STEEL

ESTABLISHED 1882

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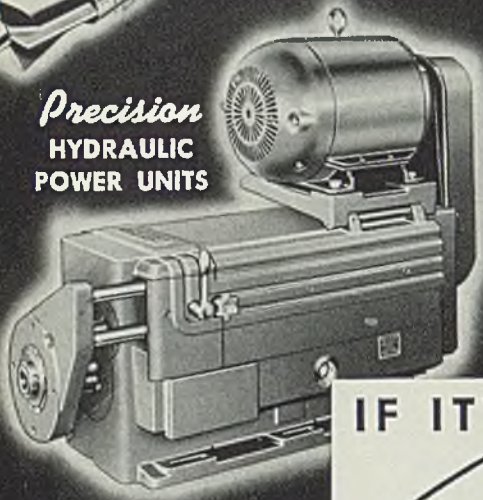

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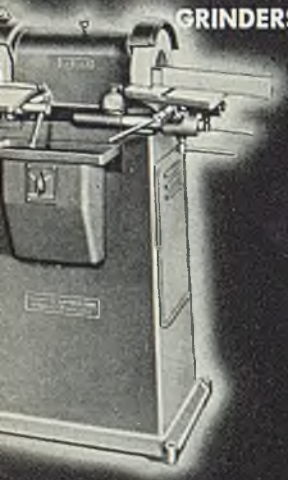

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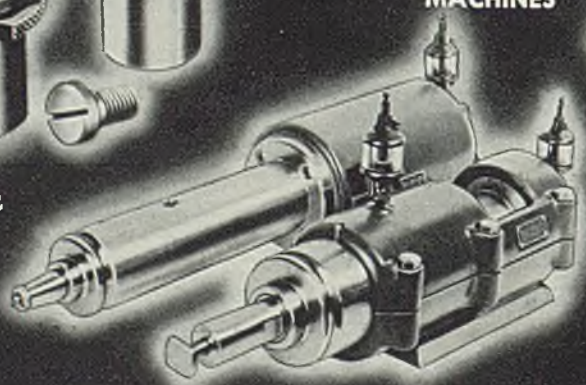

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HIGHLIGHTING THIS ISSUE OF STEEL

■ USE of substitute materials as a result of certain shortages **(pp. 21 and 95)** is beginning to be pushed. Steel companies are urging customers to specify substitutes for nickel steels. This move results from the fact that supplies of nickel at most steel plants are equivalent to 2 to 14 days' requirements, with shipments considerably below the level necessary to maintain inventories. Tight zinc supply has led certain producers to reduce output of galvanized sheets and they are prepared to take similar action with respect to galvanized wire. Although the situation in aluminum is not acute steelmakers are ready to substitute open for killed steel on a large scale if it becomes necessary.

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ARMCO to Build 1000-Ton Stack

Following its announcement of a new steel plant to be built in the South, American Rolling Mill Co. **(p. 49)** is preparing to build a new blast furnace with 1000 tons daily capacity. . . . Two new coke oven batteries **(p. 49)** will aggregate 1199 units. . . . Interesting sidelight on the recently published TNEC monograph entitled "Price Discrimination in Steel". It was written by co-authors one of whom is a 25-year old economist while the other has done statistical work for brokerages and a newspaper but **(p. 23)** has had no experience in the steel industry. . . . Leon Henderson last week **(p. 32)** issued the first of a series of maximum price schedules on second-hand machine tools.

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Industrialists At Washington

It is increasingly manifest that the armament program has been entrusted to industrial leaders; more of them **(p. 23)** were called to Washington last week. . . . The Defense Manufacturers Association **(p. 27)** has been organized to facilitate defense contract bidding by small manufacturers. . . . With the consent of the CIO regional director, Vanadium Corp. of America **(p. 27)** has dismissed 400 striking employes. . . . The steel industry will be represented **(p. 23)** in an "industrial exploration" tour of South America. . . . It finally has been settled **(p. 22)** that a tin smelter will be erected in this country. It will be owned by Reconstruction Finance Corp. and operated for its account.

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Arc Welding in Sheet Metal

In this week's installment in STEEL'S series of articles on the production of high-explosive shells, Prof. Arthur F. Macconochie **(p. 58)** explains how the flow of metal is controlled in the forging operation. . . . An unusual lathe has been designed **(p. 57)** for finishing the perfectly balanced wheels which are required for the modern, lightweight, streamlined, high-speed railroad trains. . . . An Eastern manufacturer of sheet metal specialties **(p. 68)** has developed a highly successful fabricating procedure involving the use of arc welding. . . . C. A. Richardson **(p. 70)** describes a number of new features that have been incorporated in the new cold strip mill of Acme Steel Co.

• • •

Cement Plastic To Coat Metals

How grain size affects creep strength **(p. 80)** is the subject of an article by S. H. Weaver. . . . A new pump for handling dilute acids **(p. 86)** is made of transparent plastic; flow of the liquid and motion of moving parts can be observed at all times. . . . Fred B. Jacobs tells **(p. 74)** how production was expedited by several hundred per cent at a small fabricating plant by installing equipment which reduced the finish baking time from hours to minutes. . . . A new cement plastic is recommended **(p. 72)** as a protective and decorative coating for metals. . . . A new paint is available **(p. 69)** for use under extremely corrosive conditions. . . . Adequate materials handling around punch presses **(p. 64)** pays dividends.

How to get Steel *More Quickly*

A practical suggestion that may help you

SPEED your steel by sending open orders (not inquiries) to a dependable source of supply. We are glad to receive all inquiries and give them prompt personal attention but with today's emergency demands there is a chance that certain stocks may become depleted while the request for quotation is being handled.

Here at Ryerson, stocks are remarkably complete, deliveries are prompt. Out-of-the-ordinary demands may, however, temporarily deplete our stock of a particular size. Because of recent experiences our advice is this: If you need steel, order it! Don't wait for quotations. An open order to Ryerson will get you the same price, and, will be shipped at once.

Have no hesitancy in placing an open order, for Ryerson stands on its 99 year reputation as a reliable, one-price house. You will save valuable time, and more important, you will have the steel you need when you need it. Joseph T. Ryerson & Son, Inc. Steel-Service Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

Defense Officials Act Early To Assure Adequate Supply of Critical Metals

✦

Priorities based on voluntary co-operation to continue to be policy . . . Producers agree to give first call to defense industries . . . Substitutes sought in both armament and peacetime products . . . Maintenance of price stability asked on tin . . . Aluminum home utensil manufacturers may be first to feel demand for "Guns Before Butter"

✦

■ PROGRAMS designed to alleviate "tight" situations in several nonferrous metals have been instituted by national defense officials in co-operation with industry representatives. These actions were largely of a precautionary nature as the situations are not yet critical.

William S. Knudsen, director general, Office of Production Management, last week described steel and copper supplies as adequate, said zinc and nickel "need watching," while aluminum situation "is tight."

At a meeting in New York, leading steel producers and Dr. S. S. Stratton, of OPM's minerals and metals priorities section, discussed the shortage in nickel supply and the producers agreed to two steps:

1.—To give first call on stainless steel and other nickel steels to defense industries.

2.—To consult with and give technical advice to their customers, in both defense and nondefense spheres, in an effort to help them conserve the use of nickel steels wherever possible.

Representatives of the producers said they believed the shortage of nickel might be relieved in a number of cases through changes in order specifications. There are cases, for example, in which high-nickel steels now being specified could be supplanted by steel alloys containing a lesser amount of nickel.

It was agreed the shortage in the supply of nickel, which comes almost wholly from Canada, was largely responsible for the tight situation in the supply of stainless steel and allied products. In connection with this, it was pointed out that the necessity for acquiring working stocks of nickel also figured in the situation.

The program designed to ease the nickel situation is subject to further review and in this connection the producers are being asked to furnish the priorities division with specific information as to their present stocks of nickel, their anticipated requirements, their rates of consumption, and their delivery schedules.

May Be Less for Civilian Use

Effect of the program is to apply the priority principle to nickel steel production in an informal way and on the basis of voluntary co-operation. It is expected that this may mean some diminution in the supply of these products for ordinary civilian channels. If these steps are successful, the imposition of formal priorities may be avoided.

Steel producers also attended an organization meeting of a steel priorities advisory committee, in New York last week.

That manufacturers of aluminum home utensils will be the first to be affected when "butter gives way to guns" was predicted in national defense circles in Washington last week. Production, priorities and purchasing divisions of the OPM were reported to be working on a utensil curtailment program which is expected to be placed in operation within a few days.

Long-term capacity and requirements of aluminum foundries were being explored in Washington last Friday by OPM aluminum consultants and some 25 members of the industry at a meeting described as being an attempt to bring up to date aluminum production expectancy and its probable effect of the aluminum scrap price problem, now being studied.

Meanwhile the aluminum scrap price and supply situation continued to receive the attention of defense officials. Appointment of a committee of ten representatives of all groups of the aluminum industry to work with the price stabilization division on the problems of prices and supplies was voted last week by a meeting of some 60 leaders in the various divisions of the industry. The meeting was held in Washington, with C. A. Bishop, acting director of the price section.

The committee will contain two representatives from each of the five groups represented in the conference: Primary producers, secondary smelters, foundries, dealers, and fabricators.

It was generally agreed that many

fabricators of aluminum products are withholding scrap from the market, thus increasing the present unbalanced situation. It was also evident that some fabricators are building up inventories and buying aluminum for future requirements.

It was also found that a few scattered small dealers are withholding aluminum scrap from the market, although that was not deemed a significant factor in the present situation.

Government's determination to reduce scrap aluminum prices was emphasized at the meeting. Officials doubted the outcome of the meeting would be the establishment of a price schedule for scrap similar to that issued for second-hand machine tools.

Fewer Galvanized Sheets

Steel producers last week reduced production of galvanized sheets and were considering a similar reduction in output of galvanized wire to conserve zinc supplies.

A statement by OPM authorities last week indicated formal priorities on zinc may not be necessary. Zinc producers meeting with OPM officials in New York reportedly agreed to sidetrack nonessential orders until smelting capacity is expanded later this year.

Tin prices which advanced as result of disturbances in the Far East also came under defense officials' scrutiny last week. W. A. Harriman, chief of the materials branch of OPM production division warned against the bidding up of tin prices.

Mr. Harriman pointed out that tin prices had advanced 4 cents a pound as a result of the Far Eastern situation and pointed out that actual supplies in this country or afloat beyond any danger zone are sufficient to meet requirements at the present rate of consumption for at least 15 months.

"Under these circumstances, buying practices which increase the price of tin are not only prejudicial to the interest of the general price stability but are extremely short-sighted. Everyone should realize that in event our supplies from the Far East should be interrupted, immediate steps would be taken to conserve our supplies, and all stocks, whether in government or private hands, would become subject to allocation on basis of requirements of national defense. It therefore should be apparent that bidding up of prices will neither increase the total supply of tin in the country nor the amount available to any particular consumer, no matter what he paid for it."

Steps to increase our tin output also were taken as Jesse Jones, federal loan administrator, announced a tentative agreement had been reached with a Dutch firm, M. V. Billiton Maatschapij, to build a tin smelter "somewhere in the South" to cost between $2,500,000 and $4,000,000.

It will be owned by Reconstruction Finance Corp. and operated for its account. Annual capacity will be 18,000 tons.

Mr. Jones also announced a loan of $9,250,000 had been made to Henry Kaiser Co. to build a new magnesium plant at Palo Alto, Calif., or San Francisco. It will have a capacity of from 12,000 to 15,000 tons annually. Ore will come from Nevada.

Tool Steel, Platemakers To Meet with Priorities Officer

WASHINGTON

Steel plate and high-speed tool steel manufacturers will meet with Dr. S. S. Stratton, assistant mineral and metals priorities executive, Feb. 24 in New York, it was announced last Friday. Purpose of the meeting will be to explore the facts concerning these commodities. No special difficulties exist at present, it was said.

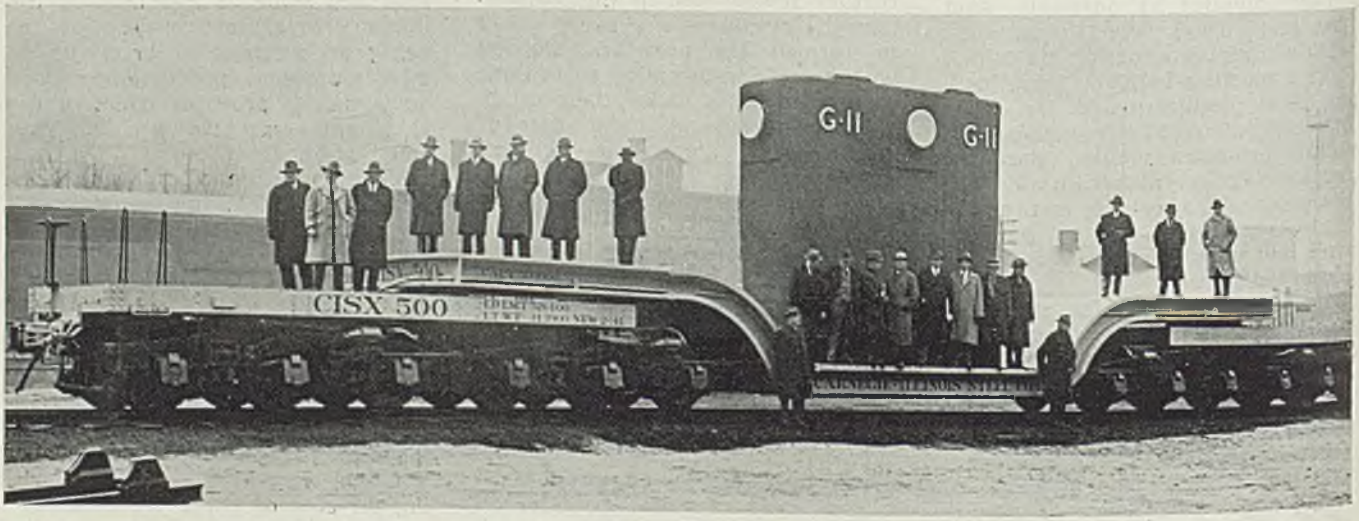
Acquisition of Tin, Rubber From British Proposed

Representative Weiss, Pennsylvania, has introduced a bill authorizing the President to acquire tin and other raw materials from any possession of the British government.

