strip May 1 is stimulating buying. Sellers generally have fixed June 30 as the deadline on shipments at present prices, and are endeavoring to discourage anticipatory buying for third quarter.

**Buffalo**—Rescinding of price reductions on sheets and strip is expected to promote heavy orders to beat the May 1 deadline. Mills report new business sufficient to hold production around 60 per cent.

**Cincinnati**—Sheet buying improved moderately on recently reduced prices, in effort to cover before quotations were withdrawn. Demand has been broad with tonnage in normal proportions. Galvanized sheets, although in improved demand, are seasonally slow.

**Birmingham, Ala.**—Sheet production, while increased somewhat with more seasonable weather, holds fairly close to the average of recent weeks. Estimated output is at 85 per cent and some backlog from last year is still being worked off.

**Toronto, Ont.**—Sheet demand continues active with mills reporting bookings well into July, and prices quoted firm to the end of June. Inquiries are appearing in good number both for war contracts and ordinary production. Canadian mills are not taking spot orders and consumers and dealers in need of quick supplies are obtaining materials in the United States. A number of local warehouses are well stocked with American sheets.

## Plates

Plate Prices, Page 80

**Chicago**—Orders show a slight gain as prices are somewhat firmer. Makers of heavy farm equipment and roadbuilding machinery are prominent buyers and the petroleum industry requirements continue to bolster the market.

**Philadelphia**—Withdrawal May 1 of the \$4 concession on sheets and strip is having a firming influence on plates and may be accountable for a slightly better volume of tonnage, as some consumers have admittedly been holding up tonnage because of the recent weakness in light flat products. Considerable ship work is in prospect, but it will be some time before much of this is translated into actual specifications.

**New York**—New shipwork is mounting rapidly, with five ship construction contracts, two just

placed and three pending, involving about 125,000 tons of steel, of which two-thirds may be plates. Bids will be opened May 7, by United States maritime commission on two 35,000-ton luxury liners, and May 8 on two 10,000-ton cruisers for the navy. Miscellaneous demand continues light, although a fair tonnage will be required for the 15,000-barrel unit for refinery of Tide Water Associated Oil Co., Bayonne, N. J. E. B. Badger & Sons Co., Boston, are engineers.

Three maritime commission cargo-passenger ships placed with Bethlehem Steel Co. for Mississippi Shipping Co. will require 14,500 tons, mostly plates. Sinclair Refining Co. is considering as many as ten tankers, the type to be decided.

**Birmingham, Ala.**—Due largely to business from tank manufacturers, production of plates remains gratifyingly high, about 85 per cent. Some railroad business and additional tonnage for shipbuilding is in prospect.

**Seattle**—Puget Sound Machinery Depot will furnish 1000 tons of plates for the Aluminum Co. of America plant, Vancouver, Wash., not 700 as previously reported. Shops report a fair volume of general jobs calling for small tonnages.

**San Francisco**—Most plate lettings were in lots of less than 100 tons. Bids on 514 tons for outlet pipes to the Friant Dam, Central Valley Project, Calif., have been postponed from April 18 to April 25. Awards totaled only 330 tons and brought the year's aggregate to 21,560 tons, compared with 16,307 tons for the same period last year.

**Toronto, Ont.**—Demand for plates is gaining steadily as ship construction work gets under way and inquiries continue in expanding volume. Large purchases have been made recently and with Canadian production absorbed for several months ahead, most of the new business is going to the United States.

## Plate Contracts Placed

1000 tons, plant, Aluminum Co. of America, Vancouver, Wash., to Puget Sound Machinery Depot, Seattle; previously reported as 700 tons.

135 tons, water tank, Moorehead, Minn., to Chicago Bridge & Iron Co., Chicago.

100 tons, boiler replacement, Letterman hospital, San Francisco, to C. C. Moore & Co.

## Plate Contracts Pending

900 tons, caisson construction Puget Sound navy yard; bids in at Washington.

750 tons, penstocks, Parker dam project, specification 898, Earp, Calif.; Chicago Bridge & Iron Co., Chicago, low.

514 tons, outlet pipe, specification 903,

Friant dam, Central Valley project, California; bids postponed from April 18 to April 25.

## Bars

Bar Prices, Page 80

**Pittsburgh**—Changes in cutting extras on hot-rolled carbon bars, reported briefly in these columns a week ago, have been generally adopted. Principal revision establishes the base length at 120 to 240 inches; formerly it was 60 to 120 inches. Cutting to specified lengths of 60 to 120 inches now carries an extra of 5 cents per 100 pounds. The 10-cent extra which formerly applied to lengths over 120 inches now applies to lengths over 240 inches. Machine cutting extra for sizes 12 inches and under has been raised from a minimum of 70 cents to a \$1 minimum.

**Chicago**—Carbon and alloy bar demand is fairly well maintained but indications of improvement are not general. Sales reports vary, with some interests noting appreciable increase in alloy bookings and some slighter improvement in carbon orders, while some mills find no change in the buying of either. Generally, however, alloy bars have shown more new activity than carbon bars.

**Boston**—Demand for alloy bars is steady with moderate gains in buying by consumers, notably several Connecticut shops, related to the armament program. Machine tool builders continue active specifications. Although improvement is noted in carbon bars, alloys and specialties are relatively more active. Delivery problems on some finishes continue, particularly on heat-treated material.

**Philadelphia**—Bar specifications are moderately active, with business relatively better than in other heavy products. Deliveries on carbon bars range around three to four weeks, with cold-finished bar shipments at about four weeks. Specially treated alloy bars are not available for delivery much before three months. Prices generally are firm.

**Birmingham, Ala.**—Bars, especially for manufacturers of agricultural implements, are in consistent demand, although no individually large tonnage is reported.

**Buffalo**—Although increase in demand for steel bar items is moderate, new business is sufficient to hold production at recent levels. Improved tonnage is expected to be specified by aircraft manufacturers as local plants start filling war orders.

**Toronto, Ont.**—Merchant bars are moving in a steady manner, and

while demand is well ahead of ordinary peace-time average, future booking has not reached the volume of some other materials. Mills report bar contracts practically covering second quarter, but no third quarter orders.

## Pipe

Pipe Prices, Page 81

**Pittsburgh** — Sales are gaining slowly as oil country goods are moving faster than in March. Line and standard pipe are up slightly as result of better weather but total shipments are on par with 1939. Other lines are holding steady. Demand for mechanical pipe shows little change and demand for pressure tubing is spotty. Specialties, particularly aircraft tubing, are moving fairly well.

Wolverine Tube Co., Detroit, at \$26,008.40, is low on admiralty metal condenser tubes for the Norfolk, Va., navy yard under schedule 1212. The navy closes April 30 on 147,200 pounds of copper-nickel condenser tubes for Puget Sound.

**Birmingham, Ala.** — While no outstanding tonnage has been placed, orders are sufficient to keep production steady at four-day operations.

**San Francisco** — No new inquiries of size were noted in the cast iron pipe market and business placed consisted entirely of small lots. So far this year 11,085 tons have been placed, compared with 7748 tons for the corresponding period in 1939.

### Cast Pipe Placed

200 tons, 3 to 6-inch and 50 tons 2-inch Metzger, Oreg., to H. G. Purcell, Seattle, for United States Pipe & Foundry Co., Burlington, N. J., and Pacific States Cast Iron Pipe Co., Provo, Utah, respectively.

### Cast Pipe Pending

325 tons, 4 to 6-inch, Spokane, Wash.; bids in.

## Rails, Cars

Track Material Prices, Page 81

Car buying is featured by placing of 40 flat cars and 12 cabooses by the Norfolk Southern, the flat cars going to Greenville Steel Car Co., Greenville, Pa., and the cabooses to Magor Car Corp., Passaic, N. J.

Richmond, Fredericksburg & Potomac has placed 1500 tons of rails

with Bethlehem Steel Co., Bethlehem, Pa.

### Car Orders Placed

Chicago, Milwaukee, St. Paul & Pacific, 35 covered hopper cars on lease-purchase basis, to General American Transportation Corp., Chicago.

Chicago, Rock Island & Pacific, 150 hopper cars to Pullman-Standard Car Mfg. Co., Chicago, and 60 covered hoppers to General American Transportation Corp., Chicago, on a lease-purchase arrangement.

Norfolk Southern, 40 flat cars, to Greenville Steel Car Co., Greenville, Pa.,

and 12 caboose cars to Magor Car Corp., Passaic, N. J.

### Rail Orders Placed

Richmond, Fredericksburg & Potomac, 1500 tons to Bethlehem Steel Co., Bethlehem, Pa.

### Buses Booked

American Car & Foundry Motors Co., New York: Five for Broadway Bus Owners' Association, Bayonne, N. J.; two for Union Bus Co., Jacksonville, Fla.; five air-conditioned for Sunshine Bus Lines Inc., Dallas, Tex.; one each for Southeastern Greyhound Lines,

**1431** **NATIONALLY KNOWN**  
**MANUFACTURERS USE**  
**AMPCO METAL**  
**FOR DIFFICULT**  
**SERVICES...**



— *Let's* **LOOK**  
**INTO IT FOR**  
**OUR PRODUCTS**

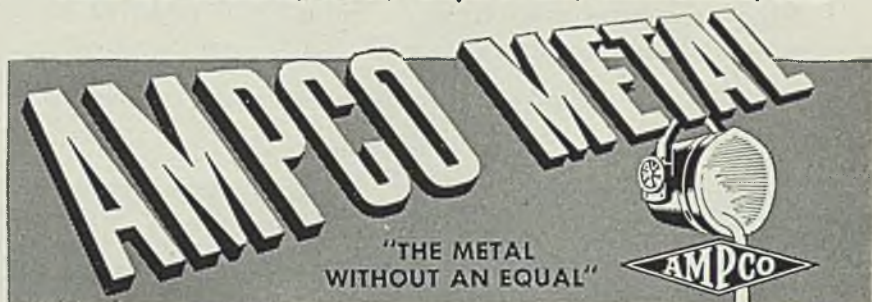
The increasing preference for

Ampco Metal for highly stressed service

parts is convincing evidence of its inherent superiority over most non-ferrous alloys. . . . Time and again, Ampco Metal has proved its extraordinary wear resistance — its strength and shock-proof qualities — its ability to often outwear hardened steel—in applications including gears, bushings, bearings, nuts, cams, shifters, thrust plates, forming and drawing dies.

You probably have a place for Ampco Metal in one or more of your products. Why not check with us. Send for data on Ampco Metal and its uses in modern industry.

**AMPCO METAL, INC., Dept. S-429, Milwaukee, Wis.**



Lexington, Ky., Jersey City & Montclair Bus Co., Verona, N. J.

American Car & Foundry Motors Co., New York: Eleven 41-passenger for Triboro Coach Corp., Astoria, Long Island, N. Y.; four 36-passenger for Georgia Power Co., Atlanta, Ga.; seven 36-passenger for Rapid Transit Inc., Saugus, Mass.; two 23-passenger for Eastern Massachusetts Street Railway Co., Boston; two 35-passenger for Eastern Trails Inc., Washington; two 36-passenger for Fort Worth Transit Co., Fort Worth, Tex.

### Locomotives Pending

Chicago, Rock Island & Pacific, 1000-horsepower diesel switch engine, to be

purchased shortly.

Terminal Railroad association, St. Louis, 10 diesel electric switch engines, pending; estimated to cost approximately \$700,000.

## Wire

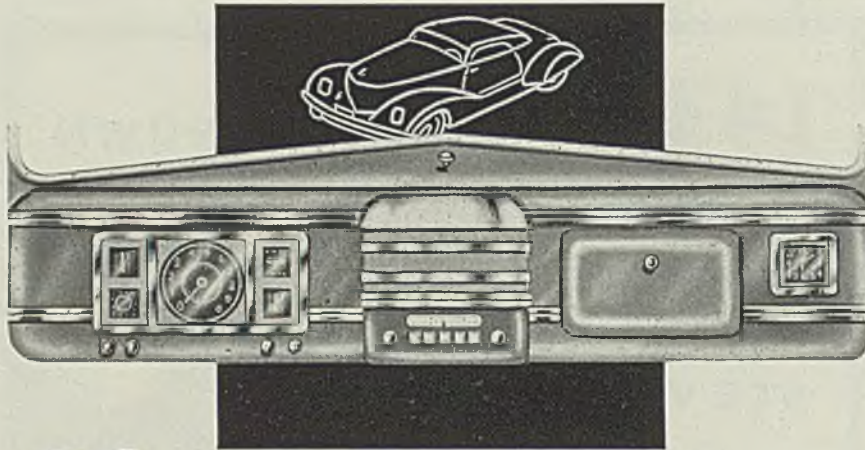
Wire Prices, Page 81

**Pittsburgh**—Production of wire products is unchanged, with demand relatively light. The merchant market has been disappointingly unfavorable, unseasonal weather retarding demand from farm mar-

kets and reducing the normal spring buying considerably. Jobber stocks of most merchant products are heavy, leading to price weakness in most sections by increasing competition for the available business. Manufacturers' wire specifications, while fair, do not reflect much more than a seasonal increase. Export markets are active, with prices firm.