The bill, which has been referred to the house committee on foreign affairs, provides:

"That the President is authorized to acquire, on behalf of the United States, by lease, purchase, gift, in satisfaction of any debt, or in exchange for any defense articles heretofore or hereinafter made under any existing law or laws, or otherwise, on such terms as he shall deem most beneficial to the United States, any raw materials, such as rubber, tin, or any other raw materials required by the United States

Twenty-Four Wheel Car To Haul Massive Ingot Mold



■ Believed to be one of the largest railroad cars ever built, this unit was constructed for the Carnegie-Illinois Steel Corp. by Greenville Steel Car Co., Greenville, Pa. Principally of welded construction, the car was built from heavy plate and wide flange beams. Its 24 wheels are 36 inches in diameter. The large number of wheels is necessary to distribute the weight of the car and its 500,000-pound load—a giant ingot mold. The mold, one of several being cast at the Clairton works of Carnegie-Illinois, will be carried on this car to Homestead works where ingots weighing upwards of 500,000 pounds will be cast. These ingots will be forged into armor plate for battleship decks

■ PICTURE OF THE WEEK: Benjamin F. Fairless, president, United States Steel Corp., and Irving S. Olds, chairman (right), leaving the White House last week after discussing the steel situation with President Roosevelt. NEA photo

government, from any possession of the British government."

Defense Supplies Corp. To Buy Diamond Dies from Britain

Jesse Jones, Federal Loan Administrator, announced that Defense Supplies Corp., upon recommendation of Office of Production Management, had authorized the purchase of not to exceed 6000 small unset diamond dies from the British Purchasing Commission, New York.

The dies are made available through the co-operation of the British government to meet a shortage in the wire-drawing industry which has resulted from the discontinuance of imports from France and Holland.

Distribution of the dies to the industry will be made by the Defense Supplies Corp. with the assistance of the OPM's Priorities Division.

U. S. Steel Officials Talk With President Roosevelt

Benjamin F. Fairless, president, and Irving S. Olds, chairman of the board, United States Steel Corp., had a half hour's conference with President Roosevelt at the White House last week.

Following the conference Mr. Olds told newsmen that the President had been told that the steel industry feels that it should go along with the defense program and furnish whatever steel is needed.

"We talked production in a general way," Mr. Olds said. "Like the rest of the industry, our company feels it has a duty to go along and provide whatever is needed."

Mr. Olds said there was no particular discussion of industry expansion or priorities. His own company, he said, is carrying out several expansion projects. He said the President was informed what the corporation is doing and was assured that its co-operation would be continued.

TNEC Releases Monograph on "Steel Price Discrimination"

Monograph on "Price Discrimination in Steel," a study made for the Temporary National Economic Committee, was released last week. Study constitutes an investigation of the extent to which prices vary by size of buyer and is based on data received from producers in reply to the committee's questionnaires covering business for the month of February, 1939.

Monograph was written by John Blair, aged 25, a graduate student in American university, Washington, and an economist for the Department of Labor. Arthur Reeside, who has done statistical work for brokerage offices and a newspaper, but who has had no experience with the steel industry, was co-author.

The study concludes that in normal times in the steel industry the larger buyer receives lower prices than small buyers. In cases of those steel products consumed in considerable part by a small number of large buyers (cold-rolled strip), the price concessions to big purchasers may account for as much as 50 per cent, the authors stated. However, in those products sold mainly to many relatively small buyers, the price variation is much less.

"Effect of these concessions to large purchasers is that small purchasers are placed at a competitive disadvantage," the authors conclude. The existence of these concessions is significant not only to small businesses, but also to the government, they continue. The government, large though its orders may be, "receives none of these price concessions."

New Jersey Welding Society Plans Exhibit

■ A manufacturers' exhibit of welding equipment will be held March 21 and 22 in the Mosque theater building, Newark, N. J., sponsored by the northern New Jersey section of the American Welding Society.

The purpose is to bring together manufacturers of welding equipment, welded products and industrial manufacturers in the district in one showroom. The show is limited to two days at the end of the week, to interfere as little as possible with company sales activities.

Metallurgical Engineers Discuss Wartime Economy at Convention

Procuring sufficient supplies of certain essential materials considered leading problem . . . New ore fields in this country and greater use of those in Canada promise to improve outlook

NEW YORK

■ A FAIRLY reassuring picture with respect to strategic minerals was presented by government mining experts at the one hundred fifty-fourth meeting of the American Institute of Mining and Metallurgical Engineers here, Feb. 17-20.

The country was described as reasonably self-sufficient in mercury, tungsten and antimony—three of the seven strategic minerals considered the most important by the Army and Navy—and as being in position eventually to develop sufficient supplies of chrome and manganese to meet, with stocks already on hand, the likely requirements of the present emergency, although at prices probably well above normal.

Tin and nickel, rounding out the list of seven, are not produced in this country in important quantities. However, the immediate problem as to tin was not regarded as too pressing for more than a year's supply is now on hand. As for nickel, there is every reason to believe that all necessary needs will be supplied through Canada, which is said to be producing 95 per cent of the world's output, and still increasing her production.

However, it was indicated there will be increasingly rigid priority control, with greater conservation by the substitution of other materials where possible for non-military requirements, and other measures.

While, it was said, there is no possibility of self-sufficiency in manganese over a long period of time, current stocks on hand represent well more than a year's requirements even at present capacity operations in the steel industry. With development work under way here and in certain countries abroad, the prospects for obtaining sufficient supplies to see the country through the present emergency appear promising, particularly in the light of the technological advancement that is constantly being made.

Emergency requirements of these seven minerals per year in this country were estimated as follows: Chrome ore, 600,000 tons; manganese, 1,250,000 tons; mercury, 35,000 to 40,000 flasks (76 pounds per flask); pure nickel, approximately 50,000 tons; tin, 80,000 tons; and tungsten concentrates, 5000 to 6000 tons.

The major problem with respect to most strategic minerals is effective distribution rather than source of supply, it was indicated. Non-military requirements may have to be increasingly curtailed as time goes on, it was said.

Discussing work in the exploration of domestic deposits of strategic minerals, Charles F. Jackson, of the Bureau of Mines, Washington, said that of the 30 projects started by the bureau to date, six are completed, four are recessed for the winter and 20 are still active. The bureau is confining itself almost entirely to work on specific deposits, concerning which some favorable information already is available. Of the six completed projects, two appear to warrant some further work, one might warrant additional work in an extreme emergency, one revealed the tonnage to be definitely limited to a small amount, and two were definitely unsuccessful from the standpoint of adding to strategic reserves.

One project, still active, has revealed tonnages of low grade antimony ore, large enough in spite of the grade to furnish a very substantial tonnage at a price above

John Robert Suman
Elected president, of Institute of Mining and Metallurgical Engineers

C. H. Herty Jr.
Elected chairman, Iron and Steel Division

Donald K. Crampton
Elected chairman, Institute of Metals Division

Carl F. Hoffman
Received J. E. Johnson Jr. award

Robert C. Stanley
Received Charles F. Rand gold medal

normal. Appreciable tonnages of chromite, off grade on account of the chromium-iron ratio, had been indicated by trenching and drilling in two localities — Stillwater county, Montana, and Grant county, Oregon.

Institute Elects New Officers; John R. Suman Is President

John Robert Suman, vice president, Humble Oil Refining Co., Houston, Texas, was introduced as the new president of the institute at the annual banquet at the Commodore hotel, Feb. 19. He succeeded Herbert G. Moulton, consulting engineer. Paul Dyer Merica, vice president, International Nickel Co. of Canada, Ltd, New York, and LeRoy Salsich, president, Oliver Iron Mining Co., Duluth, Minn., are new vice presidents.

New directors are: J. Terry Duce, vice president, California Arabian Standard Oil Co., San Francisco; Ira B. Joralemon, president, Dessert Silver Inc., San Francisco; J. R. Van Pelt Jr., assistant director, Museum of Science and Industry, Chicago; and Clyde E. Williams, director, Battelle Memorial Institute, Columbus, O. Re-elected to the directorate are H. T. Hamilton, assistant to president, New York Trust Co., and H. Y. Walker, vice president, American Smelting & Refining Co., both of New York.

At the annual banquet various medals and honors were conferred. Robert Crooks Stanley, chairman and president, International Nickel Co. of Canada Ltd., New York, received the first Charles F. Rand medal for "distinguished achievement in the administration of the mining and metallurgical treatment of nickel, and the expansion and diversification of world markets for nickel products." Conrad Schlumberger, posthumously, and Marcel Schlumberger, his brother, geophysicist, were awarded the Anthony F. Lucas medal for "development of the art of electrical coring in oil wells."

The William Lawrence Saunders gold medal was awarded to Herman C. Bellinger, vice president in charge of operations, Chile Exploration Co., New York, for his outstanding work in copper mining, as practiced in the development of the Chuquicamata Copper mine, in Chile.

The Robert Woolston Hunt awards for 1941 went to A. B. Greninger and A. R. Troiano, assistant professors of metallurgy at Harvard and Notre Dame universities, respectively, for their paper on "Crystallography of Austenite Decomposition," and G. E. Steudel, division superintendent of blast furnace operations, South Works, Carnegie-Illinois Steel Corp., Chicago, for his paper on "Effect of the Volume and Properties of Bosh and Hearth Slag on the Quality of Iron."

Carl F. Hoffman, superintendent of blast furnaces, Sparrows Point plant, Bethlehem Steel Co., Bethlehem, Pa., received the J. E. Johnson, Jr., cash prize award for his paper entitled "Manufacture of Low-Silicon Pig Iron Using High Blast Temperatures."

Laurence A. Hawkins, executive engineer, research laboratories, General Electric Co., Schenectady, N. Y., was the principal speaker at the annual banquet of the Institute of Mining division at the Biltmore hotel, his subject being "Research and Progress."

The Institute of Metals award for 1941 was presented at the annual dinner of the division at the Biltmore hotel, Feb. 20, to S. E. Maddigan and Albert I. Blank, research physicist and research assistant, respectively, Chase Brass & Copper Co., Waterbury, Conn., for their paper entitled "Recovery and Recrystallation in Long Time Annealing of 70-30 Brass."

Charles T. Herty, Jr., research metallurgical engineer, Bethelehem Steel Co., Bethlehem, Pa., was introduced as the newly elected chairman of the Iron and Steel division; and Donald K. Crampton, director of research, Chase Brass & Copper Co., Waterbury, Conn., as the new chairman of the Institute of Metals division. Julian Elnathan Toby, manager, Fuel Engineering division, Appalachian Inc., Cincinnati, was introduced as the new chairman of the coal division.

Measures Gun Firing Loads

The eighteenth Howe memorial lecture was delivered by Alfred V. deForest, professor of mechanical engineering, Massachusetts Institute of Technology, who spoke on the subject of "New Methods for the Study of Rapidly Applied Loads." He described new methods of measurement for applied loads such as the loading of walls of gun barrels by the explosion of the charge of powder behind a projectile. The ability to measure expansions and contractions in a gun barrel for definite charges of explosive help to determine the strength of materials necessary for the construction of big guns. Research in this field, the speaker pointed out, is thus closely related to national defense.

The twentieth Institute of Metals lecture by George Saches, assistant professor in the department of metallurgy, Case School of Applied Science, Cleveland, was on "Some Fundamentals of the Flow and Rupture of Metals." The speaker indicated scientific advancement toward finding a solution of the problem of why, when metal is deformed until rupture occurs, a large cross section often appears to break earlier or at lower stresses than a smaller

Prof. A. B. Greninger
Received Robert W. Hunt award jointly with Dr. Troiano

Dr. A. R. Troiano
Received Robert W. Hunt award jointly with Prof. Greninger

George E. Steudel
Received Robert W. Hunt award

Herman C. Bellinger
Saunders medalist, 1941

cross section—contrary to expectation.

S. Harbert Hamilton, mining geologist, Overbrook, Philadelphia, presented a paper showing that there is considerable expectable tonnage of low phosphorus magnetite in the Great Smoky mountains of North Carolina and Tennessee.

More Is Learned of Carbide Precipitation in Stainless

A small electrolytic cell, which it was said, can determine in three minutes the susceptibility of stainless steel to corrosion, was described by Paul V. Miller in a paper written by H. W. Russell, H. Pry and himself, all research metallurgists. Battelle Memorial Institute, Columbus, O., in a paper, "A Simple Method of Detecting Susceptibility of 18-8 Steels for Intergranular Corrosion." Mr. Miller stated that reactions may take place in stainless steel to cause carbides to form around the edges of the grains of the structure. This carbide precipitation leaves the steel subject to intergranular corrosion and subsequent rapid deterioration.

The electrolytic cell is attached to the steel by a rubber gasket, which is held in place by a spring or clamping device. The electrolyte reacts with the surface of the stainless steel when the current is turned on and after three minutes the technician can tell by looking at the spot acted on whether or not the steel will resist corrosion. If the spot is smooth, the steel is all right; if rough and frosty-looking, corrosion is likely to develop.

The test also is applicable to wrought and cast steel materials having various carbon contents. However, it is used most often on stainless steels which are to be welded. One advantage of the device is that it is nondestructive since no sample need be cut from the article tested as in the past.