**Chicago**—Steel wire and wire products bookings are slightly better. Prospects are good for heavier business from automotive parts-makers, who will need wire for completion of 1940 model parts and for advance work. Rural demand for rails, staples, fencing and other items more or less pends warmer weather. Farm implement makers are among most prominent users.

**Birmingham, Ala.**—All wire specifications are satisfactory, due to tonnage carried over from last year, but with moderate increase in current bookings. Unofficially, the production rate is estimated at 85 per cent.



# Thomas Strip Meets Exacting Demands for Finish and Drawing Qualities

**P**ROCURING STEELS of exceptionally bright finish or extra good drawing qualities is a problem of many automotive manufacturers that Thomastrip is solving constantly. The demands of these manufacturers are extremely critical because their standards must face the severest competition in both quality and price.

Thomastrip serves the automotive market on a large scale. It meets the exacting requirements for all those features of cold rolled strip steel that promote economy and attractive appearance in the mass production of finished parts. Uniformity of finish, gauge, width, fabricating properties and physical characteristics is one of its outstanding qualities.

BRIGHT FINISH UNCOATED, AND ELECTRO COATED WITH NICKEL, ZINC, COPPER, BRASS, BRONZE, TIN

*Steels that Stimulate Progress*

**THE THOMAS STEEL CO.**  
SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL  
WARREN, OHIO

## Shapes

Structural Shape Prices, Page 80

**New York**—March fabricated structural steel contracts totaled 127,731 tons, against 93,707 tons in February and 95,065 tons a year ago, according to reports to the American Institute of Steel Construction. March shipments of 91,853 tons compare with 95,557 tons in February and 125,259 tons a year ago.

**Pittsburgh**—Industrial demand continues steady. Public works tonnages are gaining as better construction weather speeds up road jobs and army-navy expansion work. Awards have been fairly heavy over the past week as a fair number of jobs involved more than 100 tons.

**Chicago**—Orders declined slightly although private projects are gaining. Over 2300 tons are involved in recent inquiries. Bridge

### Shape Awards Compared

	Tons
Week ended April 27 .....	11,204
Week ended April 20 .....	10,014
Week ended April 13 .....	7,960
This week, 1939 .....	20,638
Weekly average, year, 1940 .....	16,842
Weekly average, 1939 .....	22,411
Weekly average, March .....	19,759
Total to date, 1939 .....	395,267
Total to date, 1940 .....	286,316

Includes awards of 100 tons or more.



work is prominent and bids will be taken April 30 on 750 tons for Grand avenue viaduct, Kansas City, Mo.; 310 tons for three Wisconsin state highway bridges; 520 tons for two Colorado state highway bridges.

**Boston** — Contracts are limited to small tonnages with volume placed first quarter well below that of corresponding period last year. While small individual industrial expansions are more in evidence, public works are off materially. District fabricating shops have small backlogs. Bids for about 1000 tons will be taken next month on a memorial building, University of Vermont, Burlington, Vt.

**Philadelphia**—John McShain, this city, is apparently low bidder on the general contract for the naval medical center, Bethesda, Md., requiring 700 tons of shapes and a large tonnage of reinforcing steel. This is outstanding among pending projects, although a few bridge jobs are being figured, requiring from 100 to 400 tons.

**Buffalo**—The structural steel market is dull. A fair tonnage is in the hands of fabricators, although a considerable portion of recent awards went to other than local firms.

**Seattle** — Washington state has called bids May 7 at Olympia for the general contract, Kettle Falls, Columbia river bridge, requiring 1595 tons of shapes, 37 tons of cast steel and 88 tons of reinforcing.

**San Francisco** — The structural market was active and 2290 tons were booked, bringing the aggregate for the year to 59,663 tons, compared with 46,764 tons for the corresponding period in 1939.

**Toronto, Ont.**—Structural awards continue in good volume and further large orders are indicated. The largest pending project is 3000 tons for plant addition at Arvida, Que., Aluminum Co. of Canada.

### Shape Contracts Placed

2700 tons, foundry and welding shop, for Cincinnati Milling Machine Co., Cincinnati, to Bethlehem Steel Co., Bethlehem, Pa.

1500 tons, addition to plant of International Nickel Co. at Copper Cliff, Ont., to Canadian Bridge Co., Windsor, Ont.

1400 tons, manufacturing building and boiler house, for Andrew Jergens Co., Belleville, N. J., to Lehigh Structural Steel Co., Allentown, Pa.

500 tons, addition to plant of Ford Motor Co. of Canada Ltd., Windsor, Ont., to Canadian Bridge Co., Windsor, Ont.

440 tons, building, for George Ker, New York, to American Bridge Co., Pittsburgh.

431 tons, sheet piling, including 207 tons of bearing piles, improvement to Los Angeles river channel, Los Angeles, between Downey road and Atlantic boulevard, to Bethlehem Steel Co., Los Angeles.

415 tons, welded steel gate anchorages, spillway, Watt Bar dam, Tennessee, to Whitehead & Kales Co., Detroit; bids April 9 to Tennessee valley authority, Knoxville, Tenn.

385 tons, apartment, Wilmington, Del., to Max Corchin Co.

380 tons, train shed, for Fisher Body division, General Motors Corp., Flint, Mich., to Indiana Bridge Co. Inc., Muncie, Ind.

360 tons, vehicular underpass and approaches, New York, to American Bridge Co., Pittsburgh.

340 tons, chemical building, for city, Toledo, O., to Bethlehem Steel Co., Bethlehem, Pa.

315 tons, hangar No. 7, Oakland, Calif., port commission, to Golden Gate Iron

Works, San Francisco.

260 tons, bridge CWR-121-1-2, Bosque county, Texas, to North Texas Iron & Steel Co., Fort Worth, Tex.

260 tons, sheet piling, Everett, Wash., to Columbia Steel Co., San Francisco.

255 tons bridge B1-16-3-7, Cheboygan, Mich., to R. C. Mahon Co., Detroit.

245 tons, store building, S. S. Kresge Co., Reading, Pa., to Lehigh Structural Steel Co., Allentown, Pa.

240 tons, highway bridge, Gardner, Mont., for United States government, to Bethlehem Steel Co., Bethlehem, Pa.

210 tons, Rackham educational memorial building, Detroit, to Whitehead & Kales Co., Detroit.

180 tons, storage building No. 40, Na-



## CASTINGS

*Finished or Unmachined*

MANY times, where highly specialized requirements must be met by steel specifications that usually incur expensive alloys, you will find only a nominal cost increase by substitution of Nelo or Nelo Molybdenum . . . Steel castings unmachined, machined or flame-hardened under one control from raw material to finished product as ordered . . . Get Bulletin 6A giving complete characteristics of Nelo and Nelo Molybdenum Steel Castings.

**NATIONAL-ÉRIE**  
**CORPORATION**  
 ÉRIE, PA., U.S.A.

tional Carbon Co., Niagara Falls, N. Y., to R. S. McMannus Steel Construction Co., Buffalo.

177 tons, addition to warehouse, for Continental Can Co., Syracuse, N. Y., to American Bridge Co., Pittsburgh.

170 tons, building addition, Allegheny Ludlum Steel Corp., Dunkirk, N. Y., to R. S. McMannus Steel Construction Co. Inc., Buffalo; Gilmore, Carmichael & Olson, Cleveland, low on general contract.

155 tons, boiler plant building No. 21, state school, Hudson, N. Y., to Ingalls Iron Works, Birmingham, Ala.

150 tons, nurses' home, for Hospital and Home for Crippled Children, Newark, N. J., to Bethlehem Steel Co., Bethle-

hem, Pa.

140 tons, fire control towers, Virginia Beach, Va., to Acme Steel Engineering Co.

130 tons, bridge No. 5847, Hamel, Minn., to American Bridge Co., Pittsburgh.

130 tons, Georgian creek bridge for Sacramento county, California, to Minneapolis-Moline Power Implement Co., Minneapolis.

125 tons, 135-foot turntable, Chicago, Burlington & Quincy railroad, Cicero, Ill., to American Bridge Co., Pittsburgh.

125 tons, store building, W. T. Grant Co., Kalamazoo, Mich., to International Steel Co., Evansville, Ind.

120 tons, school building, for St.

Augustine's school, Larchmond, N. Y., to Ingalls Iron Works Co., Birmingham, Ala.

120 tons, Union Gospel building, Cleveland, to Fort Pitt Bridge Works, Pittsburgh.

120 tons, shop building, 1530 St. John street, Los Angeles, for city, to Bethlehem Steel Co., Los Angeles.

115 tons, bridge FBI-51-13-16, Thompsonville, Mich., to Wisconsin Bridge & Iron Co., Milwaukee.

115 tons, cylinders and heads, Steel Tank Co., Tulsa, Okla., to Carnegie-Illinois Steel Corp., Pittsburgh.

110 tons, malt distillery building, Peoria, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.

110 tons, 90-foot through plate girder span, Union Pacific railroad, Kansas division, to American Bridge Co., Pittsburgh.

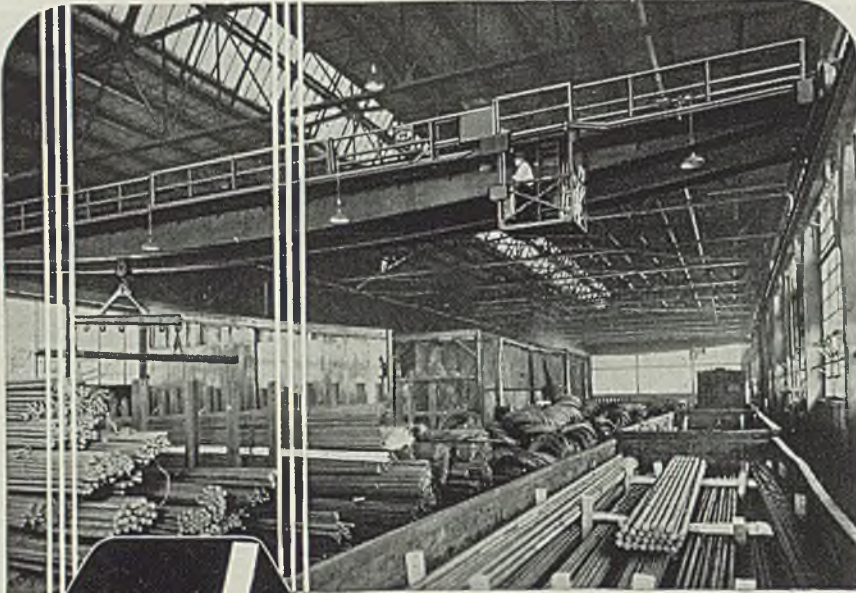
110 tons, cylinders and heads, Combustion Engineering Co., St. Louis, to Wyatt Metal & Boiler Works, Dallas, Tex.

110 tons, bridge FBI-10-12-16, Beulah, Mich., to Wisconsin Bridge & Iron Co., Milwaukee.

106 tons, steel sheet piling, pumping station, Connecticut river, Northampton, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; J. G. Roy & Sons Co., Springfield, Mass., general contractor.

105 tons, boiler supports, Waterside station, Consolidated Edison Co., New York, to American Bridge Co., Pittsburgh.

100 tons, two bowling alley buildings, Binghamton and Utica, N. Y., to American Bridge Co., Pittsburgh.



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### Shape Contracts Pending

3000 tons, plant for Aluminum Co. of Canada Ltd., at Arvida, Que.; Foundation Co. of Canada Ltd., Montreal, Que., general contractor.

1595 tons, (also 37 tons cast steel and 88 tons reinforcing), state Kettle river bridge, Columbia river; bids at Olympia, Wash., May 7.

1300 tons, caisson gates, dry dock 5, Bremerton, Wash., for United States navy.

750 tons, addition to postoffice, Spokane, Wash.

750 tons, Grand avenue viaduct, Kansas City, Mo., bids April 30.

700 tons, naval medical center, Bethesda, Md., John McShain, Philadelphia, apparent low bidder on general contract; tonnage of bars also will be required.

600 tons, hotel at Ottawa, Ont.; Sam Diamond, 313 Laurier avenue, Ottawa, interested in project.

600 tons, assembly plant additions for Canadian Associated Aircraft at St. Hubert, Que., and Malton, Ont.

550 tons, bascule bridge, Sinepuxent bay, Ocean City, Md., for state.

500 tons, coaster gates, Coulee dam; bids in at Denver.

470 tons, grade crossing elimination, Westchester-Putnam counties, New York, for state.

400 tons, shop for DeHavilland Aircraft of Canada Ltd., North York Township, Ont.

400 tons, New Jersey state underpass, route 6, section 13, Morris county, New Jersey; bids April 26.

375 tons, contract 10, section 2, Bowery Bay sewage works, New York, for city.

330 tons, out-patient building, Kings County hospital, Brooklyn, N. Y., for city.

310 tons, three state highway bridges.

- Wisconsin, bids April 30.
- 300 tons, addition to department store, for The Diamond Inc., Charlestown, W. Va.
- 300 tons, plant for Bennett Ltd., Chambly Canton, Que.
- 265 tons, trestles, for Florida East Coast railway, St. Augustine, Fla.
- 265 tons, McCullough housing project, Baltimore, for Baltimore Housing authority.
- 250 tons, building, Lawrence Portland Cement Co., Northampton, Pa.; pending.
- 250 tons, building, for Rockham Engineering Foundation, Detroit.
- 225 tons, highway bridge, Clarke, Neb., bids April 25.
- 220 tons, tube-rolling building, for American Brass Co., Waterbury, Conn.
- 207 tons, sheet piling, two bridges, San Mateo county, California, for state; bids May 8.
- 180 tons, manufacturing building, for Rheem Mfg. Co., Baltimore.
- 180 tons, state bridge SA-route 27, section 404-F, Harristown, Ill.
- 155 tons, subway section S-1-A, Chicago, bids May 9.
- 150 tons, state bridge, Willbur Cross parkway, Milford, Conn.
- 150 tons, state bridge over Raisin river, Blissfield, Mich.
- 130 tons, store building, for Henry estate, Detroit.
- 120 tons, building, for Corning Fibre Box Corp., Corning, N. Y.
- 120 tons, warehouse building, for J. A. V. C. Terminal Corp., Carlstadt, N. J.
- 120 tons, extension to building 122, Aluminum Co. of America, Massena, N. Y.
- 120 tons, building, for Cranbrook school, Bloomfield Hills, Mich.
- 115 tons, state bridge, Warren county, Pennsylvania; bids to state highway department, Harrisburg, Pa., May 3.
- 100 tons, state bridge, Crawford and Warren counties, Pennsylvania; bids to state highway department, Harrisburg, Pa., May 3.
- 100 tons, three state highway bridges, Indiana, bids April 30.
- 100 tons, Alaska road commission bridges; bids in at Seattle.

level. Business is fairly active, particularly in small lots for private construction. Estimating departments are rushed with the latter type of jobs, although individual tonnages usually are small.

**Chicago** — Concrete bar market is quiet, though producers are busy figuring small jobs. Large tonnages are few. Increase in private work is definitely apparent and includes many types of construction not noted recently.

**Seattle**—The market continues slow, with no immediate prospects

for important tonnages. Highway construction schedules of both Oregon and Washington include no major projects. Home building is active but industrial construction is lagging.

**San Francisco** — Awards of reinforcing bars were light and totaled only 882 tons. This brought the aggregate to date to 44,112 tons, compared with 66,018 tons for the same period last year.

**Toronto, Ont.** — Reinforcing awards slowed down during the week, with business confined to

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THE COUNTRY'S LARGEST PRODUCER OF DOMESTIC PIG LEAD

## Reinforcing

Reinforcing Bar Prices, Page 81

**Pittsburgh**—Efforts to strengthen reinforcing bar prices have been without success. Quotations on new billet steel in most cases are within the 1.70c-1.90c range, but on rail steel frequently are well below this

### Concrete Bars Compared

	Tons
Week ended April 27.....	1,725
Week ended April 20.....	10,576
Week ended April 13.....	15,866
This week, 1939.....	18,732
Weekly average, year, 1940.	8,082
Weekly average, 1939....	9,197
Weekly average, March....	7,469
Total to date, 1939.....	180,912
Total to date, 1940.....	137,403

Includes awards of 100 tons or more.

small projects involving 200 to 300 tons.

### Reinforcing Steel Awards

- 500 tons, shop building, 1530 St. John street, Los Angeles, for city, to Soule Steel Co., Los Angeles.
- 500 tons, flood wall, Huntington, W. Va., United States engineer, to West Virginia Rall Co., Huntington, W. Va.; R. B. Potashnic, general contractor.
- 300 tons, factory for International Braid Co. of Canada Ltd. at Ste. Rose, Que., to Dominion Reinforcing Steel Co. Ltd., Montreal, Que.
- 150 tons, bridge, Marion, Ind., to Truscon Steel Co., Youngstown, O.

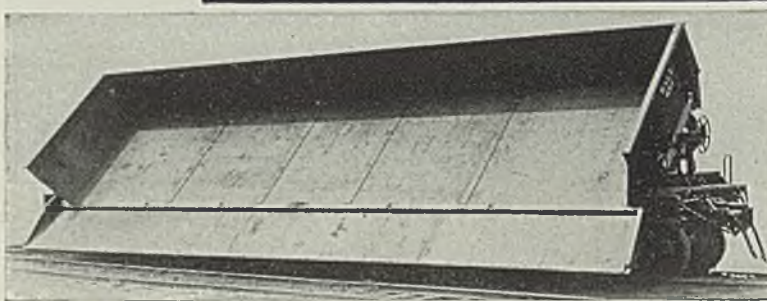
- 150 tons, Penn Dixie Cement Co., building, Nazareth, Pa., to Bethlehem Steel Co., Bethlehem, Pa.; Santer & Schwertner, general contractors.
- 125 tons, rail steel, Sears, Roebuck & Co., Detroit, to Calumet Steel Co., Chicago.
- 100 tons, sewage treatment plant, Hammond, Ind., to Inland Steel Co., Chicago.
- 100 tons, hangar, air base, Squantum (Quincy, Mass.) to Bethlehem Steel Co., Bethlehem, Pa.; Grande & Volpe, Malden, Mass., general contractors.
- 100 tons, Cleveland Electric Illuminating Co. plant, Cleveland, to Republic Steel Corp. through Paterson-Leitch Co.; Hunkin-Conkey Construction Co., Cleveland, contractor.

### Reinforcing Steel Pending

- 2000 tons, Long Island railway subway, Brooklyn, N. Y.; Poirier & McLane, low bidders.
- 1354 tons, Chicago subway, section S-1-A.
- 1000 tons, dam, United States engineer, Kanapolis, Kans.
- 800 tons, Winton Terrace housing, Cincinnati; bids April 25.
- 750 tons, miscellaneous buildings, army, Panama canal.
- 500 tons, storehouse, naval air base, Alameda, Calif.; bids May 22.
- 360 tons, flood control wall, Fall creek section, unit No. 1, Indianapolis, United States engineer's office, Louisville, Ky., bids in.
- 300 tons, Rackham Engineering club, Detroit; W. E. Wood Co., contractor.
- 250 tons, garages, 125 South Wabash avenue, Chicago.
- 200 tons, railroad bridge, Santa Fe lines, Western avenue and Thirty-first street, Chicago, bids in.
- 200 tons, medium security prison, Hutonsville, W. Va.; bids May 1.
- 200 tons, addition, Wisconsin Steel Co., South Chicago.
- 181 tons, two bridges, Pescadero, San Mateo county, Calif., for state; bids May 8.
- 175 tons, cold storage building, Cedar Rapids, Iowa.
- 143 tons, state bridges, Blair county, Pennsylvania; bids to state highway department, Harrisburg, Pa., May 3.
- 125 tons, chemistry building, Missouri College of Mines, Rolla, Mo.; Huff Construction Co., Pittsburg, Kans., low on general contract.
- 120 tons, bridge over Central Vermont railroad, Willington, Conn.
- 100 tons, underpass, Atchison, Topeka & Santa Fe railroad, Chicago.
- Unstated tonnage, foundation and first floor, technological school, Northwestern university, Evanston, Ill.; R. C. Wieboldt, Chicago, contractor, bids in.
- Unstated, \$780,000 concrete and steel viaduct, Seattle; bids soon.
- Unstated tonnage, naval medical center, Bethesda, Md.; John McShain, Philadelphia, apparent low bidder on general contract.



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## Pig Iron

Pig Iron Prices, Page 82

**Chicago**—Sales are slightly improved. Shipments are about even with same period in March, but releases slowed down the last part of last week, and April shipments may end up slightly below March. This does not indicate a trend, sellers believe, but possibly only holding off till the first of the month. Shipments of by-product foundry coke are now on a par with those of last month, having eased slightly.

**Boston** — Pig iron buying in small lots is slightly more active, although few consumers are placing much forward business and some larger users continue to draw substantially from stocks. Shipments are steady and slightly above tonnage moved earlier in the month.

Foundry melt is well maintained but steelworks are slightly less active.

**New York** — Domestic demand continues steady and foreign demand is increasing. Italy now has three inquiries involving three grades, each inquiry specifying 5000 to 10,000 tons. Another 30,000-ton inquiry is attributed to Europe. Unconfirmed rumor is that allies are inquiring for 80,000 to 100,000 tons. Within the past fortnight a 25,000-ton sale for Italian delivery reportedly was completed. Present reports are in conflict concerning the sale of a similar tonnage to England.

**Philadelphia** — Heavy export demand, particularly from Mediterranean and Balkan countries, is reported by pig iron sellers here. The latest inquiry is said to involve 10,000 tons for Yugoslavia. Domestic buying is light, although specifications have been somewhat heavier this month than last. Prices are steady.

**Buffalo** — Uncertainty over prices is blamed by producers for the recent recession in pig iron shipments. Buying is hand-to-mouth despite low inventories and relatively active operations of some foundries. Pig iron production holds at 64 per cent.

**Cincinnati** — The reduction in ore prices has evoked discussion regarding possible effect on pig iron, but there are no indications of a change in the latter. Buying continues slow, with shipments barely holding their own despite active demand from machine tool builders. Stove foundry operations are light for this season.

**St. Louis** — Sales usually are limited to one or two carloads for spot shipment. Farm equipment plants relatively are the most active consumers, with backlogs reported sufficient to continue heavy operations until mid-June.

**Birmingham, Ala.** — Pig iron production is steady with all but two of the district's 18 blast furnaces in operation.

**Toronto, Ont.** — Merchant pig iron sales are steady at about 2500 tons per week, although melters chiefly are taking lots under 500 tons for spot delivery. Booking to the end of June is responsible for good movement of iron and it is stated that larger shipments will start in a few days over water routes.

proposed ships may be largely of welded construction. Building construction is increasing specifications for bolts and nuts, although not as much as anticipated. Automotive demand is at a higher rate than expected.

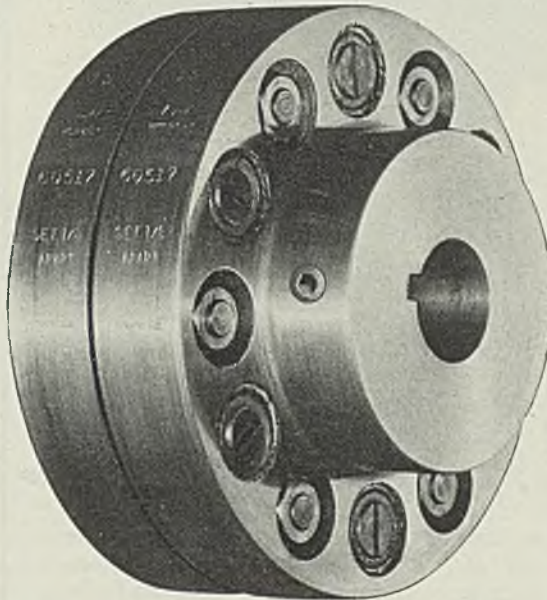
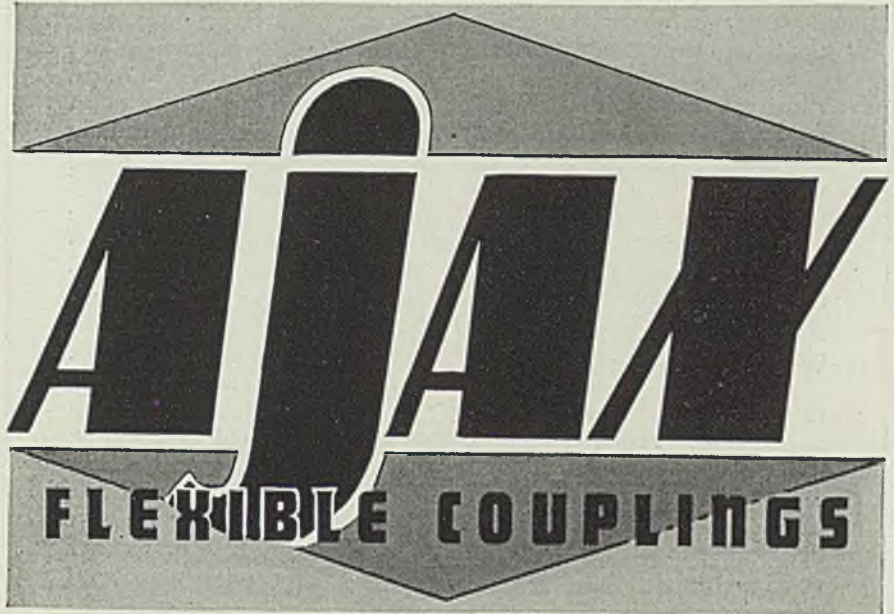
## Scrap

Scrap Prices, Page 84

**Pittsburgh** — Although open hearth grades are dull with little interest

shown, strength is exhibited by railroad specialties and low phos material. Prices on these commodities have been raised 50 cents, putting the specialties on a \$22 basis. Some few cars have gone above this figure, due largely to freight differentials and temporary shortage. Current offerings by the railroads are heavy and closings this week and next should bring fair quantities into this district.