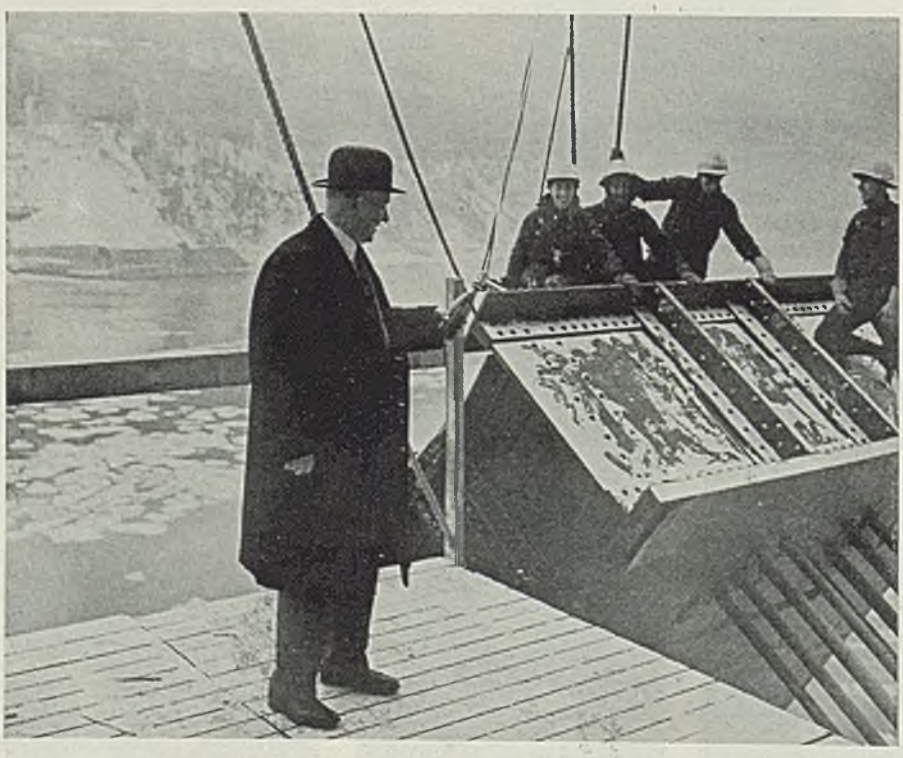
Predicts Characteristics of Coke for "First Time"

A method said to establish for the first time a formula whereby an analysis of coal, correlated with the temperature at which it is to be coked, can accurately forecast the resulting properties and amounts of coke and its byproducts was described by H. H. Lowry, director, coal research laboratory of Carnegie Institute of Technology, Pittsburgh, at the symposium on coke in blast furnace operation. The formula is the result of six years of research by Mr. Lowry with the assistance of H. G. Landau and Leah L. Naugle, also of the coal research laboratory, co-authors of the paper Mr. Lowry presented.

M. A. Meyers also of Carnegie Tech's coal research laboratory and Mr. Landau announced a method for controlling the properties of pig iron and the economy of its production in blast furnace operation. This method ascertains the particular qualities in the coke necessary to produce certain qualities and quantities of pig iron under specific conditions of operation and ore analysis. As the "shatter index" of coke is improved, the amount needed to produce a ton of pig iron is decreased and the production capacity in a given period increased. Tests revealed that improving the "shatter index" by one point increased the production by 3 per cent, while the amount of coke required to produce a ton of iron decreased.

As subjects for research an extended list of problems relating to the physical chemistry of steelmaking was presented by John J. Egan, Union Carbon & Carbide Research Laboratories, Niagara Falls, N. Y., as secretary of the Institute's committee on this subject. Prepared from answers to a questionnaire submitted to a number of metallurgists engaged in industrial and educational work, the list was not restricted to problems of practical steelmaking, but also included suggestions for many other studies.

First Steel for Rainbow Bridge, "Symbol of Amity"



■ First steel for the 950-foot span of the Rainbow bridge over Niagara river, to replace the "Honeymoon bridge" destroyed by ice a year ago, was christened by T. B. McQuesten, Ontario minister of highways, and chairman of the Niagara Falls bridge commission. The bridge was referred to as "a symbol of the amity of the two countries," now joined in defense efforts. The steel grillage, weighing 63 tons, then was lowered onto foundations in the gorge. Acme photo

Mechanism of Hydrogen Embrittlement Revealed

In a paper entitled "Hydrogen Embrittlement, Internal Stress and Defects in Steel," C. A. Japffe and C. E. Sims, research engineer and supervising metallurgist, respectively, Battelle Memorial Institute, Columbus, O., discussed the concept of "block" structure and expressed the belief that hydrogen embrittlement is the phenomenon of occlusion of hydrogen under high pressure in "interblock disjunctions." These disjunctions, they said, appear to be a fundamental part of crystal structure and are related to slip and cleavage phenomenon. When the occlusion pressure exceeds the elastic pressure of steel, the disjunctions are sprung and slip and cleavage planes operate much as during cold deformation.

The results of an experimental study of equilibrium between slags and liquid iron at temperatures used in steelmaking were presented in a paper by Karl L. Fetters, metallurgical department, Youngstown Sheet & Tube Co., Youngstown, O., and John Chipman, department of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass. To simplify interpretation of results they employed a special mixture.

LABOR

Antistrike Question Smolders; Knudsen Advises: Not Now

■ HOW to prevent stoppage of defense material production by labor disputes continues a smoldering question in Washington and other centers as a growing wave of strikes and threatened tieups develop.

To a proposal for antistrike legislation, Defense Production Director William S. Knudsen last week said: "Conditions of today do not warrant me in making any recommendations for labor legislation." Mr. Knudsen's conditional "no" is supported by the President, by Mr. Knudsen's associate director, Sidney Hillman, and a number of proponents of organized labor.

But the issue still is being pushed on Capitol Hill by influential senators and representatives.

United Mine Workers may force the antistrike legislation issue. Wage increase or strike when contracts expire April 1 is John L. Lewis' ultimatum. Walkout such as occurred in 1939 would darken many defense plants but would focus intense light on no-strike bills.

Meanwhile defense officials are doing what they can by way of mediation. A new agreement was submitted at Allis-Chalmers Mfg. Co., Milwaukee, where a five-week old strike is delaying work on $45,000,000 in defense materials. According to Mr. Hillman, the proposal would permit the company to maintain shop discipline, permit the union to appeal to a referee if it considers disciplinary action too severe. Mr. Hillman insisted the proposal was neither a provision for a closed shop nor a "device for a closed shop."

Frank Knox, Secretary of Navy, and Emory Land, chairman, Maritime Commission, sent a joint wire to commercial shipyards holding navy and maritime orders requesting temporary freezing of wages to discourage strikes.

Wildcat Strike Loses Jobs for 400 Workers

Vanadium Corp. of America has dismissed 400 striking employes at its Bridgeville, Pa., plant, with consent of the CIO regional director, who declared the strike a violation of the union's contract. The strike followed a controversy over hiring of plant guards, which the union members claimed was their right to choose. Federal mediators announced there was nothing in the union contract to warrant the strike.

Steelmen To Participate In South American Tour

■ George W. Warner, general manager, Armco International Corp., Middletown, O., and H. W. Graham, director of metallurgy and research, Jones & Laughlin Steel Corp., Pittsburgh, will participate in a "tour of industrial exploration" through several South American countries in March. Tour was arranged to develop practical methods for exchange of American industrial technology for noncompetitive raw materials produced by South American countries.

Invited participants, comprising prominent research, industrial and banking executives, were selected from more than 300 research administrators, industrial executives and bankers. Government departments charged with responsibility for inter-American relations are co-operating.

Columbia, Peru, Chile, Argentina, Uruguay and Brazil will be studied by the group. National Research Council, New York, is sponsoring the tour.

Defense Manufacturers Organize Association

■ An organization known as the Defense Manufacturers association has been formed in Chicago to facilitate bidding by small manufacturers on national defense contracts. A. C. Dunn, president, Dunn Mfg. Co., 341 East Ohio street, Chicago, jobbing machine shop and manufacturer of door closers, is president of the group. Present headquarters are at Mr. Dunn's office.

A dinner meeting to discuss work of the association was held in Hotel Sherman, Feb. 20. Although membership now includes only Chicago district manufacturers, plans are to extend activity to the central states.

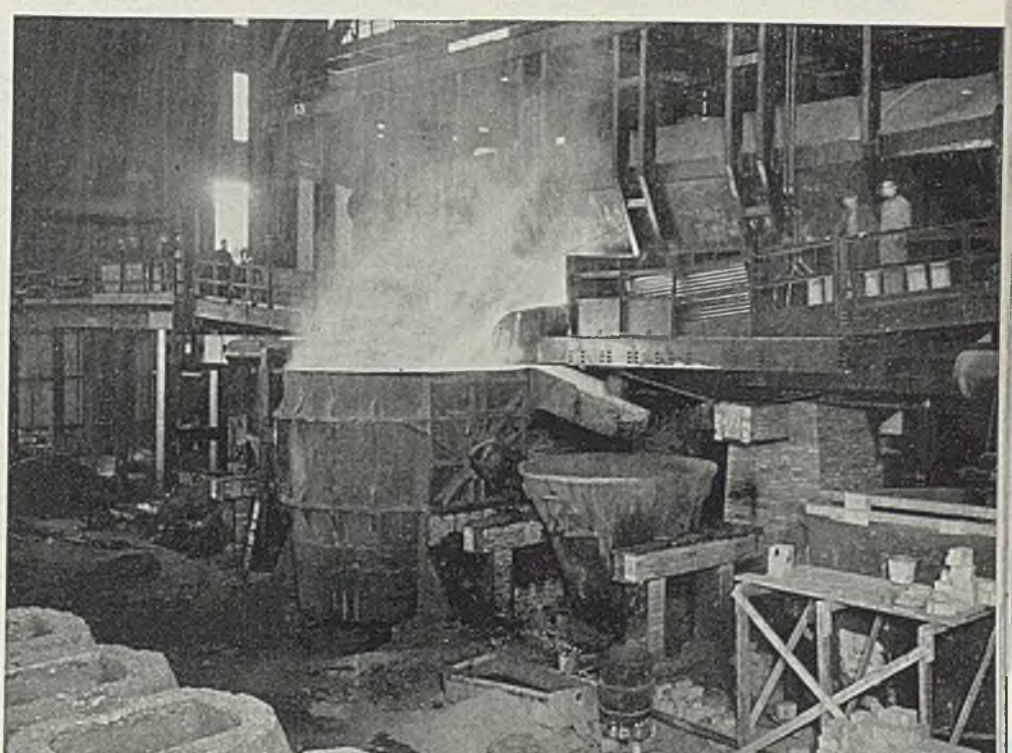
■ Manitowoc, Wis., vocational school board has been authorized by city council to build a $12,500 addition to provide shops to teach electric welding. School is expected to provide 200 to 250 welders for the Manitowoc Ship Building Co. which now is building submarines for the United States Navy. Federal government will provide necessary machines and equipment for the school.

Bethlehem Taps New 190-Ton Open-Hearth Furnace

■ Tapping the new 190-ton open hearth furnace just installed at Bethlehem Steel Co.'s plant in Bethlehem, Pa. This addition to melting capacity is a phase of expansion to meet increased demand for steel for national defense.

Excavation for foundations was started Nov. 18. Furnace was completed and ready for its first charge Feb. 12, less than three months after construction began.

The furnace is designed for oil fuel but producer gas may be used. A feature of the design is the provision of large 3-pass regenerators comprising 8400 cubic feet of checkers on each side of the furnace. The stack is 225 feet high; 7 feet, 6 inches, inside diameter. The furnace is the largest of its type in production at Bethlehem.



FINANCIAL

Midvale Co.'s 1940 Net $3,227,737, Nearly Double Previous Year's

■ MIDVALE CO., Nicetown, Philadelphia, steel producing subsidiary of Baldwin Locomotive Works, Philadelphia, reports net income in 1940 after depreciation, federal and state income taxes and provision of $1,745,000 for excess profits tax was $3,227,737. Equal to $16.14 per capital share, this was almost double net earnings of $1,703,770 or $8.52 per share in 1939.

Sharon Steel Net Income in 1940 Totaled $1,336,822, Taxes $829,487

Sharon Steel Corp., Sharon, Pa., reports net profit earned in 1940 totaled $1,336,822 after depreciation, interest, federal income and excess profits taxes and other charges. This was equal to $2.64 per share on common after dividend requirements on the corporation's $5 cumulative convertible preferred stock. In 1939, net income was $255,497 or $4.28 per share on the $5 preferred.

Tax accruals in the year aggregated $829,487.

Molybdenum Corp. of America Earned $778,438 Net Profit in 1940

Molybdenum Corp. of America, Pittsburgh, reports net income last year was $778,438 after depreciation, depletion, interest, federal and state income taxes and provision of $300,000 for excess profits tax. This was equal to $1.34 per share on the corporation's par $1 capital stock, and compared with adjusted net profit of $524,202 or 90 cents per capital share in 1939.

Superior Steel Corp. Nets $349,674, Sales Increase 37 Per Cent in 1940

Net income earned in 1940 by Superior Steel Corp., Pittsburgh, steel finisher, totaled $349,674 after depreciation, interest, federal and state income taxes and provision of $66,000 for excess profits tax. Equal to $3.08 per share on the corporation's capital stock, this compared with net profit of $175,192 or $1.54 per share in 1939.

Frank R. Frost, president, reported total sales in 1940 had increased almost 37 per cent over the previous year. Expenditures for improvements, added to property accounts in 1940, totaled $537,100.

Carpenter Steel Earned $436,726 Net Profit in Fourth Quarter

Carpenter Steel Co., Reading, Pa., earned $436,726 net profit in quarter ended Dec. 31, 1940, after provision of $265,000 for excess profits tax in addition to other charges. This was equal to $1.21 per share on the company's capital stock, and compared with net earnings of $382,033 or $1.06 per capital share in the quarter in 1939. In the period ended Sept. 30, last year, net income was $321,067 or 89 cents per share.

Indicated net profit in six months ended Dec. 31 was $757,793, equal to $2.10 per share. In the period in 1939, net income was $577,624.

Dividends Declared

Republic Steel Corp., Cleveland, 50 cents per share on common, payable April 2 to record of March 10. Dividends of $1.50 per share on the corporation's 6 per cent cumulative convertible prior preference stock, series A, and $1.50 per share on the 6 per cent cumulative convertible preferred stock were also declared, both payable April 1 to record of March 10.

Keystone Steel & Wire Co., Peoria, Ill., 25 cents per share on capital stock, payable March 15 to record of March 1. This will bring dividend payments to 75 cents per share since July 1, 1940.

Copperweld Steel Co., Glassport, Pa., 20 cents per share on common and quarterly of 62½ cents per share on preferred, both payable March 10 to record of March 1.

Pittsburgh Coke & Iron Co., Pittsburgh, quarterly of $1.25 per share on preferred, payable March 1 to record of Feb. 18.

Youngstown Sheet & Tube Co., Youngstown, O., 50 cents per share on common and quarterly of 1.37½ per share on preferred. Dividend on common payable March 15 to record of March 3, and on preferred April 1, to record of March 3. Last year the company made payments of 25 cents each on common April 1, July 1 and Oct. 1; 50 cents was paid Dec. 16.