**Cleveland** — Trading is light, electric furnace melters furnishing the best outlet. Closing of monthly



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## Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 81

**New York** — Shipbuilding activity and rising inquiries are stimulating demand despite the fact some

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# Behind the Scenes with STEEL

## Procurement Oddities

■ The Procurement Division of the Treasury Department last week invited bids to furnish a skeleton for the U. S. Marine Hospital in Chicago. The Quartermaster General of the Army has asked Congress for \$50,000 to develop a field laundry and delouser, capable of servicing 600 men a day. The same Q. M. Corps wants \$500 to develop "a satisfactory electric lantern; something to replace the oil lamp." Also requested is \$1000 for the development of a nonslip, longwearing horseshoe. Before it's all gone, we'd better get the heck down there and see if we can't get a couple of bucks for that new non-slicing brassie we've been working on.

## Won't Be Long Now

■ Herbert W. Reith of Carnegie-Illinois was first in with the correct answer last week and wins the tin *Croix de Puzzle*. The big puzzler these days is the new service that STEEL will soon announce. It won't be long, now, and we guarantee you'll not only be very agreeably surprised, you'll wonder how you ever got along without it!

## In A Nutshell

■ The other day we saw a breakdown of government statistics with all of those long rows of zeros eliminated by dividing the whole works by a million. The proportions, of course, remain the same and the results are something like this: "The United States is a rich country of 3 square miles, with a population of 130, 42 of whom live on farms. Only 36 are working now, although 12 more would like to if they could find anything to do. Also a lot of these folks would like to go back and live on the farm, but there are only 7 farms and not all of them are needed to supply the wants of the country. With the Federal debt up to \$44,000, people are complaining about high

taxes but these are mostly indirect. Only 5 persons are required to file income tax returns and of these just one pays on earnings of a half-cent ( $\frac{1}{2}c$ ) or more. This year 35 or 40 of the gang over 21 are going to take a day off and vote and then things may or may not get better."

## "The Globetrotter"

■ Last week we thought we had a winner in G. H. Allen, who subscribes personally to 22 magazines, but he is practically a sissy compared to an interesting and newly discovered reader of STEEL, Ulmer Turner, "The Globetrotter" of the *Chicago American*. As a radio commentator, head of a radio research laboratory, and a metallurgical hobbyist (member ASM), Mr. Turner wants to keep up on major developments in all important industries and to do so he subscribes to and reads 34 magazines. As for STEEL, the Globetrotter has this to say: *Your magazine was my choice in its field, and it covers all of my requirements nicely, thanks to its clever editorial format. That's why I read it, and if this be treason, my friend, let's make the most of it!*

Far from treason, Mr. Turner, but we hope you won't mind our making the most of it!

## Next Week

■ Flame Hardening Cast Iron will be the highspot in next week's issue. R. O. Day, metallurgist, The Linde Air Products Co., is the author.

## Pull Up A Chair

■ This week two new advertisers certainly deserve an outstretched paw of welcome. An hello and how-are-you to American Forge Div., American Brake Shoe & Fdry. Co. (p. 56-7) and to Atlas Lumnite Cement Co. (p. 61). Nice copy, too.

■ Read STEEL—and PROFIT!

SIRDLU

railroad lists this week is expected to show the current trend.

**Chicago**—Brokers have been occupied largely with covering previous mill orders and much of this is being done at \$15.75 for No. 1 heavy melting steel. Instances are reported of dealers' obtaining as high as \$16 for this grade. Mills have been out of the market for some time now but it is indicated that an early purchase by a local steelworks is likely. Last price paid was \$15.50, but it is generally expected, in view of the current level of trading, that a new sale would set a higher value on this grade.

**Philadelphia**—Prices generally are firm to strong. Railroad malleable and machine shop turnings have been reduced 50 cents, but No. 1 cupola cast and low phosphorus crops are higher. No. 1 melting steel is unchanged, but it is doubtful if much tonnage can be obtained at \$16.50. Domestic buying is slow, but there is no pressure to sell. A substantial tonnage of No. 1 and No. 2 scrap is being figured for Italy.

**Buffalo**—Mixed sentiment continues to lean slightly to the bullish side, as small sales substantiate the prevailing range of \$16 to \$16.50 for No. 1 heavy melting steel. Strength is shown in the face of the opening of navigation here, and the arrival of two boats from upper lake ports carrying approximately 10,000 tons. Three more boats carrying 5000 tons each are scheduled to arrive this week. A strong undertone in cast and malleable grades is aided by Canadian demand.

**Detroit**—Canadian steel mills continue an important factor in the local market, aiding to hold prices at present levels. Foundry grades show no weakness and heavy breakable cast is up 50 cents a ton. Local mill buyers, apparently comfortably fixed for supplies, are showing little interest in acquiring tonnage at the current market.

**Cincinnati**—Dealers in iron and steel scrap are marking time until stronger consumer interest appears. Under such conditions prices are none too strong, but recent minor sales do not justify lowering of quotations. Dealer trading shows heavy melting steel maintaining previous firmness. Country scrap, however, has been coming out in greater tonnage and is in dull demand.

**St. Louis**—Brokers advanced their prices 25 cents a ton on No. 2 heavy melting steel, Federal, Ill., following purchase of approximately 5000 tons of that grade. However, other grades of melting steel did not follow, on the contrary,

being 25 cents a ton lower. Movement of scrap against contracts has been increasing, but new offerings have been light.

**Birmingham, Ala.** — The district's scrap market is unusually quiet. Prices are nominal, but tonnage is not moving in quantity except some cast for foundries and moderate volume of heavy melting.

**Seattle** — Exporters state that Japan is buying rather steadily, but in smaller volume. The market is slow and prices none too firm. No. 1 export is around \$14 but in the absence of representative sales, dealers are not inclined to quote openly. Rolling mills, under reduced capacity, have ample supplies and are out of the market.

**Toronto, Ont.** — Firmer prices have appeared in scrap, dealers now offering \$18 for machinery cast, \$17 for dealers' cast and \$12.50 for stove plate in net tons, delivered yards. Steel scrap also is showing minor strength, but no revision has been made in these materials.

**San Francisco** — Scarcity of bottoms and high rates is believed the reason why no new orders for Japan have been received. Open-hearth producers buy only enough material to keep up reserves. No. 1 heavy melting steel, f.o.b. cars, metropolitan districts of Los Angeles and San Francisco, is unchanged at \$11.50 to \$12.00 a net ton while No. 2 holds at \$10.50 to \$11.00. Turnings and borings are unchanged at \$5.00 to \$5.50 a net ton and compressed sheets \$9.00 to \$9.50 a net ton.

## Iron Ore

Iron Ore Prices, Page 84

**New York** — Prices are stronger with disruption of Scandinavian shipments. North African low phosphorus and Spanish and North African basic ores have risen to 16 and 17 cents per unit, alongside, Atlantic ports, prices prohibitive to domestic consumers. Manganiferous ores are holding nominally around 15 cents per unit with trend strongly upward. Due to the highly disturbed shipping situation, long term contracting is out of the question, most business consisting of single shipments. Chrome buying has been active recently, with Turkish lump ore holding at \$31 per gross ton, c.i.f. seaboard.

## Warehouse

Warehouse Prices, Page 83

**Chicago** — Warehouse buying shows no appreciable change but continues on an encouraging level.

April is expected to end with bookings substantially the same as those of March.

**Philadelphia**—Due to reduction in mill prices more than a fortnight ago on hot and cold strip and long ternes, jobbers recently reduced several items. Meanwhile, leading mills have rescinded price cuts May 1 on tonnage ordered for shipment up to Sept. 30. As a result this may lead to a reinstatement of former warehouse prices in the near future, but in some reliable quarters this is doubted.

**Buffalo** — Following recent price

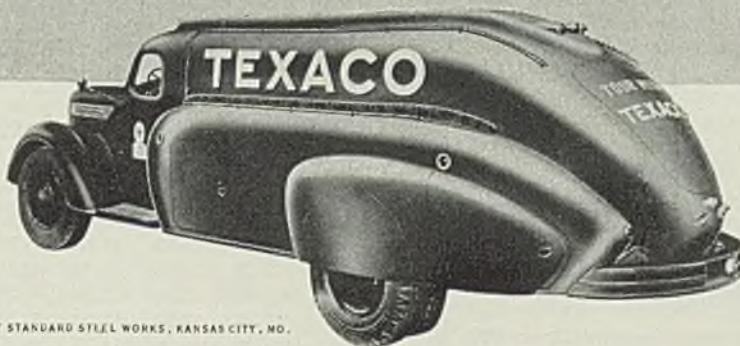
cuts in sheet and strip items, a minor increase is reported in aggregate sales of warehouse products. Buying is about equal to the favorable pace of first quarter.

**Cincinnati** — Sales are well maintained in satisfactory volume, considerably below fourth quarter. This decline, which developed early in the year, is most apparent in sheets.

**St. Louis**—Sheet prices have been reduced 20 cents per 100 pounds. Business has been spotty this month but slightly ahead of March.

**Seattle**—Jobbing houses report a

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HIGH TENSILE STEEL

steady volume of business, mostly in small tonnages for quick delivery. The price situation in this territory remains unsatisfactory.

## Steel in Europe

Foreign Steel Prices, Page 83

**London**—(By Cable)—From April 24 the British steel control applies its new plan and directly controls distribution of steel products. Only a limited tonnage is available for commercial users and exporters. Semifinished supplies now enable rerollers to increase output. Shipyards absorb a large tonnage of material. Other structurals and tank and boiler plates also are in great demand.

Belgium and Luxemburg works are fully booked and unable to take fresh export commitments. Belgian scrap prices have been increased.

## Tin Plate

Tin Plate Prices, Page 80

Tin plate operations are steady at 63 per cent. This represents almost full operation for cold mills in most sections, although there is still some idle capacity. Releases from can makers are slightly improved and about equal to production. April tonnage is ahead of March in both production and shipments. Demand is still good from West coast points where freight rate increases are to become effective shortly.

## Ferroalloys

Ferroalloy Prices, Page 82

**New York**—Ferroalloy shipments are tending slightly upward, although sellers believe that the movement this month will be about the same as in March. Prices generally are steady, with ferromanganese holding at \$100, duty paid, Eastern seaboard, and spiegeleisen. 19 to 21 per cent, at \$32, Palmerton, Pa., and 26 to 28 per cent, at \$39.50.

The procurement division, treasury department, Washington, will open bids May 7 on 1000 to 20,000 tons of chrome ore for storage at New Cumberland, Pa., and 1000 to 5000 tons for Ogden, Utah.

## Semifinished Steel

Semifinished Prices, Page 81

**Pittsburgh** — Semifinished orders for export are building up substantially. There is little activity designed to build up domestic stocks, with orders almost entirely spot. Specifications from nonintegrated mills last week were somewhat

lower than the previous week, in line with fluctuations over the past few months. Prices are firm.

## Nonferrous Metals

**New York** — Nonferrous metal markets were devoid of important changes last week. Offerings of copper at 11.25c, Connecticut, on outside market stimulated sales slightly but other metals were quiet.

**Copper** — Russia has been unable to take out large tonnages of copper, estimated up to 15,000 tons, which were purchased from American companies during the past month. This has been due to lack of cargo space. This resale metal is being absorbed without prices easing below the 11.25-cent level. Buyers report that they have been unable to obtain sufficient metal for prompt shipment through the usual channels and have had to specify shipment as far forward as August. The minimum price quoted by leading mine producers held at 11.50c, Connecticut.

**Lead**—A few sellers reported moderate sales each day but generally the market was described as quiet. Turnover for the period probably totaled not more than 6000 or 7000 tons. Prices held firm on the

basis of 4.95c, East St. Louis, and 5.10c, New York, with St. Joseph Lead Co. still asking \$1 premium a ton on certain brands in the latter market.

**Zinc**—Total sales for the week probably did not amount to 2000 tons as consumers continued to draw on reserve stocks, as expected. Shipments continued to hold steady, however, at about twice the new buying rate. Prime western held steady on the basis of 5.75c, East St. Louis.

**Tin**—United States treasury department has asked for bids, due May 2, on 100 to 500 short tons of grade "A" pig tin for delivery within six months after contract to New York or Columbus, O. The department holds an option to increase or decrease by 25 per cent the amount it may purchase from each bidder. A moderate volume of business was placed with domestic consumers during the week at a steady price level which fluctuated from a low of 47.12½c to a high of 47.50c, the closing price.

**Antimony**—The domestic market remained in the doldrums with prices unchanged at 14.00c, New York, for American spot and nominally 16.50c, duty paid New York, for Chinese spot.

## Nonferrous Metal Prices

April	Copper			Straits Tin, New York		Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99% Spot, N.Y.	Anti-mony Amer. Spot, N.Y.	Nickel Cathodes
	Electro, del. Conn.	Lake, del. Midwest	Casting, refinery	Spot	Futures						
20	*11.37½	11.50	11.12½	47.37½	46.87½	5.10	4.95	5.75	19.00	14.00	35.00
22	*11.25	11.50	11.00	47.12½	46.62½	5.10	4.95	5.75	19.00	14.00	35.00
23	*11.25	11.50	11.00	47.50	46.87½	5.10	4.95	5.75	19.00	14.00	35.00
24	*11.25	11.50	11.00	47.37½	46.87½	5.10	4.95	5.75	19.00	14.00	35.00
25	*11.25	11.50	11.00	47.50	47.12½	5.10	4.95	5.75	19.00	14.00	35.00
26	*11.25	11.50	11.00	47.50	47.12½	5.10	4.95	5.75	19.00	14.00	35.00

\*Based on sales by custom smelters; mine producers unchanged at 11.50c.