Net Profit of 81 Steel Consumers $130,636,935 in 1940

■ EIGHTY-ONE iron and steel consumers tabulated by STEEL earned an aggregate net income of $130,636,935 in 1940, compared with $89,762,798 net profit realized by the same companies in 1939. Increase in combined net income was more than 45 per cent. None of the companies incurred a loss last year; in 1939, seven reported a deficit.

Previous tabulation in STEEL, Feb. 17, page 26, listed 27 companies; the following includes 54. All figures are net earnings, except where asterisk denotes loss:

	1940	1939
Aetna Standard Engineering Co., Youngstown, O.	$142,279	$151,859*
Altorfer Bros. Co., Peoria, Ill.	100,860	101,476
American Can Co., New York	17,440,906	18,284,963
Animal Trap Co. of America, Lititz, Pa.	96,518	73,336
Atlas Drop Forge Co., Lansing, Mich.	151,649	68,638
Baldwin Locomotive Works, Philadelphia	1,944,073	542,026
Bath Iron Works Corp., Bath, Me.	2,052,179	660,703
Baush Machine Tool Co., Springfield, Mass.	335,318	225,069*
Bastian Blessing Co., Chicago††	752,378	567,467
Bell Aircraft Corp., Buffalo	284,745	9,203
Buckeye Steel Castings Co., Columbus, O.	782,422	708,471
Chain Belt Co., Milwaukee	1,039,076	936,651
Chicago Electric Mfg. Co., Chicago	122,035	86,535
Chicago Flexible Shaft Co., Chicago	1,498,931	1,583,670
Cleveland Hobbing Machine Co., Cleveland	169,485	147,619
Compo Shoe Machinery Corp., Boston	226,263	302,685
Continental Can Co. Inc., New York	8,953,632	8,635,787
Deere & Co., Moline, Ill.‡	12,171,778	7,627,355
Detroit Gray Iron Foundry Co., Detroit	60,952	79,995
Divco-Twin Truck Co., Detroit‡	347,281	202,605
Electric Controller & Mfg. Co., Cleveland	506,708	158,115
Ferry Cap & Set Screw Co., Cleveland	61,129	21,929
Foote-Burt Co., Cleveland	371,708	168,252
General Fireproofing Co., Youngstown, O.	1,099,119	766,341
General Steel Wares Ltd., Montreal, Que.	435,518	626,208
Gisholt Machine Co., Madison, Wis.	969,191	437,163
Globe Steel Tubes Co., Milwaukee	650,301	364,998
Hein-Werner Motor Parts Corp., Waukesha, Wis.	125,585	133,684
Hubbell, Harvey, Inc., Bridgeport, Conn.	503,910	390,078
Hussman-Ligonier Co., St. Louis	302,808	260,199
Indiana Steel Products Co., Chicago	$75,656	$1,292
Iron Fireman Mfg. Co., Portland, Oreg.	721,308	611,761
Jaeger Machine Co., Columbus, O.††	495,160	333,468
Lamson & Sessions Co., Cleveland	365,475	5,353
Leland Electric Co., Dayton, O.	119,686	102,205
Liberty Aircraft Products Corp., Farmingdale, N. Y.	247,440	37,541
Lima Locomotive Works Inc., Lima, O.	87,007	134,326*
Lunkenheimer Co., Cincinnati	699,858	384,512
McCord Radiator & Mfg. Co., Detroit	253,086	69,036
National Radiator Co., Johnstown, Pa.	262,463	200,694
New Haven Clock Co., New Haven, Conn.	52,336	76,227
Ohio Seamless Tube Co., Shelby, O.	497,866	260,874
Page-Hersey Tubes Ltd., Toronto, Ont.	942,051	1,126,515
Pierce Governor Co., Anderson, Ind.	103,450	76,737
Pneumatic Scale Corp., Quincy, Mass.††	243,097	325,522
Sivyer Steel Casting Co., Milwaukee	221,345	173,610
Tappan Stove Co., Mansfield, O.	370,749	390,003
U. S. Pipe & Foundry Co., East Burlington, N. J.	2,403,804	2,570,279
Union Twist Drill Co., St. Athol, Mass.	1,256,623	666,761
Van Norman Machine Tool Co., Springfield, Mass.	533,258	256,546
Viking Pump Co., Cedar Falls, Iowa	301,130	266,657
Vogt Mfg. Corp., Rochester, N. Y.	413,110	306,660
Warren Foundry & Pipe Corp., Phillipsburg, N. J.	652,407	501,820
West Michigan Steel Foundry Co., Muskegon, Mich.	220,850	171,661

*Loss: ‡fiscal year ends Oct. 31; ††year ended Nov. 30.

Steel Institute To Meet In New York, May 22

■ Fiftieth general meeting of the American Iron and Steel Institute will be held Thursday, May 22, in New York. The program has not been announced. Attendance at all sessions and the banquet will be restricted to members.

Foundry Equipment Index Up in January

■ Foundry Equipment Manufacturers' Association, Cleveland, reports index of net orders closed for new equipment in January was 301.8, compared with 276.1 in December. Index for repairs was 235.8 in January and 203.2 in December. Total sales index was 285.3 in January and 257.8 in December.

Indexes are per cent of monthly averages of sales to metalworking industries, 1937-39. Practical comparison on the old base, 1922-24, can be determined by multiplying the new base figures by 1.328.

Republic To Obtain Iron From Wickwire Spencer

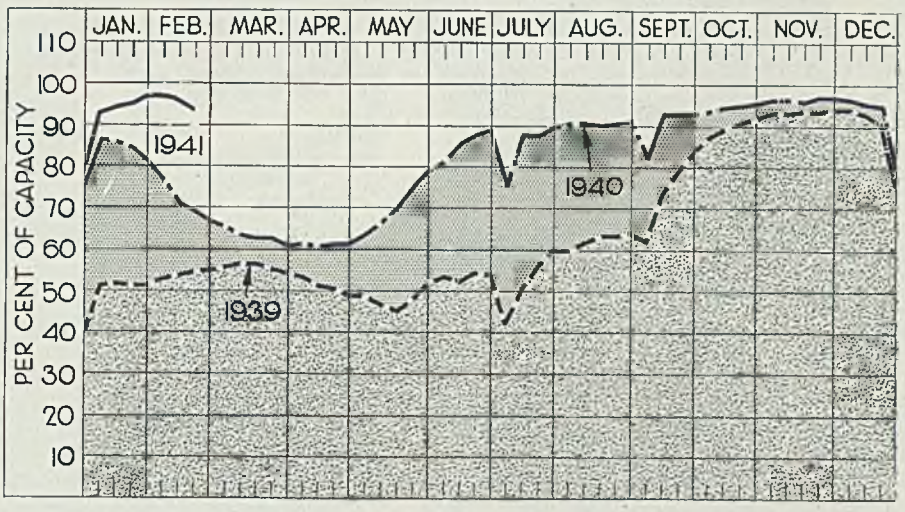
■ Republic Steel Corp. and Wickwire Spencer Steel Co. have entered into an arrangement for increasing pig iron output in the Buffalo district. Republic will bear part of the expense of reconditioning a Wickwire blast furnace stack which has not been in operation for several years, and will receive a portion of the output for steelmaking.

A similar arrangement between Bethlehem Steel Co. and the Hanna Furnace Corp. has been in effect for some time, providing additional pig iron for the former.

Broadcast Defense Production Progress

■ Progress in defense material production will be reported in a series of 13 nation-wide broadcasts sponsored by the National Association of Manufacturers and the National Broadcasting Co. First broadcast was presented Feb. 22 from Cleveland and depicted the progress made by machine tool manufacturers in responding to Defense Commissioner William S. Knudsen's appeal to "do the impossible" in achieving new highs in tool production.

The other 12 broadcasts will originate in key defense production cities and will include interviews with workers and executives. Reports already scheduled and industries covered include: Aviation from Santa Monica, Calif.; oil from Tulsa, Okla.; tanks from Peoria, Ill.; automobiles from Detroit; shipbuilding from Newport News, Va.



PRODUCTION . . . . Down

■ STEELWORKS operations last week declined 2 points to 94½ per cent, due to furnace repairs and effects of Youngstown labor difficulties. Two districts advanced, five declined and five were unchanged. A year ago the rate was 67 per cent; two years ago it was 55 per cent.

Youngstown, O. — After-effects of the Brier Hill strike in the preceding week held the rate last week at 90 per cent. Although the strike was settled and furnaces relighted considerable tonnage was lost. Active open hearths numbered 75, Sharon Steel Corp. adding one. This week production is estimated at 97 per cent, highest in 12 years. Republic will add one open-hearth this week.

St. Louis — Steady at 93 per cent for the third week.

Detroit — Gained 3 points to 95 per cent, only one open hearth being inactive.

Birmingham, Ala. — Held to 100 per cent for the eighth week.

Cincinnati — Sustained at 95 per cent with only one open hearth idle. Two steelmakers are at 100 per cent.

Chicago — Dropped 4 points to 95½ per cent as several furnaces went down for repair. Five steelworks are producing at 100 per cent or higher. Youngstown Sheet & Tube Co. plans to blow in its only idle stack, at South Chicago works, March 1.

New England — Furnace repairs at one steelworks caused the rate to drop 8 points to 92 per cent.

Pittsburgh — Necessity for furnace repairs at several points caused a loss of 2 points to 94½ per cent.

Wheeling — Declined 12 points to 88 per cent as several open hearths were taken off for relining.

Buffalo — Continued 90½ per cent.

Central eastern seaboard — Down 1 point to 95 per cent.

Cleveland — Advanced ½-point to 84½ per cent.

District Steel Rates

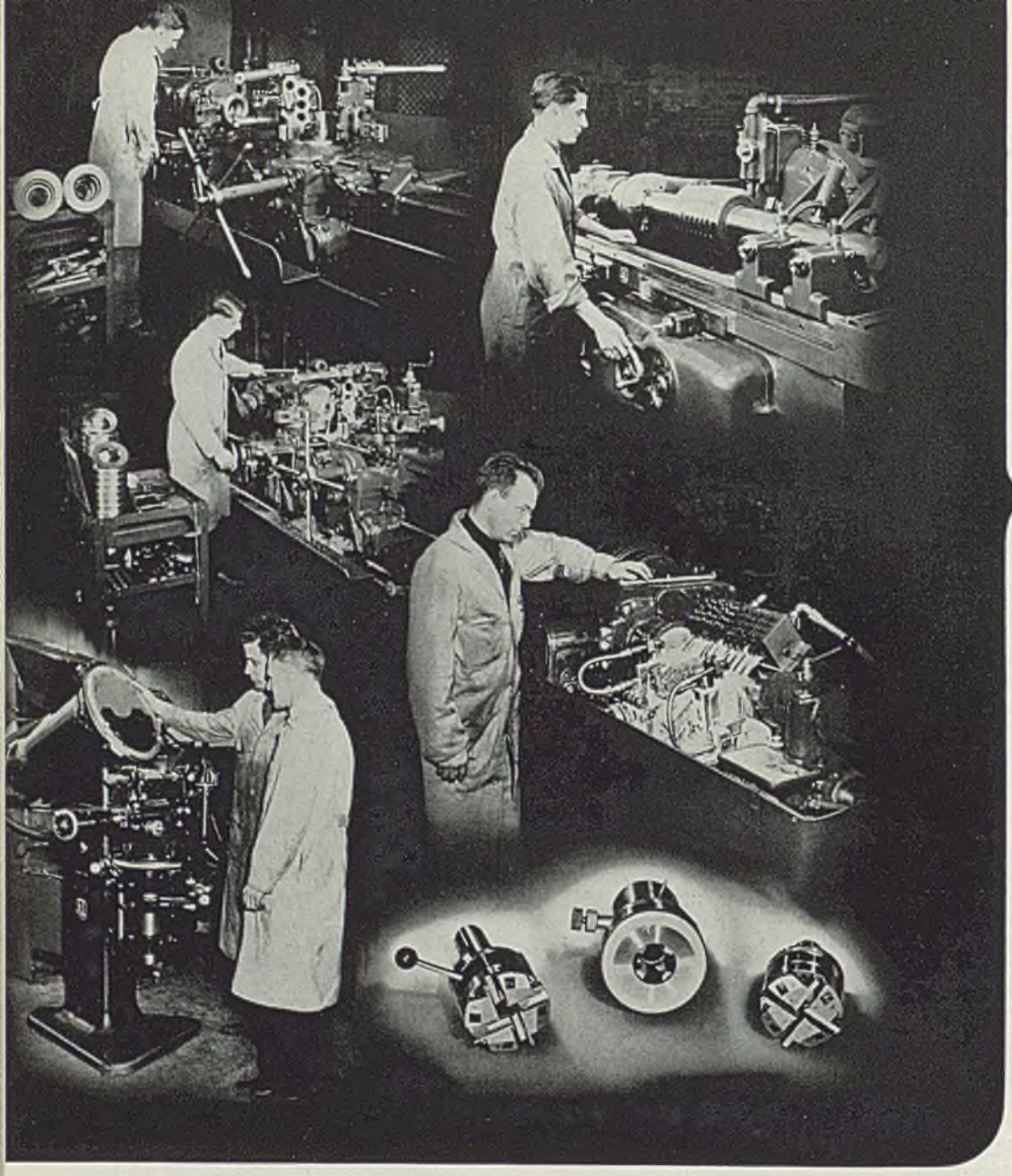
Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Feb. 22	Change	Same week 1940	Same week 1939
Pittsburgh	94.5	— 2	63	48
Chicago	95.5	— 4	63.5	53.5
Eastern Pa.	95	— 1	68	37
Youngstown	90	None	40	47
Wheeling	88	—12	94	68
Cleveland	84.5	+ 0.5	68	54
Buffalo	90.5	None	67	32.5
Birmingham	100	None	90	83
New England	92	— 8	63	70
Cincinnati	95	None	59	55
St. Louis	93	None	63.5	55
Detroit	95	+ 3	92	86
Average	94.5	— 2	67	55

Midvale Doubles Armor Plate, Forging Capacity

■ Midvale Co., Nicetown, Pa., subsidiary of Baldwin Locomotive Works, is building an addition to increase output of armor plate and heavy gun forgings for defense. Capacity will be nearly doubled. Midvale ranks with Carnegie-Illinois Steel Corp. and Bethlehem Steel Co. as a producer of heavy forgings. Its defense contracts are reported close to $32,000,000.