### MILL PRODUCTS

F.o.b. mill base, cents per lb., except as specified. Copper brass products based on 11.50c Conn. copper

Sheets	
Yellow brass (high)	18.31
Copper, hot rolled	20.12
Lead, cut to jobbers	8.25
Zinc, 100 lb. base	11.00

Tubes	
High yellow brass	21.06
Seamless copper	20.62

Rods	
High yellow brass	14.26
Copper, hot rolled	16.62

Anodes	
Copper, untrimmed	17.37

Wire	
Yellow brass (high)	18.56

### OLD METALS

Nom. Dealers' Buying Prices	
No. 1 Composition Red Brass	
New York	7.12½-7.37½
Cleveland	8.00-8.25
Chicago	7.37½-7.62½
St. Louis	7.75-8.25

Heavy Copper and Wire	
New York, No. 1	8.75-9.00
Cleveland, No. 1	9.00-9.25

Chicago, No. 1	8.75-9.00
St. Louis	8.75-9.25

Composition Brass Turnings	
New York	6.75-7.00

Light Copper	
New York	6.75-7.00
Cleveland	7.00-7.25
Chicago	6.75-7.00
St. Louis	6.75-7.00

Light Brass	
Cleveland	4.00-4.25
Chicago	4.50-4.75
St. Louis	4.50-4.75

Lead	
New York	4.50-4.75
Cleveland	3.90-4.15
Chicago	3.90-4.10
St. Louis	4.00-4.25

Zinc	
New York	3.00-3.25
Cleveland	2.75-3.00
St. Louis	3.25-3.50

Aluminum	
Misc., cast, Cleveland	8.00
Borings, Cleveland	6.50
Clips, soft, Cleveland	14.00
Misc. cast, St. Louis	7.75-8.00

SECONDARY METALS	
Brass ingot, 85-5-5-5, less carloads	11.75
Standard No. 12 aluminum	13.75-14.00



## Review Problems at Mill Supply Convention

(Concluded from page 25)

cast further light on industry problems. In answering the question, "What can be done about the small order problem?" Mr. Northrup said supply houses are entitled to a re-adjustment of the small quantity schedules to stop present losses. Although admitting that such readjustments would be difficult, he said they could be accomplished by announcing effective dates 30 days hence. Revised schedules then could be withdrawn if found impracticable.

A. R. Smith, Boyer-Campbell Co., Detroit, declared manufacturers should not require distributors to give extra discounts to large users without providing them with a compensating discount.

As to maintenance of specialty salesmen supplementing regular salesmen, J. M. Bates, Moore Handley Hardware Co., Birmingham, Ala., said such men get customer recognition. For instance, in selling welding supplies, the salesman must know his line completely and the specialty man fits into this picture.

P. O. Boylan, W. M. Pattison Supply Co., Cleveland, said the most effective method of distributing advertising literature supplied by manufacturers was through direct contact by salesmen.

"What can be done to offset increases in costs attributable to the regulation of minimum wages and maximum hours, sales taxes and similar factors?" was answered by Ralph E. Kramer, H. Channon Co., Chicago. He said there are several matters involved, and that the fact the supply house operates a retail business on a wholesale margin of profit, averaging about 23 per cent, must be kept in mind. First, he said, do not handle items which move too slowly; second, watch costly pickups on returned products; third, do not break packages; fourth, avoid full allowance on small purchases by large companies who might buy large quantities later, and finally, place a minimum invoice value on orders taken.

At one of the "triple" sessions, J. A. Channon, editor, *Mill Supplies*, said the industry should concentrate on how to do a better sales and service job at lower costs rather than such problems as small orders, rising taxes, wages and hours, and the like. He suggested that the industry pool its operating and sales methods as a means of arriving at a basis for lower costs. A study of the Ross-Willoughby Co., Columbus, O., showed that 13.65 per cent of total orders were for less than \$1, 42.33 per cent for \$1 to \$5, 20.18 per cent for \$5 to \$10, 7.96 per cent

for \$10 to \$15, and 15.88 per cent for more than \$15. These figures were regarded representative for the supply trade.

American Supply & Machinery Manufacturers association elected the following officers: President, H. K. (Tony) Clark, Norton Co., Worcester, Mass.; first vice president, R. G. Thompson, Lufkin Rule Co., Saginaw, Mich.; second vice president, H. P. Ladds, National Screw & Mfg. Co., Cleveland; J. S. Disston Jr., Henry Disston & Sons, Philadelphia.

Executive committee: A. A. Murfey, Cleveland File Co., Cleveland, chairman; C. O. Hedner, Yale & Towne Mfg. Co., Philadelphia; R. D. Black, Black & Decker Mfg. Co., Towson, Md.; F. J. Tone Jr., Carborundum Co., Niagara Falls, N. Y.; Irving Lemaux, Indiana Brush & Broom Co., Indianapolis, Ind.; C. F. Conner, B. F. Goodrich Co., Akron, O.

National Supply & Machinery Distributors' association named: President, A. R. Smith, Boyer-Campbell Co., Detroit; vice president, area one, Andrew Carey, Carey Machinery & Supply Co., Baltimore; vice president, area two, Tyler W. Carlisle, Strong, Carlisle & Hammond Co., Cleveland; vice president, area three, H. V. Waterman, Hendrie & Bolthoff Mfg. & Supply Co., Denver.

Executive committee: F. M. Butts, Butts & Ordway Co., Cambridge, Mass., area one; H. H. Edwards, Federal Hardware Co., New York, area two; Charles E. Allinger, The Charles E. Strelinger Co., Detroit, area three; Samuel H. Clark, Samuel Harris & Co., Chicago, area four; H. J. Gundlach, Mine & Smelter Supply Co., Denver, area five and A. J. Glessner, A. J. Glessner Co., San Francisco, area six.

Southern Supply and Machinery Distributors' association elected: President, J. M. Bates, Moore Handley Hardware Co., Birmingham, Ala.; first vice president, J. B. Crammins, Mills & Lupton Supply Co., Chattanooga, Tenn. Executive committee: Edward F. Strauss, Oliver H. Van Horn Co., New Orleans, La., chairman; Jack B. Dale, Briggs-Weaver Machinery Co., Dallas, Tex.; Phillip Pidgeon, Pidgeon-Thomas Iron Co., Memphis, Tenn.; Harry P. Leu, Harry P. Leu Inc., Orlando, Fla.

## FINANCIAL

(Concluded from page 27)

in gross sales, less discounts, returns and allowances.

Net income for quarter ended March 31 totaled \$644,652 and was equal, after quarterly dividend requirements on \$5 prior preferred and on 6 per cent preferred stock, to 29 cents a share on 569,616 common shares. This compares with \$728,661 adjusted net profit, equal to 44 cents a share on 563,637 common shares, earned in same 1939 quarter.

### RUSTLESS EARNS \$312,847 FIRST QUARTER NET PROFIT

Rustless Iron & Steel Corp., Baltimore, reports first 1940 quarter net income totaled \$312,847, well above \$193,724 adjusted net profit earned in corresponding 1939 period, but 21 per cent below \$395,868 net profit resulting from operations in fourth quarter last year. Net income in third 1939 quarter totaled \$262,045.

March, 1940, quarter net profit



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Type 3  
Standard Pattern

Type 14  
Special Broad Base

Type 10  
Standard Pattern

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was equal, after dividend requirements on \$2.50 cumulative preferred, to 31 cents a share on 926,229 shares of common. This compares with first 1939 period net profit equal to 20 cents a share on 871,904 shares of common.

#### **PITTSBURGH STEEL CO. NETS \$203,008 IN FIRST QUARTER**

Pittsburgh Steel Co., Pittsburgh, reports first 1940 quarter net profit was \$203,008, equal after quarterly dividend requirements on 49,960 shares of 5½ per cent prior preferred and 69,434 shares of 5 per cent class A preferred stock, to \$1.34 a share on 35,316 shares of 7 per cent class B preferred. This compares with \$377,159 net loss incurred in corresponding 1939 quarter.

Net profit earned in fourth quarter last year totaled \$1,039,551; in third period, \$85,093.

#### **AMERICAN ROLLING MILL NET INCOME IS \$1,005,194**

American Rolling Mill Co., Middletown, O., reports first quarter consolidated net income was \$1,005,194, equal to 17 cents per common share after preferred dividend requirements. This compared with \$793,480 net income, including \$400,000 non-recurring earnings, equal to 10 cents per common share after preferred dividend requirements in corresponding 1939 period.

Fourth 1939 quarter net income was \$1,741,964; third period net profit totaled \$600,794.

#### **GRANITE CITY STEEL EARNS \$43,152 FIRST PERIOD NET**

Granite City Steel Co., Granite City, Ill., earned \$43,152 net profit, equal to 11 cents a share on capital stock, in first quarter this year. This compares with \$13,435 net profit, equal to three cents a share, in corresponding 1939 period. Fourth quarter profit last year was \$258,941; in period ended Sept. 30, \$53,953.

#### **OTIS STEEL INCURS \$165,513 FIRST PERIOD NET DEFICIT**

Otis Steel Co., Cleveland, reports net loss incurred during first quarter this year totaled \$165,513, compared with \$180,326 net profit reported for corresponding 1939 period. Net income earned in fourth quarter last year was \$650,923.

## **Equipment**

**Boston** — Machine tool orders are substantial, but undoubtedly would be heavier but for deferred deliveries. Unable to get shipment until late in the year on numerous units, buyers are withholding con-

siderable volume. Shops are operating full and overtime schedules in numerous instances with domestic business generally given preference, although allies are pressing for shipment against orders already placed. Producers of steel mill equipment are engaged mostly in supplying parts with few large inquiries for mills active. Some such active business figured and estimated late last year has never been placed.

**New York** — Fairbanks, Morse & Co. is low on propelling machinery for two small seaplane tenders for the navy, bidding \$1,435,350 and \$1,454,797, April 10.

Shepard-Niles Crane & Hoist

## **Construction and Enterprise**

### **Michigan**

**DETROIT**—Donnelly Pattern & Engineering Co., Martin Donnelly, president, Braden and Michigan avenues, has let contract to the Austin Co., Cleveland, for a manufacturing plant for a new line of manufacture recently developed.

**DETROIT**—Co-Operative Tool Service Co. has been incorporated with \$25,000 capital to manufacture tools, by Ralph B. Duncan, 1434 East Ferry avenue, Detroit.

**DETROIT**—Economy Die & Tool Supply Inc., 852 Clairpointe avenue, has been incorporated to manufacture dies, jigs and patterns, with \$25,000 capital, by Louis M. Stameroff, 627 Algonquin street.

**DETROIT**—Humdex Sales Corp. has been incorporated with 50,000 shares no par value to manufacture agricultural machinery, by Bert Wermuth, 1632 West Lafayette street.

**DETROIT**—Detroit Conveyor & Steel Corp. 2235 East Larned avenue, has been incorporated with 1000 shares no par value to conduct a structural steel business, by Louis J. Merwin, 4882 Algonquin street.

**DETROIT**—Ultra-Lap Machine Co., 247 McDougall avenue, has been incorporated with 150 shares no par value to manufacture machinery equipment, by Clarence B. Swift, 770 Bedford road, Grosse Pointe Park, Mich.

**KALAMAZOO, MICH.** — City engineer is making plans for a sewage disposal plant to cost about \$100,000.

**WARREN, MICH.**—Warren Toy Co. has been incorporated with \$50,000 capital to manufacture metal stampings, by Frank J. Martin, 648 Pallister avenue, Detroit.

**YPSILANTI, MICH.**—United Stove Co. has awarded a contract to the Austin Co., Detroit, for a factory addition to cost about \$75,000.

### **Connecticut**

**BRIDGEPORT, CONN.**—Southern New England Ice Co., 224 Hallam street, will build a 1 and 2-story ice manufacturing plant and garage, 100 x 292 feet and 60 x 162 feet, on Knowlton street, to cost about \$150,000. Keith, Sellers & Halne, 100 Mohawk drive, West Hartford, Conn., are engineers.

**EAST NORWALK, CONN.**—R. T. Vanderbilt Inc., 33 Winsfield street, is building a 40 x 75-foot chemical processing plant to cost about \$40,000. W. L. Oes-

Corp., Montour Falls, N. Y., has the contract for two 175-ton bridge cranes for the Brooklyn navy yard, also four 3-ton wall cranes, at \$175,400. Harnischfeger Corp., Milwaukee, booked two 20-ton bridge cranes for the same yard at \$41,960. These were bid under spec. 9638, bureau of yards and docks.

**Chicago** — Machinery and tool sales last week were lower, although market still is active. Bookings, however, remain below a month ago. This is not seen as a downward trend, as much material is pending and inquiries are encouraging. Railroads are not active.

trecher Co. Inc., 10 May avenue, Great Neck, L. I., is contractor.

**GLENBROOK, CONN.**—Phillips Chemical Co. is building an addition to its plant, general contract to Samworth-Hughes Co., Paterson, N. J.

**NAUGATUCK, CONN.**—United States Rubber Co., Passaic, N. J., is building boiler house and other additions to its rubber reclaiming and chemical manufacturing divisions here.

### **Massachusetts**

**SOMERVILLE, MASS.** — Brighton Dressed Beef & Veal Co., 4 Abattoir grounds, Brighton, Mass., will take bids early in May for a 1 and 2-story steel and concrete rendering plant costing \$150,000.

### **New York**

**CAMILLUS, N. Y.**—Camillus Cutlery Co. is building a plant addition to care for increased production.

**NIAGARA FALLS, N. Y.** — Acheson Graphite Co., Buffalo avenue, and 30 East Forty-second street, New York, will build a 1-story addition 50 x 200 feet, costing over \$40,000.

**ROCHESTER, N. Y.**—Eastman Kodak Co., C. Brown in charge, is building a 6-story factory 79 x 215 feet, to cost \$200,000. Ridge Construction Co., Kodak Park, is contractor.

### **New Jersey**

**ATLANTIC CITY, N. J.**—Atlantic City Electric Co., will build an extension to its generating station, for which additional equipment will be needed.

### **Pennsylvania**

**MEADVILLE, PA.**—Talon Inc., W. D. Walker, president, is building a boiler-house addition. George A. Rutherford Co., 2725 Prospect avenue, Cleveland, is engineer.

**PHILADELPHIA**—Midvale Co., Wilsahickon avenue, is building an oil tempering plant to cost about \$40,000.

**WILKES-BARRE, PA.**—Wyoming Valley Industrial Building Corp., T. M. B. Hicks Jr., 853 Wyoming avenue, Kingsston, representative, is building a 1-story aircraft manufacturing plant costing \$40,000 for Welch Aircraft Industries Inc., South Bend, Ind., lessee.

### **Ohio**

**ASHTABULA, O.**—Ashtabula Water

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Works Co., M. R. Johnson, manager, will install two boilers, capacity 10,000 pounds steam per hour, replacing present equipment. Contract for boilers has been given Riley Stoker Co., 1740 East Twelfth street, Cleveland.

**CLEVELAND**—C. S. Bush Iron & Steel Co., 865 East Sixty-seventh street, is adding to its plant for automobile wrecking, and will extend its activities.

**CLEVELAND**—Kay-Zee Mfg. Co., recently incorporated, has leased 6500 square feet of space at 5201 Denison avenue for manufacture of restaurant and hotel equipment. (Noted April 22.)

**CLEVELAND**—Vichek Tool Co., 3001 East Eighty-seventh street, is seeking plant site in suburbs rather than build addition, to accommodate increased demand for its products. F. J. Vichek is president.

**CLEVELAND**—Accurate Parts Mfg. Co., Lakeview and Euclid, has leased additional space and is installing additional machine tool equipment for production of automotive parts. Former storage space is being utilized for production.

**CLEVELAND**—American Steel & Wire Co., Rockefeller building, has let contract to National Concrete Fireproofing Co., Citizens building, for \$75,000 improvements to its Cuyahoga works, Harvard avenue and East Forty-second street. Includes improvements to three hot-mill buildings, total size about 100 x 210 feet.

**MT. GILEAD, O.**—Village, James P. Bennett, clerk, will build chemical sewage disposal plant, including tank units, pump feeders, agitators and other equipment.

**MILLERSBURG, O.**—City will install a water softening plant costing \$25,000. R. H. Hunter, Wooster, O., is engineer.

**NEW PHILADELPHIA, O.**—Ladel Conveyer Mfg. Co., A. L. Schwab, secretary-treasurer, has acquired additional land space adjacent to its factory and is planning a brick and steel addition 60 x 300 feet.

## Illinois

**CHICAGO**—Amalgamated Machinery Corp., 11 South LaSalle street, has been incorporated with 1000 shares par value \$5 to manufacture and deal in machinery, by Charles Weinfeld, 11 South LaSalle street.

**CHICAGO**—Dewey & Almy Chemical Co., 62 Whittemore avenue, Cambridge, Mass., is building a 2-story plant 120 x 175 feet at Fifty-first street and Meade avenue, Chicago. Robert G. Regan Construction Co., 228 North LaSalle street, is contractor. Cost is estimated at \$100,000.

**ELGIN, ILL.**—City, M. Lehman, mayor, plans water filtration plant and auxiliaries, to cost \$15,000. V. Kasser, city hall, is engineer.

**VENICE, ILL.**—Union Electric Co. of Illinois, unit of North American Co., has retained Stone & Webster Engineering Corp., 90 Broadway, New York, to design and erect a steam-electric power plant. Will include two high-pressure, high-temperature 40,000-kilowatt turbine generators and two boilers of 360,000 pounds per hour capacity, and auxiliaries. (Noted April 1.)

## Indiana

**ANDERSON, IND.**—Rhyneason Products Inc., 1809 Ohio avenue, Anderson, has been incorporated with 600 shares no par value to manufacture automobile

body supplies and do general machine shop business, by Robert C. Rhyneason and associates.

## Maryland

**BALTIMORE**—Frankfort Distilleries Inc., 1300 Race street, with executive offices at Louisville, Ky., has plans involving expenditure of \$1,800,000 for increasing its bottling, warehousing and production facilities at Baltimore and Dundalk, Md.

## District of Columbia

**WASHINGTON**—Bureau of supplies and accounts, navy department, will ask bids on machine tool and similar equipment, as follows: May 7, schedule 1409, one vapor-cleaning degreasing machine for Alameda, Calif.; May 3, schedule 1416, one motor-driven pedestal, vertical precision milling machine for Cardereck, Md.; May 7, schedule 1417, two motor-driven plain horizontal milling machines for Mare Island, Calif.; May 3, schedule 1423, two motor-driven power presses for Norfolk, Va.; May 14, schedule 1461, one motor-driven hydraulic pipebending machine for San Diego, Calif.; May 7, schedule 1463, one dust collecting unit, for Sewalls Point, Va.; May 14, schedule 1467, one motor-driven radial drill for San Diego, Calif.; May 10, schedule 1430, one motor-driven multiple-spindle drill for Mare Island, Calif.; May 3, schedule 1442, one sand mold drying oven for Brooklyn, N. Y.; May 10, schedule 1443, one motor-driven precision bench lathe; May 3, schedule 1446, 300 centrifugal tachometers for Philadelphia delivery; May 3, schedule 1456, one motor-driven power squaring shear for Norfolk, Va.

## Minnesota

**FLOODWOOD, MINN.**—Village, Gordon Dodd, clerk, is taking bids to May 7 for 50,000-gallon elevated water tank and tower, watermains, hydrants and gate valves. Charles K. Handschu, Moose Lake, Minn., is consulting engineer.

**THIEF RIVER FALLS, MINN.**—City, P. G. Pederson, clerk, takes bids to April 29 for \$130,000 bonds to finance addition to municipal power plant and installation of 1600-horsepower diesel unit. I. E. Quist is city engineer. Ralph D. Thomas & Associates, 1200 Second avenue South, Minneapolis, are engineers.

## Texas

**HOUSTON, TEX.**—Liquid Carbonic Co. has let contract to Kaiser-Ducett Co., 80 East Jackson boulevard, Chicago, for a \$25,000 manufacturing plant at Center and Hemphill streets, 1-story, 50 x 200 feet, containing 50 x 60-foot boiler room 50 feet high. Will manufacture carbon dioxide gas and later dry ice. T. M. Stallings is local manager.

**LUFKIN, TEX.**—Southland Mills Inc., manufacturer of newsprint paper from yellow pine pulp, is considering extensions to double capacity from 50,000 tons per year. E. L. Kurth is president.

## Colorado

**ESTES PARK, COLO.**—Special election approved formation of sanitation district, including sewage disposal plant costing \$40,000. Carroll H. Boberly, 1441 Welton street, Denver, is consulting engineer.

**TRINIDAD, COLO.**—Council has authorized survey for municipal power plant. E. T. Archer & Co., Kansas City, Mo., are engineers.

## Montana

**FORSYTHE, MONT.**—City, F. F. Pal-

mer, city engineer, plans electric generating plant with three diesel generators, 150 and 300 horsepower.

**MISSOULA, MONT.**—Findell & Silver will rebuild burned sawmill, installing electric motorized equipment.

## California

**BAKERSFIELD, CALIF.**—Richfield Oil Corp. is undertaking expansion in Buena Vista lake district, near here, 50 wells being planned. Steel derricks, drilling machinery, pipe and other equipment will be required.

**TEHACAPI, CALIF.**—Monolith Cement Co., Coy Burnett, president, is constructing fifth kiln at cost of about \$1,000,000 and plans new gypsum plant to utilize gypsum deposits near Maricopa, Calif.

## Washington

**HOQUIAM, WASH.**—Acme Door Co. will build powerhouse and install equipment, at cost of about \$65,000.

**LONGVIEW, WASH.**—Port of Longview will call bids in May for a proposed \$110,000 addition of ten concrete bins to the public grain elevator, adding 450,000 bushels capacity.

**SEATTLE**—Hydraulic Brake Safety Seal Inc., 1990 Alaskan way, has been formed with \$10,000 capital by John R. Wallace & Associates to manufacture machinery and appliances.

**SEATTLE**—Electric Contracting Co. has REA approval for two contracts for transmission lines, a 268-mile system for Big Bend electric co-operative and a 54-mile line in Okanogan county.

**SEATTLE**—Plans are completed for Spokane street viaduct, six lanes, concrete and steel, estimated to cost \$780,000. Bids will be asked when share of railroads in cost is determined.

## Canada

**PRINCE GEORGE, B. C.**—City, A. M. Paterson, mayor, will double capacity of municipal electric power plant at cost of \$30,000. New equipment will include 375-horsepower diesel engine connected to 250-kilowatt generator.

**COPPER CLIFF, ONT.**—International Nickel Co. of Canada Ltd. has given contract to Canadian Bridge Co. Ltd., Walker road, Windsor, Ont., for addition to steel receiving bins at plant here.

**NORTH YORK TOWNSHIP, ONT.**—G. K. Shells, deputy minister, department of munitions and supply, Ottawa, Ont., is receiving bids for assembly shop at plant of DeHaviland Aircraft of Canada Ltd. D. Shepherd, 1244 Dufferin street, Toronto, Ont., is engineer.

**WINDSOR, ONT.**—Ford Motor Co. of Canada Ltd., has awarded general contract to Hein Construction Co., 172 Aylmer avenue, and placed several smaller contracts in connection with \$54,000 plant additions.

**ARVIDA, QUE.**—Aluminum Co. of Canada Ltd., 1010 St. Catharine street West, Montreal, has awarded general contract to Foundation Co. of Canada Ltd., 1538 Sherbrooke street West, Montreal, for plant addition to cost \$3,000,000.

**LACHINE, QUE.**—Dominion Engineering Co. has awarded contract to Hyde & Tiller, Montreal, Que., for a plant addition.

**MONTREAL, QUE.**—Wilsil Ltd. has asked bids on an extension to its meat-packing plant, 2 stories, 27 x 210 feet. Mechanical ice manufacturing equipment is to be installed.



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# ◆ ◆ ADVERTISING INDEX ◆ ◆

Where-to-Buy Products Index carried in first issue of month.