■ National Supply Co., Pittsburgh, will start shell forging operations at its Ambridge, Pa., plant next month, according to A. E. Walker, president. In his annual report to stockholders last week, Mr. Walker declared the required equipment was being installed.



PLAN *for* FUTURE PROFITS *with* JONES & LAMSON EQUIPMENT

THE present emergency offers a double opportunity to alert manufacturers. First and foremost, of course, is the chance to rearm America and safeguard our peace. Second, by choosing it wisely, the same equipment that works for defense today can earn greater profits for you in commerce tomorrow. Before committing yourself to building special machines for defense work, consider the versatility of Jones & Lamson Universal Turret Lathes, Comparators, Die Heads, Automatic Thread Grinders and Fay Automatic Lathes. Not only will they increase your future earning power, but they will handle a big share of your present work to best advantage. That's why it pays to put your production problems up to Jones & Lamson engineers.

JONES & LAMSON MACHINE CO.

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PROFIT PRODUCING MACHINE TOOLS

MANUFACTURERS OF: SADDLE & RAM TYPE UNIVERSAL TURRET LATHES . . . FAY AUTOMATIC LATHES . . . AUTOMATIC DOUBLE-END MILLING & CENTERING MACHINES . . . AUTOMATIC THREAD GRINDING MACHINES . . . COMPARATORS . . . TANGENT AND RADIAL, STATIONARY AND REVOLVING DIES AND CHASERS

Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

Granting of applications for certificates of necessity speeded up in February . . . Training programs reported proceeding more rapidly than originally scheduled . . . Price ceiling ordered for used machine tools, to stop profiteering . . . Industry praised for adhering to wages and hours law provisions . . . Key personnel appointed in OPM's production division's airplanes, tools and ordnance section

WASHINGTON

■ SPEED-UP in granting applications for certificates of necessity for plant expansion under the defense program was shown last week in a report by the National Defense Advisory Commission. From Feb. 1, through Feb. 15, the commission issued 93 certificates to 89 corporations as compared with 51 corporations which received certificates in the last half of January and 67 in the first half.

Aproximate cost of facilities covered by the certificates was $63,977,000 as compared with $71,864,000 during the last half of January, and $120,188,000 in the first half of the month. The average per certificate during the first half of February was $687,925 as compared with an average of $1,409,098 in the second half of January, and $1,793,851 in the first half.

Certificates of necessity are issued to enable manufacturers to avail themselves of the 60-month income tax amortization of plant cost provided for under Section 124 of the internal revenue code. Estimates are subject to audit by the commissioner of internal revenue.

Defense Training Programs Are Ahead of Schedule

Reports received by the United States office of education indicate regular and defense vocational school training is ahead of schedule.

Plans formulated last year called for the training of 700,000 workers for defense industries by June 30, 1941. A report to Paul V. McNutt, federal security administrator, from John W. Studebaker, commissioner of education, indicates that, if present trends continue, about 1,000,000 persons will have been trained for defense occupations by June 30.

During the first six months ended Jan. 1, 1941, records show 325,000 trained or in training in the rapidly expanding program.

More than 800 of the 900 cities with vocational trade and industrial schools are making their facilities available for defense training. More than 300 cities have put their vocational schools on 24-hour, 6-day-week schedules.

Enrollments in the regular vocational education program are highest in history. They total approximately 2,000,000. A large proportion of the occupational training in the regular program is directly useful to defense industry needs.

Trade and industrial education alone enrolls more than 750,000 including hundreds of apprentices who attend part-time. Youth in these courses receive basic and related training in such defense-vital skills as patternmaking, welding, sheet metal, drafting, machine shop, electricity and auto mechanics.

Total number who will be served by various vocational education courses during the coming year will exceed 3,000,000.

New Appointments Made in OPM's Production Division

John D. Biggers, director of the Office of Production Management's production division last week announced numerous appointments to the airplanes, tools and ordnance branch of the division. Naming of key personnel for the other two branches of the production division —ships, construction, supplies; and materials—will be made soon.

Chief of the aircraft, ordnance and tools branch is E. F. Johnson, who served as director of the light ordnance section of the production division, National Defense Advisory Commission. Before retirement from private business Mr. Johnson held an executive position with General Motors Corp.

Chief of the aircraft section is Merrill C. Meigs, publisher and advertising executive, who was formerly director of the aeronautical section, production division, National Defense Advisory Commission. Mr. Meigs formerly was advertising director of the *Chicago American* and in 1926 became publisher of the Chicago *Herald-Examiner*, now the *Herald-American*. He is now on leave from that position.

T. P. Wright To Assist Meigs

T. P. Wright, former vice president and chief of research engineering of the Curtiss Wright Corp., will be assistant to Mr. Meigs. Mr. Wright previously served as consultant on aviation problems to the National Defense Advisory Commission, and has been engaged in aircraft engineering, production and research work for many years. He is the author of numerous papers on aircraft problems and in 1931 was awarded the Wright Brothers medal by the Society of Automotive Engineers for having written the best published aeronautical paper during 1930.

Under the aircraft section are three units: Engineering, production planning, and manufacturing.

Chief of the engineering unit is Maj. E. M. Powers, who has been assigned to work with the Office of Production Management by the Air Corps of the United States Army. Major Powers has been in army service since 1918 and was grad-

uated from the Air Corps Aeronautical Engineering School in 1931.

Chief of the production planning unit is Dr. A. E. Lombard. Dr. Lombard received a Ph.D. degree in aeronautics from the California Institute of Technology, has done aeronautical research work for the Curtiss-Wright Corp., and is the author of several technical papers on airplane design.

Chief of the manufacturing unit is A. J. Brandt, who has had wide experience in the explosives, chemical and automobile industries. Mr. Brandt resigned his business connection as president of A. J. Brandt Inc., consulting engineers, and president of the National Tool Co. to join the staff of the aircraft division.

Heads Ordnance Section

Chief of the ordnance section is A. R. Glancy, who was graduated from Lehigh university as a mechanical engineer. Mr. Glancy was associated with E. I. du Pont de Nemours during the World war and later joined General Motors Corp., of which he became vice president. He also served as president of the Pontiac Motor Co., holding both positions until 1931. Since 1931 he has headed A. R. Glancy Inc., Detroit.

Under the ordnance section are four units: Artillery, fire control and optical; explosives, artillery, ammunition, bombs; small arms and their ammunition; and tanks and combat vehicles.

Chief of the artillery, fire control and optical unit is L. E. Osborne, who is on leave from his position with Westinghouse Electric & Mfg. Co. Mr. Osborne, as manager of engineering, manufacturing and merchandising division for all appliance production, had charge of the Springfield, Mass., and Mansfield, O., plants of Westinghouse.

Chief of the explosive, artillery ammunition, bombs unit is Louis de B. McCrady, who was graduated as an engineer from Clemson college in 1909. Mr. McCrady was associated with E. I. du Pont de Nemours and was sent to Canada to renovate various commercial explosives plants and the plant of the Dominion Cartridge Co. in 1911. He held the position of chief engineer of Canadian Industries Ltd. at the time of his retirement in 1939.

Chief of the small arms and their ammunition unit is E. S. Chapman. Mr. Chapman formerly held an executive position with the Gisholt Machine Co., Madison, Wis., and in 1928 joined the Chrysler Corp., later becoming vice president of the Plymouth division. He is now on leave.

Chief of the tank and combat vehicle unit is W. W. Knight Jr., a graduate of Yale university and Harvard business school. His past business connection was with the Michigan Alkali Co., where he held the position of assistant general manager in charge of engineering, research, personnel and accounting. Mr. Knight was one of the first men to become affiliated with the defense commission in his capacity as assistant director of the tank, truck and tractor section and administrative assistant to Mr. Biggers.

Chief of the tools section is Mason Britton, who was in charge of the machine tool section of the National Defense Advisory Commission from its inception. Mr. Britton is vice chairman of the McGraw-Hill Publishing Co., from which position he has taken a leave to work with the defense program.

Mr. Britton will have two assistant chiefs: Howard Dunbar and Alvin B. Einig. Mr. Dunbar will have the title of technical chief, and is vice president and general manager of the machine division of the Norton Co., with which he has been associated for 27 years. He is a past president, National Tool Builders' Association, and American Society of Mechanical Engineers, Worcester division. He is on leave of absence from his company.

Mr. Einig is general manager, Motch & Merryweather Machinery Co., Cleveland. During the World war he was assistant chief of the machine tool section of the War Industries Board.

Under the tools section will be eight units: Machine tools, foundry equipment; gages; heat treating equipment; cranes; mill equipment and supplies; machine tool electrical equipment; and forge equipment and presses. The first six units have been established.

Mr. Britton, in addition to being chief of the entire tools section, also will act as chief of the machine tools unit.

Chief of the mill equipment and supplies unit is H. H. Kuhn, president of the Hardware and Supply Co.

Chief of the heat treating unit is Bradley Stoughton, dean of the department of Metallurgical Engineering, Lehigh university.

Chief of the crane unit is Sidney Buckley, president, Sheppard Niles Crane Co.

Ralph G. Farrell, board chairman, Fairmont Aluminum Co., Fairmont, W. Va., has been appointed producers' representative on the aluminum and magnesium priorities advisory committee.

Col. Fleming Finds Industry Complying with Wage-Hour Law

Defense importance of labor relations was pointed out to Congress by Col. Philip B. Fleming, administrator, in the second annual report of the wage and hour division of the United States Department of Labor.

"Employment indexes, stimulated by our tremendous defense production program and by the 40-hour week of the wage and hour law, will soon attain new peaks—higher than 1929 levels and proportionate to our increase in population since those busy days," said Colonel Fleming.

"Both employment and payroll indexes of factory employment today are higher than at any time since the last war. The index employment has been steadily rising. It was 103 in July, 107 in August, 111 in September, 113 in October, 114 in November, and 116 in December, and workers for new factories which are rising throughout the land have not yet been recruited.

Price Ceiling Established For Second-Hand Tools

Leon Henderson, head of the division of price stabilization, National Defense Advisory Commission, last week issued the first of a series of price schedules, "designed to limit profiteering" on second-hand machine tools.

He explained his action initiates a program which will be extended where necessary to assert the full force of the federal government, including the power of commandeering and requisitioning, to protect the public interest against those seeking to profit exorbitantly on defense requirements. It will also serve, he said, to expose their activities to the Congress and to the public in general.

Mr. Henderson emphasized that the prices set forth are "ceiling" or maximum prices; that they are not only reasonable but liberal, and that sales may and should be made below the ceiling.

"The underlying purposes of this schedule," Mr. Henderson said, "is to establish fair price standards which will enable the great bulk of industry to co-operate in maintaining price stability, and to single out those who wish to grow rich on the defense program."

Cases have been brought to the attention of the price stabilization division where machine tools are being priced at twice the original cost when purchased 30 or more years ago, he said.

Maximum prices, in terms of percentage of current list price of equivalent new machine tools, are as follows: For tools built since Jan. 1, 1936, 75 to 95 per cent (higher price is for tools rebuilt and guaranteed); for tools built between Jan. 1, 1930, and Dec. 31, 1935, 70 to 90 per cent; for tools built between Jan. 1, 1920, and Dec. 31, 1929, 60 to 80 per cent; for tools built before Jan. 1, 1920, 50 to 70 per cent.

Priorities Machinery Completed; Army, Navy To Rate "Critical Items"

■ HOW priorities on national defense materials will be handled was clarified last week by E. R. Stettinius Jr., director of priorities for the Office of Production Management. Mr. Stettinius announced a new working arrangement for the issuance and application of preference ratings and defined the relationship between the priorities division and the Army and Navy Munitions Board.

"The priorities division," he said, "will seek to avoid the imposition of priorities wherever such imposition would needlessly conflict with civil and private activity, and, in so far as possible, action will be withheld until an actual shortage in connection with defense is imminent."

Under the new plan, the priorities division will divide administration of the system along practical lines, supplementing its own organization by the available facilities of the two armed services.

The Army and Navy Munitions Board will continue to determine priority ratings covering all items on the "critical list" which primarily is composed of military items and parts which usually have no counterpart in commercial production. The Munitions Board also will handle the extension of priority ratings down to the first subcontractor, for items on the "critical list".

Priority ratings for all raw materials, for extension of ratings below the first subcontractor, for items not on the "critical list", and over the general field of civilian and commercial needs, will be handled by the priorities division. The division also will have authority over questions that may arise in the application of the formula to specific cases.

Symbols Used for Preferences

"Principal administrative mechanism in the operation of this system," said Mr. Stettinius, "is the priorities certificate, which is the notice to a contractor that a certain material is to be given preferential treatment, if necessary to meet delivery dates. This should be done without prejudice to contracts and orders bearing equal or superior ratings, but by withholding or deferring deliveries on other contracts and orders.

"In order to preserve the effectiveness of the priorities certificate, it is to be used only when an alternative solution is not readily available. Therefore, the priorities division will attempt to obviate the use of priorities, wherever possible, by working in close collaboration with the division of production, with a view to adjusting production schedules, and with the division of purchasing, with a view to finding alternative sources of supply."

Order of preference is indicated by symbols, starting with AA, which is reserved for emergencies of an exceptional nature, and grading down as follows: A-1-a, A-1-b, A-1-c, etc. As between contracts and orders in the same subdivision, as A-1-c, date of delivery contracted for will determine the order of precedence, except as otherwise specifically requested by the director of priorities.

All priorities certificates will be issued over the name of the director of priorities, but in the case of prime contracts and first subcontracts for critical list items, the Army and Navy Munitions Board will be supplied with certificates signed in blank to be issued to the contracting officers.

Ratings will be assigned by the contracting officers with respect to direct army and navy procurement. If a priority rating has not been obtained at any time by a government supplier and he believes that a rating is necessary, he may request a certificate be issued by the contracting officer.