	Page		Page
<b>A</b>			
Abrasive Co., Division of Simonds Saw & Steel Co.	—	Brookmire Corporation	—
Abrasive Products, Inc.	—	Brosius, Edgar E., Inc.	—
Accurate Spring Mfg. Co.	—	Brown & Sharpe Mfg. Co.	—
Acme Galvanizing, Inc.	—	Brown Instrument Co., The	—
Acme Steel & Malleable Iron Works	—	Bryant Chucking Grinder Co.	—
Air Reduction Sales Co.	—	Buffalo Galvanizing & Tinning Works, Inc.	—
Ajax Electrothermic Corp.	—	Bullard Co., The	—
Ajax Flexible Coupling Co.	98	Bundy Tubing Co.	—
Ajax Manufacturing Co.	16	<b>C</b>	
Alan Wood Steel Co.	—	Cadman, A. W., Mfg. Co.	—
Aldrich Pump Co., The	—	Carborundum Co., The	106
Allen-Bradley Co.	—	Carey, Philip, Co., The	—
Allis-Chalmers Mfg. Co.	2, 3	Carnegie-Illinois Steel Corp.	—
Alrose Chemical Co.	—	Carpenter Steel Co., The	—
American Agile Corp.	—	Carter Hotel	—
American Brake Shoe & Foundry Co.	—	Cattle, Joseph P., & Bros., Inc.	—
American Brass Co., The	—	Celcote Co., The	—
American Bridge Co.	—	Central Screw Co.	97
American Chain & Cable Co., Inc.	—	Chain Belt Co.	10
American Chain Division	—	Chambersburg Engineering Co.	—
American Chain & Cable Co., Inc., Ford Chain Block Division	99	Champion Rivet Co., The	—
American Chain & Cable Co., Inc., Page Steel & Wire Division	—	Chandler Products Co.	—
American Chain Division of American Chain & Cable Co., Inc.	—	Chicago Perforating Co.	—
American Chemical Paint Co.	—	Chicago Rawhide Mfg. Co.	—
American Engineering Co.	77	Cincinnati Grinders, Inc.	5
American Forge Division of the American Brake Shoe and Foundry Co.	56, 57	Cincinnati Milling Machine Co.	5
American Foundry Equipment Co., The	—	Cincinnati Shaper Co., The	—
American Gas Association	—	Clark Controller Co.	—
American Hot Dip Galvanizers Association	—	Clark Tractor, Div. of Clark Equipment Co.	—
American Lanolin Corp.	101	Cleveland Cap Screw Co.	—
American Monorail Co.	31	Cleveland-Cliffs Iron Co.	—
American Nickeloid Co.	—	Cleveland Crane & Engineering Co.	—
American Pulverizer Co.	—	Cleveland Hotel	—
American Roller Bearing Co.	—	Cleveland Punch & Shear Works Co.	—
American Rolling Mill Co., The	95	Cleveland Tramrail Division, Cleveland Crane & Engineering Co.	—
American Screw Co.	11	Cleveland Twist Drill Co., The	—
American Shear Knife Co.	—	Cleveland Worm & Gear Co., The	—
American Steel & Wire Co.	—	Climax Molybdenum Co.	34
American Tinning & Galvanizing Co.	—	Columbian Steel Tank Co.	—
Ames Bag Machine Co.	—	Columbia Steel Co.	—
Ampco Metal, Inc.	87	Columbus Die, Tool & Machine Co.	101
Andrews Steel Co., The	—	Cone Automatic Machine Co., Inc.	—
Apollo Steel Co.	—	Consumers Steel Products Corp.	—
Armstrong-Blum Mfg. Co.	—	Continental Roll & Steel Foundry Co.	—
Armstrong Cork Co.	—	Continental Screw Co.	11
Atlantic Stamping Co.	—	Cooper-Bessemer Corp.	—
Atlas Car & Mfg. Co.	76	Corbin Screw Corp.	11
Atlas Drop Forge Co.	—	Cowles Tool Co.	—
Atlas Lumnite Cement Co.	61	Crane Co.	—
<b>B</b>			
Babcock & Wilcox Co.	—	Criswell, James, Co.	—
Balley, Wm. M., Co.	—	Crucible Steel Company of America	—
Baker-Raulang Co.	—	Cullen-Friedstedt Co.	—
Baldwin-Duckworth Division of Chain Bell Co.	—	Cunningham, M. E., Co.	—
Baldwin Southwark Division of The Baldwin Locomotive Works	—	Curtis Pneumatic Machinery Co.	—
Bantam Bearings Corp.	18	Cutler-Hammer, Inc.	—
Barber-Colman Co.	—	Cyclone Fence Co.	—
Barnes, Wallace, Co., The, Division of Associated Spring Corporation	—	<b>D</b>	
Barnes, W. F. and John, Co.	—	Damascus Steel Casting Co.	—
Basic Dolomite, Inc.	—	Darwin & Milner, Inc.	101
Bay City Forge Co.	—	Davis Brake Beam Co.	—
Beatty Machine & Mfg. Co.	—	Dearborn Gage Co.	—
Bellevue-Stratford Hotel	—	Detroit Leland Hotel	—
Belmont Iron Works	101	Diamond Expansion Bolt Co., Inc.	—
Berger Manufacturing Div., Republic Steel Corp.	13	Dietzel Lead Burning Co.	—
Bethlehem Steel Co.	1	Dravo Corp., Engineering Works Div.	—
Birdsboro Steel Foundry & Machine Co.	—	Dravo Corp., Machinery Division	—
Blissett Steel Co., The	—	Duer Spring & Mfg. Co.	—
Blanchard Machine Co.	—	<b>E</b>	
Blaw-Knox Co.	—	Elastic Stop Nut Corp.	—
Blaw-Knox Division, Blaw-Knox Co.	—	Electric Controller & Mfg. Co.	—
Blaw-Knox Sprinkler Div., Blaw-Knox Co.	—	Electric Furnace Co., The	—
Bliss & Laughlin, Inc.	—	Electric Storage Battery Co.	59
Bliss, E. W., Co.	—	Electro Alloys Corp., The	—
Brasseri, H. A., & Co.	102	Electro Metallurgical Co.	—
Bridgeport Brass Co.	—	Elmes, Charles F., Engineering Works	—
Brooke, E. & G., Iron Co.	102	Engineering and Construction Division	—
<b>F</b>			
Fairbanks, Morse & Co.	—	Koppers Co.	—
Fanner Mfg. Co.	—	Enterprise Galvanizing Co.	102
<b>G</b>			
Farquhar, A. B., Co., Limited	—	Erdle Perforating Co., The	—
Farrel-Birmingham Co., Inc.	—	Erie Foundry Co.	—
Farval Corp., The	—	Elna Machine Co., The	—
Federal Machine & Welder Co.	—	Eureka Fire Brick Works	—
Finn, John, Metal Works	—	Ex-Cell-O Corp.	7
Firth-Sterling Steel Co.	—	<b>F</b>	
Flinn & Drefflein Co.	—	Fafnir Bearing Co., The	—
Flood Co., The	—	Fairbanks, Morse & Co.	—
Ford Chain Block Division of American Chain & Cable Co., Inc.	99	Fanner Mfg. Co.	—
Fort Pitt Spring Co.	—	<b>G</b>	
Foster, L. B., Inc.	103	Garden City Fan Co.	—
Foxboro Co., The	—	Gardner Displays	—
<b>H</b>			
Gardner Displays	—	Garlock Packing Co., The	—
Garlock Packing Co., The	—	General Blower Co.	103
General Blower Co.	103	General Electric Co.	12
General Electric Co.	12	General Electric Co., Lamp Dept.	9
General Electric Co., Lamp Dept.	9	Gordon Lubricator Division, Blaw-Knox Co.	—
Gordon Lubricator Division, Blaw-Knox Co.	—	Granite City Steel Co.	—
Grant Gear Works	—	Grant Gear Works	—
Graybar Electric Co.	—	Graybar Electric Co.	—
Great Lakes Steel Corp.	—	Greenfield Tap & Die Corp.	—
Greenfield Tap & Die Corp.	—	Gregory, Thomas, Galvanizing Works	—
Gregory, Thomas, Galvanizing Works	—	Grinnell Co., Inc.	—
Grinnell Co., Inc.	—	Gulf Oil Corporation	—
Gulf Oil Corporation	—	Gulf Refining Co.	—
Gulf Refining Co.	—	<b>H</b>	
<b>I</b>			
Hagan, George J., Co.	—	Halden Machine Co.	—
Halden Machine Co.	—	Hanlon-Gregory Galvanizing Co.	—
Hanlon-Gregory Galvanizing Co.	—	Hanna Furnace Corp.	—
Hanna Furnace Corp.	—	Hannifin Mfg. Co.	—
Hannifin Mfg. Co.	—	Harnischfeger Corp.	90
Harnischfeger Corp.	90	Harrington & King Perforating Co.	99
Harrington & King Perforating Co.	99	Harter Corp., The	—
Harter Corp., The	—	Haynes Stellite Co.	—
Haynes Stellite Co.	—	Hays Corp., The	—
Hays Corp., The	—	Heald Machine Co., The	—
Heald Machine Co., The	—	Helmer-Staley, Inc.	—
Helmer-Staley, Inc.	—	Heppenstall Co.	—
Heppenstall Co.	—	Hevi Duty Electric Co.	—
Hevi Duty Electric Co.	—	Hillside Fluor Spar Mines	—
Hillside Fluor Spar Mines	—	Hindley Mfg. Co.	—
Hindley Mfg. Co.	—	Hobart Bros.	101
Hobart Bros.	101	Hodell Chain Co., The	—
Hodell Chain Co., The	—	Hollands Mfg. Co.	—
Hollands Mfg. Co.	—	Horsburgh & Scott Co.	—
Horsburgh & Scott Co.	—	Hubbard & Co.	—
Hubbard & Co.	—	Hubbard, M. D., Spring Co.	—
Hubbard, M. D., Spring Co.	—	Huther Bros. Saw Mfg. Co.	—
Huther Bros. Saw Mfg. Co.	—	Hyatt Bearings Division, General Motors Sales Corporation	—
Hyatt Bearings Division, General Motors Sales Corporation	—	Hyde Park Foundry & Machine Co.	—
Hyde Park Foundry & Machine Co.	—	Hygrade Sylvania Corp.	—
Hygrade Sylvania Corp.	—	<b>I</b>	
<b>J</b>			
Illinois Clay Products Co.	—	Jackson Iron & Steel Co., The	—
Independent Galvanizing Co.	—	James, D. O., Mfg. Co.	—
Industrial Brownhoist Corp.	—	J-B Engineering Sales Co.	—
Ingersoll-Rand Co.	—	Jeffrey Manufacturing Co.	—
Inland Steel Co.	20	Jessop Steel Co.	—
Inland Steel Co.	20	Jessop, Wm., & Sons, Inc.	—
International Acetylene Association	—	Johns-Manville Corp.	—
International Correspondence Schools	—	Johnson Bronze Co.	—
International Derrick & Equipment Co.	—	Jones & Lamson Machine Co.	—
International Nickel Co., Inc.	—	Jones & Laughlin Steel Corp.	65
<b>J</b>			
Jackson Iron & Steel Co., The	—	Jones, W. A., Foundry & Machine Co.	—
James, D. O., Mfg. Co.	—	Joslyn Co. of California	—
J-B Engineering Sales Co.	—	Joslyn Mfg. & Supply Co.	—
Jeffrey Manufacturing Co.	—	<b>K</b>	
Jessop Steel Co.	—	Kardong Brothers, Inc.	—
Jessop, Wm., & Sons, Inc.	—	Keagler Brick Co., The	—
Johns-Manville Corp.	—	Kemp, C. M., Mfg. Co.	—
Johnson Bronze Co.	—	Kimball Safety Products Co.	—
Jones & Lamson Machine Co.	—	<b>K</b>	
Jones & Laughlin Steel Corp.	65	<b>L</b>	
Jones, W. A., Foundry & Machine Co.	—	<b>L</b>	
Joslyn Co. of California	—	<b>L</b>	
Joslyn Mfg. & Supply Co.	—	<b>L</b>	

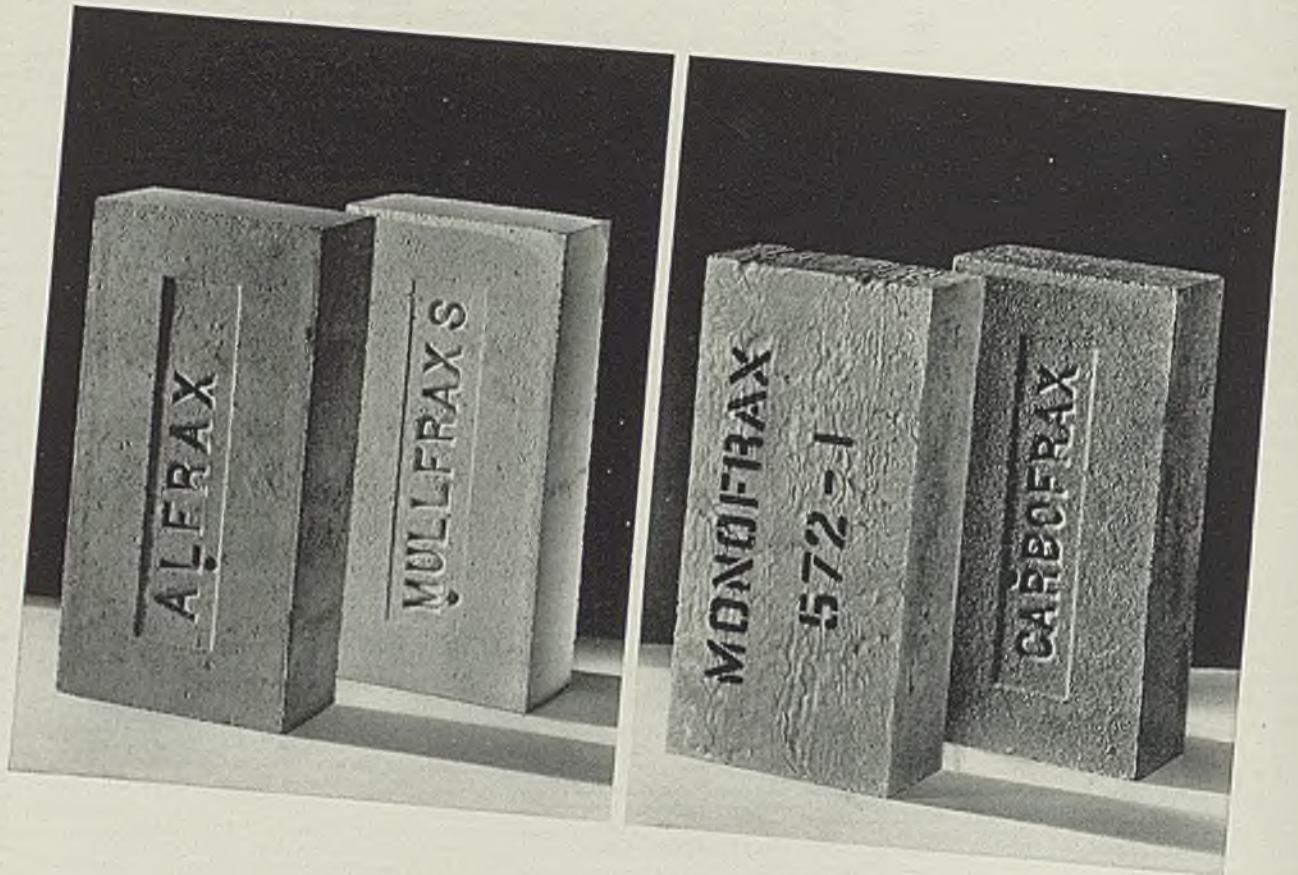


# ◆ ◆ ADVERTISING INDEX ◆ ◆

Where-to-Buy Products Index carried in first issue of month.