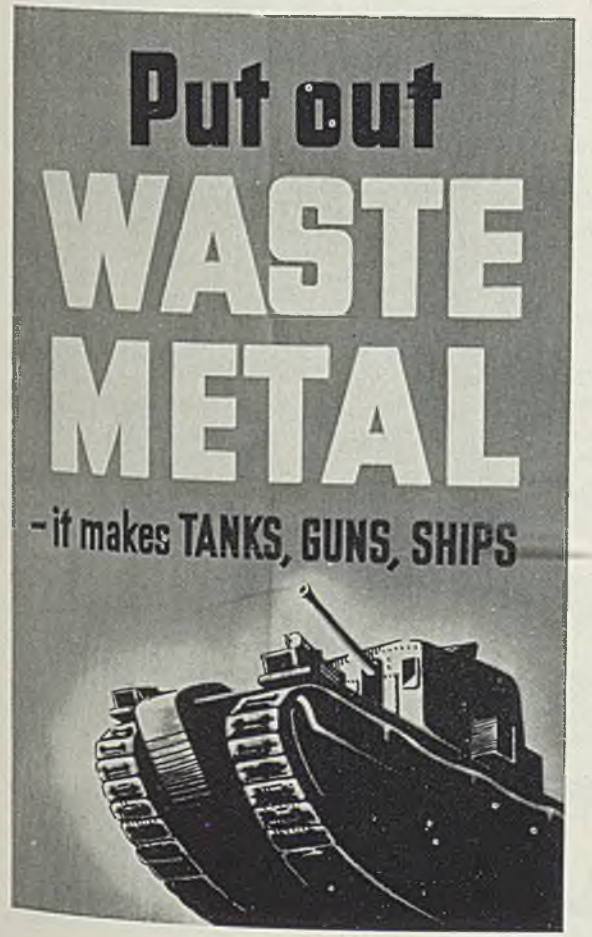
Subject to Revision

If the prime contractor wishes the rating to be extended to his subcontractors, he should ask the army and navy inspector, or contracting officer, to fill out a certificate. The army or navy official will only approve such an extension if the item purchased is on the critical list, and to the first subcontractor.

For all other contracts, including army and navy subcontractors below the first line, application for a rating must be made to the director of priorities. Application forms may be obtained from Federal Reserve offices, army and navy field procurement and inspection officers, or from the director of priorities. The application form requires the applicant to substantiate his claim for preference rating to avoid harm to other parts of the defense program.

Mr. Stettinius advised that every effort should be made to arrange for delivery of materials and equipment on the required dates through commercial channels before application of preference rating is made.

The new arrangement was worked out jointly by the priorities division and the army and navy and is subject to revision.



Posters Urge "Save Scrap"

■ Great Britain's scrap collection campaign is aided by posters such as this, reminding people to save scrap metal and other waste materials for the manufacture of implements of war

Unusual Set-up for "ACORN" DIES

This "Acorn" Die is finish-threading a special aeronautical valve of stainless steel. Accurate? Well, the ½"-20 thread must be so accurate that the threads of the High Speed "Acorn" Die have to be lapped so as to produce smooth, perfect threads within extremely close tolerances. A full thread right to the shoulder was needed, too—another reason for the "Acorn" Die. ☆ Not one manufacturer in a thousand will have an operation like this one. But the fact that only "Acorn" Dies could meet it is genuine proof of their extreme adaptability. ☆ If you need fast threading, accurate threading or super-accurate threading, you need to know more about "Acorn" Dies. Any fied "G. T. D. Greenfield" Engineer is qualified to answer your most searching questions.

GREENFIELD TAP & DIE CORP., Greenfield, Mass.

Detroit Plant: 2162 West Fort Street. Warehouses in New York, Chicago, Los Angeles and San Francisco. In Canada: Greenfield Tap & Die Corp. of Canada, Ltd., Galt, Ont.

GTD GREENFIELD

TAPS · DIES · GAGES · TWIST DRILLS · REAMERS · SCREW PLATES · PIPE TOOLS

Mirrors of MOTORDOM

By A. H. ALLEN
Detroit Editor, STEEL

Motorcar builders seeking to push crowded schedules still further ahead in belief that defense production will cause sharp decline in output of 1942 models . . . Retail sales are in highly favorable position, with dealers amply stocked. Defense activities crowd automobiles out of limelight in Detroit as pace quickens on armament production . . . Gloomy days for salesmen and P. A.'s

DETROIT

■ MAKING hay while the sun shines applies to more things than farming. The motor companies are pushing their haymakers for all they are worth right now, before the "defense cloud" obscures the sun later this year. Production is edging weekly into higher ground, even though stocks of new cars are enormous. Schedules for the weeks just ahead are being expanded wherever possible.

Steel companies report numerous requests for additional tonnage on the current model run, even though material cannot be shipped until June. Chrysler divisions are about a week ahead of earlier schedules. Apparently every last ounce of juice is going to be squeezed out of the 1941 model year, because the outlook for 1942 models is uncertain.

Starting in September, perhaps before, there is going to be a serious curtailment of automobile production—how much is anybody's guess, but estimates are heard as high as 70 per cent. For one thing, the auto industry will have to make inroads on its labor reservoir to staff new defense plants and defense manufacturing projects. It is impossible to recruit entire working forces for these plants from unemployed; the bulk will have to come from forces now building passenger cars. A 25 per cent drain is a reasonable estimate, and it is unlikely that this hole in production staffs can be filled. The men just are not to be found.

Economic picture at the moment could not be better for selling new cars. More men going to work, wages going up, plenty of cars available, higher prices in the offing, new excise taxes are likely. new models may have to be stripped down to a certain extent, production likely to be limited. So, dealers are having no trouble to find buyers and that is why they are willing to stock up on cars. The half-million or more float of new cars maintained at this time is probably 90 per cent in the hands of dealers. Whether they are all paid for is not known definitely, but it has been the policy of most motor car companies to have cash on the line before a new car was permitted out of the drive-away building.

Some conjecture has been heard to the effect that carbuilders may be storing cars on their own or rented properties. If stocks were to be built up in assembly plants they would be in the form of parts and subassemblies, not finished cars. There may be some stocks in rented warehouses and similar buildings, but on the other hand such cars may be merely awaiting transit to dealers.

Figures for General Motors Corp. for January would indicate no appreciable stocking of cars by manufacturers. Production estimate for all divisions is 239,645, while actual sales to dealers, including export shipments, totaled 235,422, a difference of less than 5000. Sales to dealers in the United States totaled 218,578, against sales to consumers of 168,168, an apparent increase in dealers' stocks of 50,410. This, however, is a normal condition, for sales to dealers during January, February and March in most years, exceed sales to consumers. In April, the two figures become about equal and for the balance of the model year, consumer sales exceed sales to dealers in order to balance out at the year end.

Detroit Industrial Picture Changed; Emphasis on Defense

Developments in connection with building of automobiles, once the dog that wagged the tail in industrial Detroit, are now just a small hair on the end of the tail. Everything today is defense—airplanes, motors, tanks, guns. No one talks anything else. Machine tool companies do not even bother to make the rounds of automobile builders' passenger car departments, all their time being taken up on defense plant needs.

Present and future activities are being disclosed daily. Hudson, for example, has been making shell components for weeks, now has been given contract for pistons and rocker arms for Wright aircraft engines. Shortly construction of aileron assemblies for Republic Aircraft will be started in the Hudson aviation division.

Ford is beginning to give consideration to equipment requirements for its "Consolidated" division, which will build parts and subassemblies for this type of bomber Presumably a complete new building will be erected to house this production and negotiations are understood to be under way for a site near the Wayne, Mich., airport.

Olds has placed contracts for about 32,000 tons of forging billets to be used in manufacture of 75 and 105-millimeter shells. Steel was distributed among several producers

and is bought to WD specifications. These specifications apply to all shell and armament material and carry a premium of $2 a ton, reduced from the former $5 a ton. As far as chemical limits are concerned the WD's pattern closely the S.A.E. steels, but numerous other controls apply, such as government inspection, special surfacing of billets, certain cropping of ingots, and the like.

General Motors currently is figuring on about $2,000,000 worth of equipment for a new 50-caliber machine gun plant in Windsor, Canada. No details are available as yet on size of plant, exact location or production.

American Brakeblock division of American Brake Shoe & Foundry Co. will build a new plant at Wayne, Mich., to centralize and expand operations. It will be a 4-story building 95 x 175 feet in size.

Federal-Mogul Corp. plans to erect two new buildings to handle production of bearings for the Packard Rolls-Royce engine. They will be 100 x 250 and 80 x 100 feet in size.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1938	1939	1940
Jan.	226,952	356,962	449,492
Feb.	202,597	317,520	422,225
March	238,447	389,499	440,232
April	237,929	354,266	452,433
May	210,174	313,248	412,492
June	189,402	324,253	362,566
July	150,450	218,600	246,171
Aug.	96,946	103,343	89,866
Sept.	89,623	192,679	284,583
Oct.	215,286	324,689	514,374
Nov.	390,405	368,541	510,973
Dec.	406,960	469,118	506,931
Year	2,655,171	*3,732,718	4,692,338

*Revised.

Estimated by Ward's Reports

Week ended:	1941	1940†
Jan. 25	121,948	106,400
Feb. 1	124,400	101,240
Feb. 8	125,000	95,985
Feb. 15	127,500	95,050
Feb. 22	129,240	102,570

†Comparable week

New Problems for the Salesmen; Purchasers Also "On the Spot"

Role of the salesman is a difficult one these days, regardless of what he is selling. He is faced with the problem of making calls on buyers and confessing inability to make deliveries, or of sitting in his office waiting for the telephone to ring and being berated by some customer whose material has not arrived as promised.

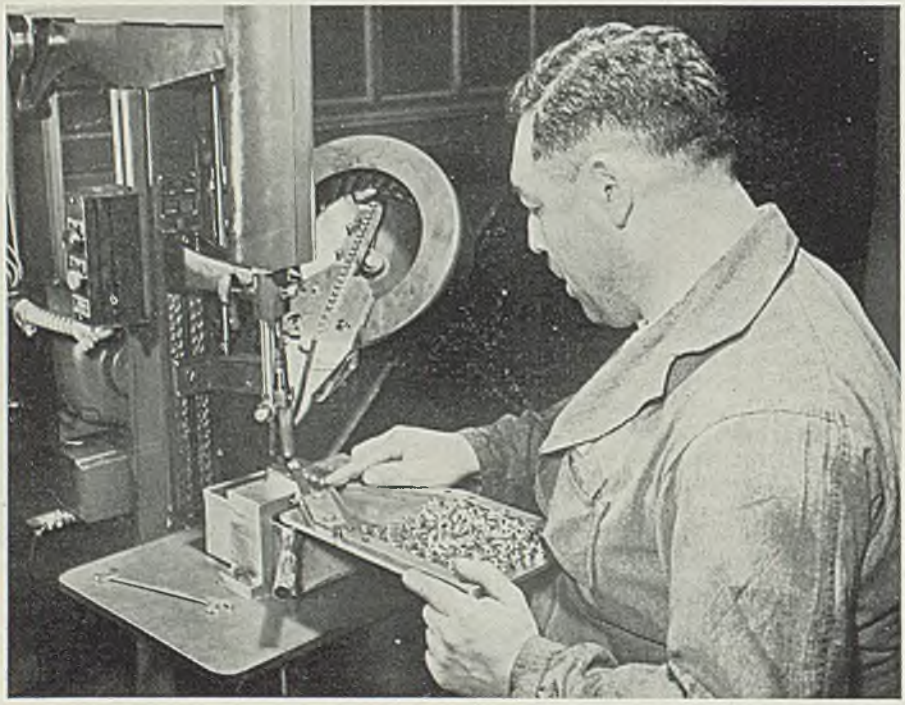
Sales managers will tell you frankly that many men have been called in off the road for the reason that it is futile to solicit new business when order books are restricted to previous customers.

Some of these men are turning to clerical tasks. Others are spending time in their home plant trying to expedite shipments and getting in the way of production men. Still others act as "crying towels" for belabored customers.

Even though the need for expert salesmen is slight, managements are most reluctant to dismiss these men because when the current rush is over—two, three, five years hence—competition is going to be ferocious, and companies with the best trained sales force will get what business there is. One large steel company is actually expanding its sales force against such an eventuality, not to any great degree, but nevertheless filling in the chinks in the merchandising staff where weaknesses are detected.

Purchasing agents, too, are on the spot. A buyer with a large motor company, requesting a step-up in steel orders, said he realized how difficult it was to accommodate increases these days and that he would be glad to scale down requirements if he could be sure his competition would do likewise. He indicated he had to keep step with the parade or run the chance of his company dropping behind and losing his job.

Threading 1500 Nuts Per Hour



■ New nut threading machine at Pontiac Motor division speeds up one of the small manufacturing steps so important in volume production. Bolts feed down from the revolving drum and nuts are automatically run half way up on the bolts which drop off into the pan behind the automatic driver. One machine such as this will thread 1500 nuts per hour

Rear Window Wiper Controlled From Instrument Panel

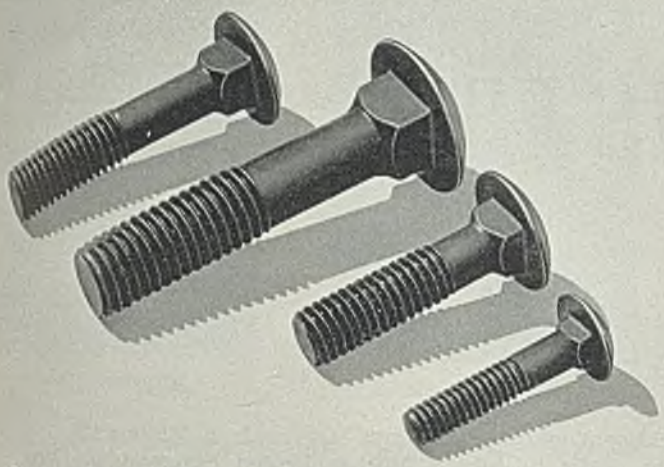
Buick engineers have developed an automatic rear window wiper, vacuum operated and similar in construction to windshield wipers, with a single blade operating in a wide arc across the rear window. Mechanism is concealed in the trunk section of the body and the blade operates from the lower edge of the window. Control valve is located on the instrument panel.