	Page		Page		Page
King Fifth Wheel Co. ....	—	Otis Steel Co., The .....	—	Sturtevant, B. F., Co. ....	—
Kinnear Mfg. Co. ....	—	Oxweld Acetylene Co. ....	14	Sun Oil Co. ....	—
Koppers Co. ....	—	<b>P</b>			
Koven, L. O., & Brother, Inc. ....	—	Page Steel & Wire Division of American Chain & Cable Co., Inc. ....	—	Superior Steel Corp. ....	—
Kron Co., The .....	—	Pangborn Corp. ....	—	Surface Combustion Corp. ....	—
<b>L</b>					
Laclede Steel Co. ....	—	Parker-Kalon Corp. ....	11	Sutton Engineering Co. ....	—
Lake City Malleable Co. ....	—	Parkin, Wm. M., Co. ....	—	Swindell-Dressler Corp. ....	—
Lamson & Sessions Co., The .....	11	Peabody Engineering Corp. ....	—	<b>T</b>	
Landis Machine Co., Inc. ....	—	Pease, C. F., Co., The .....	—	Tennessee Coal, Iron & Railroad Co. ....	—
Landis Tool Co. ....	—	Pennsylvania Industrial Engineers .....	99	Thomas Steel Co., The .....	88
Lang Machinery Co. ....	103	Pennsylvania Salt Mfg. Co. ....	53	Thompson-Bremer & Co. ....	—
Lansing Stamping Co. ....	—	Penola, Inc. ....	—	Tide Water Associated Oil Co. ....	—
La Salle Steel Co. ....	67	Perkins, B. F., & Son, Inc. ....	78	Timken Roller Bearing Co. ....	—
LeBlond, R. K., Machine Tool Co., The .....	—	Petroleum Iron Works Co., The .....	—	Timken Steel & Tube Division, The .....	—
Leeds & Northrup Co. ....	—	Pheoll Mfg. Co. ....	11	Timken Roller Bearing Co. .. Back Cover	—
Lee Spring Co., Inc. ....	—	Pittsburgh Crushed Steel Co. ....	—	Tinnerman Products, Inc. ....	—
Lehigh Structural Steel* Co. ....	—	Pittsburgh Gear & Machine Co. ....	—	Toledo Scale Co. ....	—
Lenco Laboratories .....	—	Pittsburgh Lectromelt Furnace Co. ....	—	Toledo Stamping & Mfg. Co. ....	—
Leschen, A., & Sons Rope Co. ....	—	Pittsburgh Rolls Division of Blaw-Knox Co. ....	—	Tomkins-Johnson Co. ....	—
Lewis Bolt & Nut Co. ....	—	Pittsburgh Steel Co. ....	—	Torrington Co., The .....	—
Lewis Foundry & Machine Division of Blaw-Knox Co. ....	—	Plymouth Locomotive Works, Div. The Fate-Root-Heath Co. ....	—	Towmotor Co. ....	—
Lewis Machine Co., The .....	—	Poole Foundry & Machine Co. ....	—	Townsend Co. ....	—
Lincoln Electric Co., The .....	—	Power Piping Division of Blaw-Knox Co. ....	—	Treadwell Construction Co. ....	—
Lincoln Hotel .....	—	Pressed Steel Car Co., Inc. ....	92	Tri-Lok Co., The .....	—
Linde Air Products Co., The .....	14	Pressed Steel Tank Co. ....	—	Trufla Fan Co. ....	—
Lindemuth, Lewis B. ....	—	Prest-O-Lite Co., Inc., The .....	14	Truscon Steel Co. ....	13
Link-Belt Co. ....	—	Production & Machine Tool Show .....	8	Tube Reducing Corp. ....	—
Loftus Engineering Corp. ....	—	Progressive Mfg. Co. ....	—	Twin Disc Clutch Co. ....	—
Logemann Bros. Co. ....	—	Pure Oil Co., The .....	101	<b>U</b>	
Lovejoy Flexible Coupling Co. ....	—	<b>R</b>			
Lowman-Shields Rubber Co. ....	—	Raymond Mfg. Co., Division of Associated Spring Corp. ....	—	Union Carbide & Carbon Corp. ....	14
Ludlow-Saylor Wire Co., The .....	—	Relliance Electric & Engineering Co. ....	—	Union Drawn Steel Div., Republic Steel Corp. ....	13
<b>Mc</b>					
McKay Machine Co. ....	—	Republic Steel Corp. ....	13	Union Steel Castings Co. ....	—
McKenna Metals Co. ....	—	Revere Copper and Brass, Inc. ....	51	United Engineering & Foundry Co. ....	—
<b>M</b>					
MackIntosh-Hemphill Co. ....	—	Rhoades, R. W., Metaline Co., Inc. ....	—	United States Rubber Co. ....	—
Macwhyle Co. ....	—	Riverside Foundry & Galvanizing Co. ....	—	United States Steel Corp., Subsidiaries .....	61
Maehler, Paul, Co., The .....	—	Roebbling's, John A., Sons Co. ....	—	American Bridge Co. ....	—
Marr-Galbreath Machinery Co. ....	103	Ross Operating Valve Co. ....	—	American Steel & Wire Co. ....	—
Mathews Conveyor Co. ....	—	Russell, Burdsall & Ward Bolt & Nut Co. ....	11	Atlas Lumnite Cement Co. ....	—
Maurath, Inc. ....	—	Ryerson, Joseph T., & Son, Inc. ....	101	Carnegie-Illinois Steel Corp. ....	—
Medart Co., The .....	—	<b>S</b>			
Mesta Machine Co. ....	—	St. Joseph Lead Co. ....	91	Columbia Steel Co. ....	—
Metal & Thermit Corp. ....	—	Salem Engineering Co. ....	—	Cyclone Fence Co. ....	—
Midvale Co., The .....	—	Samuel, Frank, & Co., Inc. ....	—	Federal Shipbuilding & Dry Dock Co. ....	—
Missouri Rolling Mill Corp. ....	—	San Francisco Galvanizing Works. ....	—	National Tube Co. ....	—
Moltrup Steel Products Co. ....	15	Sanitary Tinning Co., The .....	—	Oil Well Supply Co. ....	—
Monarch Machine Tool Co., The .....	—	Sawyer Electrical Mfg. Co. ....	—	Scully Steel Products Co. ....	—
Morgan Construction Co. ....	—	Scovill Mfg. Co. ....	11	Tennessee Coal, Iron & Railroad Co. ....	—
Morgan Engineering Co. ....	—	Scully Steel Products Co. ....	—	United States Steel Export Co. ....	—
Morrison Metalweld Process, Inc. ....	—	Semet-Solvay Engineering Corp. ....	—	Universal Atlas Cement Co. ....	—
Morton Salt Co. ....	—	Seneca Wire & Mfg. Co., The .....	101	Virginia Bridge Co. ....	—
<b>N</b>					
National Acme Co., The .....	—	Shafer Bearing Corporation .....	—	United States Steel Export Co. ....	—
National Alloy Steel Co. ....	—	Shakeproof Lock Washer Co. ....	11	<b>V</b>	
National Bearing Metals Corp. ....	—	Shaw-Box Crane & Hoist Division, Manning, Maxwell & Moore, Inc. ....	—	Valley Mould & Iron Corp. ....	—
National Broach & Machine Co. ....	—	Shawinigan Products Corp. ....	—	Vanadium-Alloy Steel Co. ....	—
National Carbide Corp. ....	—	Shell Oil Co., Inc. ....	—	Vanadium Corporation of America .....	—
National Carbon Co., Inc. ....	—	Shenango Furnace Co., The .....	—	Voss, Edward W. ....	—
National Cylinder Gas Co. ....	—	Shenango-Penn Mold Co. ....	—	<b>W</b>	
National-Erie Corp. ....	89	Shepard Niles Crane & Hoist Corp. ....	—	Waldron, John, Corp. ....	—
National Forge & Ordnance Co. ....	—	Shoop Bronze Co., The .....	—	Warner & Swasey Co. ....	—
National Lead Co. ....	—	Shuster, F. B., Co., The .....	—	Washburn Wire Co. ....	—
National Roll & Foundry Co. ....	—	Simonds Gear & Mfg. Co. ....	99	Wean Engineering Co., Inc. ....	—
National Screw & Mfg. Co. ....	11	Simonds Saw & Steel Co. ....	—	Weinman Pump & Supply Co., The .....	—
National Steel Corp. ....	6	Sinton Hotel .....	—	Welrton Steel Co. ....	6
National Telephone Supply Co., Inc. ....	—	SKF Industries, Inc. ....	—	Welding Equipment & Supply Co. ....	—
National Tube Co. ....	—	Snyder, W. P., & Co. ....	—	Wellman-Smith-Owens Eng. Corp. Ltd. ....	—
New Departure, Division General Motors Sales Corp. ....	—	Socony-Vacuum Oil Co., Inc. ....	—	Westinghouse Electric & Mfg. Co. ....	—
New Jersey Zinc Co. ....	37	Sorbo-Mat Process Engineers .....	—	West Penn Machinery Co. ....	103
New York & New Jersey Lubricant Co. ....	—	South Bend Lathe Works .....	—	West Steel Casting Co. ....	102
Niagara Machine & Tool Works. ....	—	Spring Washer Industry .....	—	Wheeling Steel Corporation .....	101
Niles Steel Products Div., Republic Steel Corp. ....	13	Sta-Brite Mfg. Co. ....	—	Whitcomb Locomotive Co., The, Div., The Baldwin Locomotive Works. ....	—
Nilson, A. H., Machine Co., The .....	—	Standard Arch Co. ....	—	Whitehead Stamping Co. ....	102
Nitralloy Corp., The .....	—	Standard Galvanizing Co. ....	—	Wickwire Brothers .....	—
Norma-Hoffmann Bearings Corp. ....	—	Standard Steel Works Co. ....	85	Wickwire Spencer Steel Co. ....	—
Northern Engineering Works .....	—	Stanley Works, The .....	—	Wilcox, Crittenden & Co., Inc. ....	—
Northwestern Steel & Wire Co. ....	—	Steel & Tubes Division, Republic Steel Corp. ....	13	Williams, J. H., & Co. ....	—
Norton Co., The .....	73, 74	Steel Founders' Society of America .....	—	Wilson, Lee, Engineering Co. ....	—
<b>O</b>					
Ohio Electric Mfg. Co. ....	102	Stewart Furnace Division, Chicago Flexible Shaft Co. ....	99	Wilson Welder & Metals Co., Inc. ....	—
Ohio Ferro-Alloys Corp. ....	—	Streine Tool & Mfg. Co. .... Front Cover	—	Wisconsin Steel Co. ....	—
Ohio Locomotive Crane Co., The .....	101	Strom Steel Ball Co. ....	—	Witt Cornice Co., The .....	—
Ohio Malleable Iron Co., The .....	—	Strong Steel Foundry Co. ....	—	Worthington Pump & Machinery Corp. ....	—
Ohio Steel Foundry Co., The .....	—	<b>Z</b>			
<b>P</b>					
<b>Q</b>					
<b>R</b>					
<b>S</b>					
<b>T</b>					
<b>U</b>					
<b>V</b>					
<b>W</b>					
<b>X</b>					
<b>Y</b>					
<b>Z</b>					

# What do you mean "LUXURIES"?



● A prospective customer recently wrote us asking for information on our super refractories which, he understood, were regarded as "luxury" products. We began to wonder just how many people still regarded super refractories made from electric furnace products as "luxuries".

Certainly not the zinc industry which makes wide use of the outstanding properties of these products.

Certainly not the ceramic industry which uses large quantities of super refractories each year.

Certainly not the steel and metal working industries which use electric furnace super refractories in practically every operation from the blast furnace to the

heat treating furnace for the finished product.

And as we went through the list of various industries using heat in their processes we found example after example of how many different super refractories produced by Carborundum had cut costs, speeded production and eliminated annoying, expensive shut-downs. Perhaps you may think of super refractories as "luxuries"—too expensive for your operation. Not necessarily so! Depending, of course, on the type of installation, they definitely belong in the "necessities" class. May we discuss it with you?



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