General Motors Safety Record Better in 1940 Than in 1939

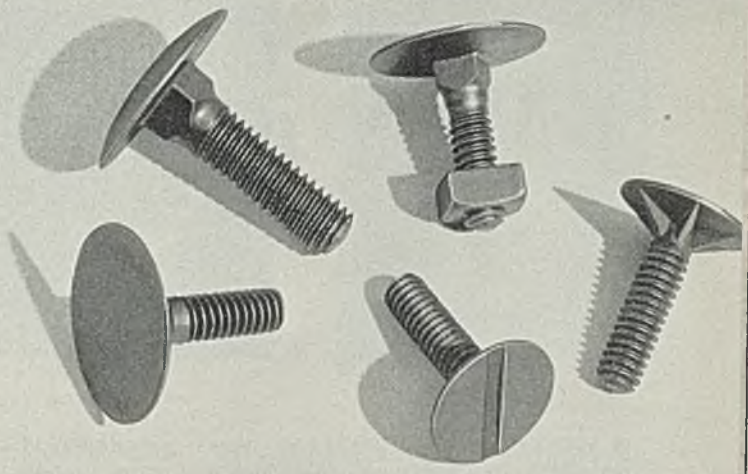
General Motors rang up another all-time safety record in its 89 plants and service units in the U. S. and Canada during 1940. For every million hours worked there were but 3.43 lost-time accidents among the 200,000 hourly rated employes covered, an 8 per cent improvement over 1939.

■ Domestic consumption of steel and iron scrap by steel mills and foundries in January reached an all-time high at 4,278,000 gross tons, it is estimated by the Institute of Scrap Iron and Steel Inc., Washington. This compares with 3,950,000 tons in December and 3,581,000 tons in January, 1940. The previous record was 4,233,000 tons, in October, 1940.

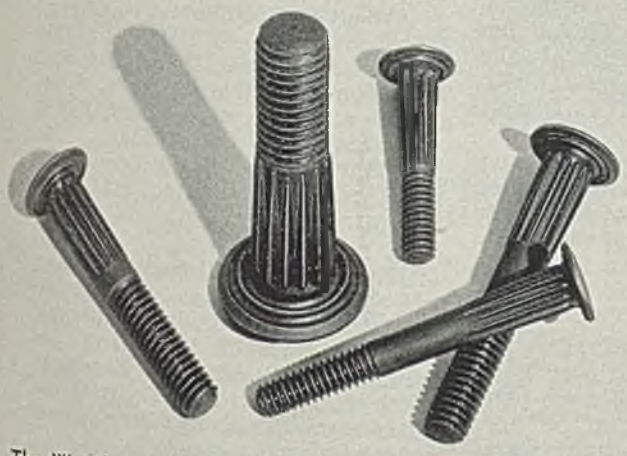
LAMSON *Lag Bolts* HAVE THE "LAG" REMOVED



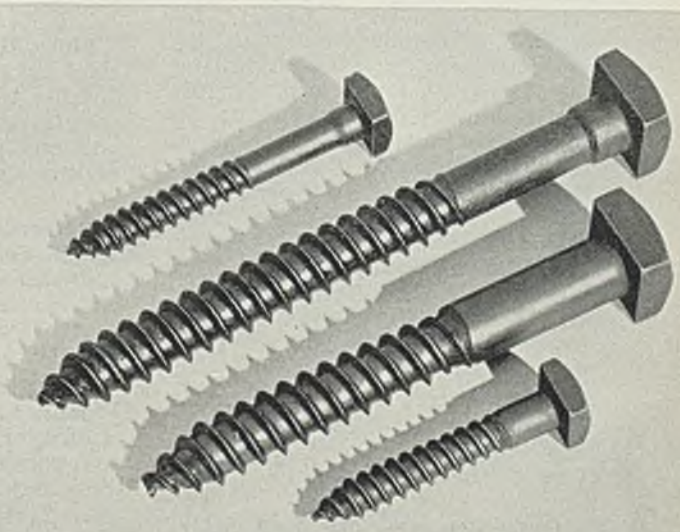
Carriage bolts of heat treated steel are accurately made, have smooth, round heads and true, square shanks. Available in either rolled or cut threads. Stocked in a full list of sizes up to ¾-inch diameter, 14-inch length. Larger sizes made to specifications.



Elevator Bolts are made in four standard types. No. 1, flat head countersunk; No. 2, oval head; No. 3, flat head, with slot, four fins beneath head; No. 4, flat head, four fins beneath head. Stocked up to ⅜-inch diameters; made with large heads to Bolt Institute standards.



The Weather-tight Bolt is for wood construction. Head of this bolt sets flush with surface of wood without counter-boring. Prevents moisture seepage beneath head and from nut end as well. Tapered splined shanks prevent turning when nut is applied.



Twin Thread Lag Bolts penetrate wood twice as fast as old-style single thread lag bolts. Hold tighter; self-centering; long tapered point permits starting by hand. And they sell at standard lag bolt prices.

• If you're engaged with any wood construction or assemblies, LAMSON Twin Thread Lag bolts should interest you a lot, particularly now when time saving is of nation-wide importance. We've taken the "lag" out of lag bolts by the simple expedient of making them penetrate wood twice as fast as before—and we've done that by giving them *twin threads* instead of the customary single thread, and tapering the point. These improvements cut time in half for assemblies using lag bolts.

• Another improvement in bolts for wood construction is the LAMSON *Weather-tight* bolt. It stops moisture from entering wood along the shank of bolt, prevents looseness, retards decay, makes a tighter, smoother assembly.

• Whether you're building a crate for a machine or army cantonment barracks, LAMSON bolts for wood construction offer speed—and a sounder construction than has been possible before. Ask for samples in sizes which interest you.

THE LAMSON & SESSIONS COMPANY, Cleveland, Ohio
Plants at Cleveland and Kent, Ohio; Chicago and Birmingham

Your Jobber stocks the Lamson Line

LAMSON & SESSIONS
BOLTS

MEN of INDUSTRY

William H. Seaman

■ **WILLIAM H. SEAMAN,** vice president in charge of rolls, Mesta Machine Co., Homestead, Pa., since February, 1935, has resigned to become president and general manager, National Roll & Foundry Co., Avonmore, Pa. He succeeds **D. H. Slonaker,** who has become chairman of the board.

He attended Washington and Jefferson college and Carnegie Institute of Technology. One of his earliest affiliations was with the Seaman-Sleeth Co., Pittsburgh, later the Pittsburgh Rolls Corp. In 1924 Mr. Seaman left the latter to become vice president in charge of rolls for Hubbard Steel Foundry Co., Chicago, and six years later, when Continental Roll & Steel Foundry Co. was formed, taking in the Hubbard company and other interests in the Pittsburgh and Wheeling, W. Va., district, Mr. Seaman became vice president of the parent company.

Other officers of National Roll & Foundry are **F. J. Kaib,** vice president and treasurer, and **A. J. Baird,** vice president.

♦

Orris Bergerud has been elected president, Fergus Iron Works Co., Fergus Falls, Minn.

♦

P. K. Povlsen has been made assistant to the president, J. I. Case Co., Racine, Wis.

♦

Thomas Rutherford has been named district manager of sales, Midvale Co., Nicetown, Philadelphia.

♦

L. F. Supple has joined Reynolds Metals Co. Inc., New York, as head of the Unifoil division. He was formerly president, Glazed Paper Co., Springfield, Mass.

♦

Verne E. Minich, founder and until recently president, American Foundry Equipment Co., Mishawaka, Ind., has been elected chairman of the board. **Otto A. Pfaff,** formerly vice president and general manager, is now president and general manager, while **Leslie L. Andrus,** heretofore sales manager, has been made vice president in charge of sales.

♦

Orville E. Mohler, the past year sales manager, Menasco Mfg. Co., Los Angeles, has been appointed a vice president. He will continue to supervise the sales division.

♦

Elmer G. Wettlaufer, for 12 years chief body engineer, commercial car division, Chrysler Corp., Detroit, has resigned to become director of sales and engineering in the special body division of Hydro Mfg. Co., Detroit.

♦

Fairman B. Lee, 166 Jackson street, Seattle, has been appointed representative for the Ajax Electric Co. Inc., Philadelphia, in the Washington, Oregon, northern Idaho and western Montana territory.

♦

John L. Johnston, president and a director, Lambert Co., New York, and subsidiaries, has been elected a director, Continental Can Co. Inc., New York, to fill the vacancy caused by resignation of Michael S. Huffman. Mr. Huffman also resigned as vice president of the company.

♦

W. D. Preston has been appointed assistant to the vice president in charge of sales, Oil City Tank & Boiler Co., Oil City, Pa. He will be in charge of the company's sales offices and also will act as special government agent for the company.

♦

Hiram Winternitz, Charles Dreifus Co., Philadelphia, has been appointed chairman, export committee, Institute of Scrap Iron and Steel Inc., Washington. Louis Dulien, Dulien Steel Products Inc., Seattle, has been named vice chairman.

♦

Joseph H. Jordan, until recently publisher, *Duluth Herald* and *Duluth News-Tribune,* Duluth, has been appointed director of public relations, Oliver Iron Mining Co., Duluth, a United States Steel Corp. subsidiary.

♦

I. F. Pohlmeyer has been appointed sales engineer in the Pacific coast territory for Ohio Seamless Tube Co., Shelby, O. He is a member of American Society of Mechanical Engineers and American Society for Testing Materials. He was formerly associated with Globe Steel Tubes Co., Milwaukee, as inspection engineer.

♦

Albert N. Koch, founder and president, Steel Plate & Shape Corp., Detroit, has resigned from active management, effective March 1, to become assistant to president, Felt & Tarrant Mfg. Co., Chicago. Mr. Koch will continue as a director and will remain associated with his former company.

♦

Everett B. Michaels, Hyman-Michaels Co., Chicago, has been appointed chairman, finance committee, Institute of Scrap Iron and Steel Inc., Washington. **Barney H. Rubine,** Hudson Iron & Metal Co., Bayonne, N. J., has been named vice chairman.

♦

John F. Van Nort has been named sales manager, western division, Duff-Norton Mfg. Co., Pittsburgh, with headquarters in Chicago. Prior to joining the Pittsburgh plant of Duff-Norton, Mr. Van Nort was associated with a United States Steel Corp. subsidiary 17 years, serving in various sales capacities in the eastern territory.

♦

James S. Duncan, formerly vice president and general manager, Massey-Harris Co. Ltd., Toronto, Ont., has been elected president, succeeding the late T. A. Russell. **W. K. Hyslop,** general manager of Massey-Harris Co., Racine, Wis., a subsidiary, has been named vice president of the parent company, and also will continue as general manager at Racine.

E. G. Burgess, superintendent of factories, Racine, has been made

Robert P. Turner

Otto W. Winter

Ernest C. Low

Dr. W. G. Theisinger

assistant general manager and a director there. **P. D. Corkum,** master mechanic at Racine, has become factory superintendent at that plant, and **C. P. Milne,** assistant to general manager of the Racine company, has been named a director.

♦

Robert P. Turner, vice president, New York Wire Cloth Co., York, Pa., has been elected president, York Manufacturers' Association. Mr. Turner is a member of the association's defense committee which has evolved the York plan for aiding the national defense program ((STEEL, Feb. 17, p. 44).

♦

Otto W. Winter has been appointed chairman, emergency defense training committee, American Society of Tool Engineers. This committee functions with the national education committee, established several months ago to determine the needs of industry for skilled men and to develop plans for education. Since 1937 he has been factory manager, Columbus McKinnon Chain Corp. and Chisholm-Moore Hoist Corp., Tonawanda, N. Y.

♦

H. B. Pulsifer, well known metallurgist, author and teacher, has joined American Metal Treating Co., Cleveland, in an executive and professional capacity. He has been instructor in the metallurgy of iron and steel at John Huntington Polytechnic Institute since 1936, and is a member of numerous American societies and of the Institute of Metals, London, England.

♦

Col. C. L. Joly has been elected president, Tate-Jones & Co. Inc., Leetsdale, Pa., succeeding the late F. C. Schroeder. **Wilson H. Jack** has been elected vice president and general superintendent. **Randall Coleman,** for many years associated wth the Mega Car Co., as vice president and in other executive capacities, will soon be associated with Tate-Jones & Co. as assistant to president.

♦

Ernest C. Low has been appointed general manager of sales, John A. Roebling's Sons Co., Trenton, N. J. He joined the California division of the company at Los Angeles in 1909, serving in various sales capacities; was appointed manager of the San Francisco branch in May, 1930, and in January, 1940, was elected president and general manager of John A. Roebling's Sons Co. of California. He will assume his new duties about March 1, with headquarters at Trenton.

♦

G. M. Carvlin has been appointed assistant vice president, and **W. L. Gable** has been named sales manager, engineering and construction division, Koppers Co., Pittsburgh. Mr. Carvlin joined the research department of Koppers in 1925; later entered the operating department, and then was promoted to sales engineer. Mr. Gable, associated with Koppers since 1916, served successively as chief draftsman, engineer and sales engineer.

♦

Sidney J. Newman, president, Newman Bros. Inc., Cincinnati, was re-elected president, for the third term, National Association of Ornamental Metal Manufacturers, at its annual convention in Cincinnati, Feb. 14-15. **Henry J. Neils,** Flour City Ornamental Iron Works, Minneapolis, was re-elected president, National Association of Ornamental Nonferrous Manufacturers, and **B. W. Stonebraker,** Roanoke Iron Works, Roanoke, Va., was re-elected president, Ornamental Iron Manufacturers. **C. J. Condon,** Washington, was re-elected executive secretary of all three organizations, which are affiliated.

♦

Dr. William G. Theisinger, since 1935 welding and metallurgical engineer, Lukens Steel Co., Coatesville, Pa., has been named director of welding research. Following graduation from Harvard university in 1934, he served Western Pipe & Steel Co. of California as consulting engineer during the summer of that year. Dr. Theisinger is a member, American Welding Society, and American Institute of Mining and Metallurgical engineers.

♦

R. B. Wilfong has been made vice president in charge of sales, Pittsburgh Tube Co., Pittsburgh.

♦

F. J. Burtt, since May, 1938, superintendent of wire and wire products, Donora, Pa., plant of American Steel & Wire Co., Cleveland, has been appointed assistant director of industrial relations, with headquarters in Cleveland. **Earl H. Dick,** plant metallurgist at Donora, succeeds Mr. Burtt at that plant.

J. E. Kelley, associated with the Wire company about 40 years, and since 1936 serving as assistant director of industrial relations, now is field supervisor, labor relations. **J. W. Carothers** has been appointed personnel supervisor. Since April, 1938, Mr. Carothers has been located in Cleveland in connection with the company's executive personnel program.

♦

John E. Keyes has been appointed a representative at Detroit for Hanson-Van Winkle-Munning Co., Matawan, N. J. **William J. Wise,** for many years associated with the finishing department of National Cash Register Co., has joined Hanson-Van Winkle-Munning sales organization, and has opened a new office in Dayton, O.; **Robert M. Norton** has been assigned to work with **H. A. Todd,** representative in Syracuse, N. Y.; **J. MacDonald Smith** has been made export manager, with headquarters in New York; **O. Waring Mellick** has been transferred from Matawan to Bridgeport, Conn.; and **John VanderVoort,** sales representative in upstate New York, has been transferred to special duties at Matawan.

Activities of Steel Users, Makers

■ AIRCRAFT & Arms Procurement Co., Syracuse, N. Y., representing more than 200 plants in the United States, has a unique role in the defense program. It acts as a clearing house for companies desiring to subcontract aircraft and armament work, bringing together manufacturers with defense contracts and machine shops with open capacity for subcontracting. A catalog of plant facilities, with keyed index, is available.

♦

Howard Foundry Co., Chicago, manufacturer of large aluminum, bronze, brass and copper castings for heavy army machinery, artillery equipment and shipbuilding, has launched a market expansion program in Ohio, Pennsylvania and New York. Rein & Webster Inc., Cleveland, has been appointed representative in Cleveland.

♦

Pioneer Engineering & Mfg. Co., Detroit, has completed its new streamlined plant at John R and State Fair avenues, on a five-acre tract, containing 23,000 square feet. It is windowless and air conditioned, with special precautions against sabotage. The company furnishes service in design of tools, dies and fixtures, special machines, reorganization of manufacturing methods, plant layout and cost reduction.

♦

Habirshaw Cable & Wire Corp., Yonkers, N. Y., a subsidiary of Phelps Dodge Corp., has awarded contract to Brown & Matthews Inc., New York, for design and construction of a warehouse, 140 x 240 feet, to be erected on Saw Mill River road, Yonkers.

♦

Peerless of America Inc., Chicago, maker of commercial refrigeration and air conditioning accessories, has purchased the former Indiana Truck Co. plant in Marion, Ind., comprising a one-story building of 185,000 square feet on 19 acres of land. The company, which has plants in Chicago, New York, Los Angeles and Dallas, Tex., will concentrate operations in the new factory.

♦

George Scherr Co. Inc., New York, has been appointed exclusive sales distributor, both domestic and foreign, for the Wilder micro-projector manufactured by R. S. Wilder Inc., Waltham, Mass.

♦

Armco International Corp., New York, will move from its present location at 21 Wall street to 120 Broadway, on or about April 22.

♦

Bendix-Westinghouse Automotive Air Brake Co. plans to formally open and occupy its new, modern general offices and factory at Elyria, O., May 1. The new plant, situated on a 36-acre plot and comprising 167,000 square feet of floor space, features latest developments in illumination and air conditioning.

♦

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., is expanding its radio division at Baltimore to three times its original size, due to mounting requirements of the national defense program. By March, the plant will have 194,000 square feet and will employ approximately 1500, five times the average for recent years.

♦

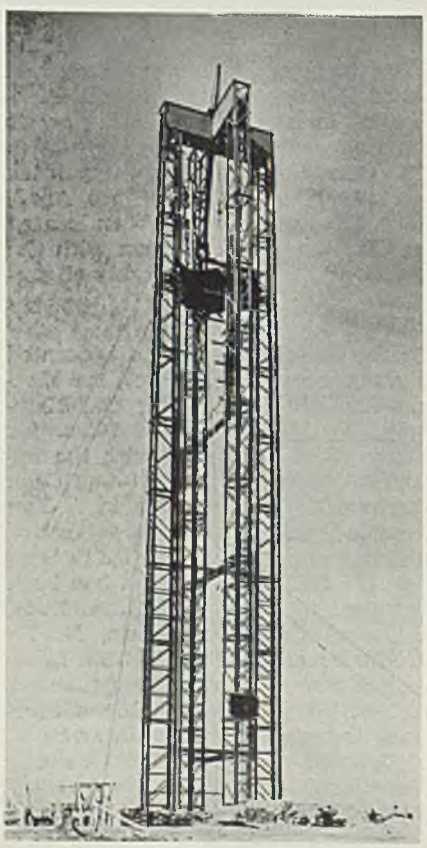
Construction of a 40,000-kilowatt turbine-generator is being started by General Electric Co., Schenectady, N. Y., for the Duke Power Co. as part of a huge expansion program to keep pace with defense needs. The new unit will be installed in the company's Buck station near Spencer, N. C., and will entail expenditures totaling $3,000,000, exclusive of necessary transmission lines and additional distribution facilities.

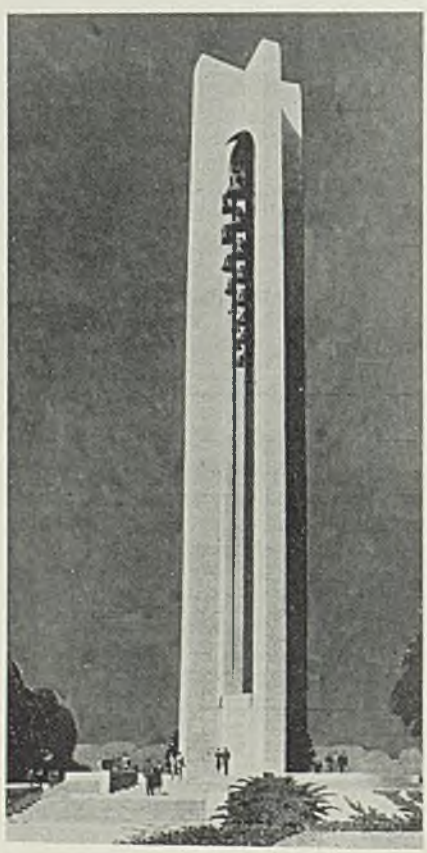
♦

Columbia Steel & Shafting Co., Pittsburgh; Edgar T. Ward's Sons Co., Pittsburgh; and Summerill Tubing Co., Bridgeport, Pa., all affiliated interests, have established a district sales office in the Third National building, Dayton, O., with C. W. Ritz and J. E. Merchant in charge.

♦

Manning, Maxwell & Moore Inc., Bridgeport, Conn., is expanding its facilities to take care of increased demand for its products. It has added a sixth floor to its Bridgeport plant, and has leased about 50,000 square feet of floor space. The Hancock Valve division of the company, located in Boston, has secured an additional four-story factory to be devoted exclusively to the manufacture of Hancock steel valves.





■ A 102-ton steel framework, fabricated and erected entirely by arc welding, will support the unique 5-tower 32-bell carillon presented to the city of Dayton, O., by Mrs. E. A. Deeds, wife of the president, National Cash Register Co., Dayton. Four main towers are 157½ feet high, consist of a 27-foot top section, three 35-foot intermediate sections and a 25½-foot bottom section. Framework is angles 8 x 8 x 1⅛-inch at the bottom and 8 x 8 x ¾-inch at the top. Architects and engineers are Reinhard and Hofmeister, New York; contracting engineers, Mellon Stuart Co., Pittsburgh; fabricators and erectors, Burger Iron Co., Dayton. Photo courtesy Lincoln Electric Co., Cleveland

Initial Awards for Construction at Outlying Defense Bases Made by Army

■ DEFENSE contracts last week reported awarded by the departments of war and the navy aggregated $66,712,791, compared with almost $100,000,000 in the previous week. Total of war department awards was more than twice that of the navy. Ordnance and quartermaster corps for the army and the navy's bureau of supplies and accounts were principal contractors.

Navy reported contract with the Cleveland Diesel Engine division of General Motors Corp. for propelling machinery and diesel engine-driven generators for a submarine tender at $1,475,000. Contract for propelling machinery for 14 submarine chasers at $420,000 per set or total of $5,880,000 was also awarded the same company.

J. A. Terteling & Sons, Boise, Idaho, were awarded a $7,547,661 contract for construction of ordnance depot at Hermiston, Oreg., by the war department.

Initial contracts for construction of outlying defense bases also were awarded by the war department last week as follows: Bermuda, initial contract for $2,456,000 to Arthur A. Johnson Corp., Long Island City, N. Y.; Necaro Co. Inc., Brooklyn, N. Y.; and Vermilya-Brown Co. Inc., New York; total estimated cost to be $19,000,000;

Newfoundland, initial contract of $3,360,000 to Al Johnson Construction Co, Minneapolis; McWilliams Dredging Co., Chicago; Nick F. Helmers Inc., New York; and A. Guthrie & Co. Inc., St. Paul; total estimated cost, $23,400,000;

St. Lucia, British West Indies, initial contract of $900,000 to Minder Construction Corp., Chicago; total cost, $3,000,000;

British Guiana, initial contract of $900,000 to Elmhurst Contracting Co. Inc., Long Island, N. Y.; total cost to be $3,000,000;

Trinidad, British West Indies, initial award of $5,190,000 to George F. Driscoll Co., Brooklyn, N. Y.; and Walsh Construction Co., Davenport, Iowa; estimated total cost, $51,000,000;

Antigua, British West Indies, initial contract of $900,000 to S. J. Groves & Sons Co. Inc., Minneapolis; estimated total cost, $2,880,000.

War department reported the following:

Ordnance Department Awards

Advance Pressure Castings Inc., Brooklyn, N. Y., artillery ammunition components, $10,925.

Aluminum Co. of America, Pittsburgh, aluminum strip, $5343.75.

American Brake Shoe & Foundry Co., Detroit, hand guards, $6000.

American Brass Co., Ansonia, Conn., brass rod, $2782.63.

American Foundry Equipment Co., Mishawaka, Ind., blasting machines, $5550.

American Generator & Armature Co., Chicago, generators, $22,000.

Apex Tool & Cutter Co. Inc., Shelton, Conn., cutters, $9150.

Ashton Valve Co., Cambridge, Mass., air pressure gages, $6830.46.

Barber-Colman Co., Rockford, Ill., cutters, $1291.50.

Bendix Aviation Corp., Eclipse Aviation division, Bendix, N. J., generators, $222,852.

Better Bilt Door Co. Inc., Jenkintown, Pa., doors, $1100.

Bodine Machine Co., Bridgeport, Conn., plates for drilling machine, $1335.

Bohn Aluminum & Brass Corp., Detroit, castings, $19,740.

Bridgeport Rolling Mills Co., Bridgeport, Conn., brass, $38,402.

Brown & Sharpe Mfg. Co., Providence, R. I., tools, $5445.50.

Canister Co., Phillipsburg, N. J., varnishing machine, $2202.

Carnegie-Illinois Steel Corp., Boston, steel, $1735.49.

Chambersburg Engineering Co., Chambersburg, Pa., parts for Chambersburg hammers, $2320.40.

Chandler Construction Co., Bridgewater, Mass., replacement of roof, Watertown arsenal, Massachusetts, $110,500.

Chase Brass & Copper Co. Inc., Waterbury, Conn., seamless metal, $12,024.

Chase, Parker & Co. Inc., Boston, chain slings, tools, $3990.47.

Chicago Tramrail Co., Chicago, tramrails, $1510.

Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati, gears, $1249.50.

Clayton & Lambert Mfg. Co., Detroit, gasoline torches, $1083.35.

Clemson Bros. Inc., Washington, hack saw blades, $1988.30.

Cleveland Tool Engineering Co., Cleveland, grinders, $1257.85.

Cleveland Twist Drill Co., Cleveland, reamers, $1788.24.

Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., small arms materiel, machinery, $21,032.50.

Columbia Steel & Shafting Co., Carnegie, Pa., steel bars, $18,259.85.

Consolidated Packaging Machinery Corp., Buffalo, scales, $1375.

Cowles, C., & Co., New Haven, Conn., small arms materiel, $1324.80.

Crucible Steel Co. of America, New York, tool steel, $2519.79.

Cutter, Wood & Sanderson Co., Cambridge, Mass., tools, $8557.59.

DeLisser Machine & Tool Corp., New York, tools, $2787.

Denman & Davis, Pittsburgh, steel bars, $3766.34.

Diecasters Inc., Ridgefield, N. J., die castings, $11,894.64.

Drive-All Mfg. Co., Detroit, motorizing units, $1794.95.

Electric Boat Co., New York, electric motors, $4152.

Electric Wheel Co., Quincy, Ill., trailers, $4293.75.

Ex-Cell-O Corp., Continental Tool Works division, Detroit, cutters, $1271.04.

Felt & Tarrant Co., Boston, comptometers, $1700.

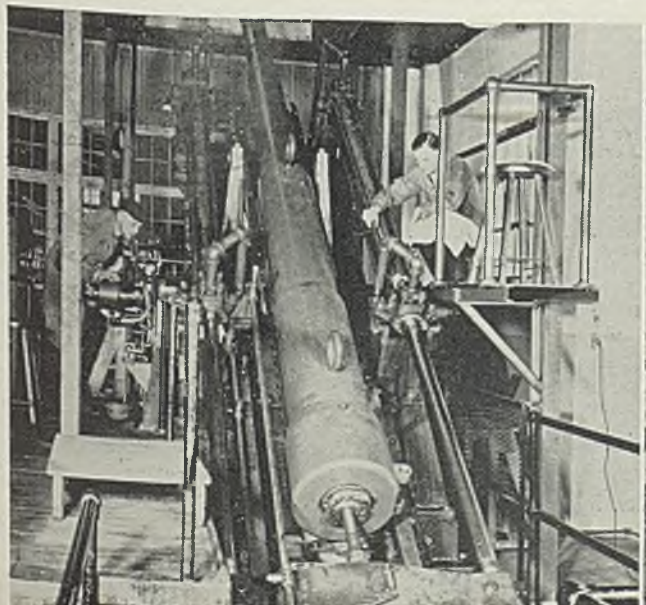
Fischer, Charles, Spring Co., Brooklyn, N. Y., springs, $3850.

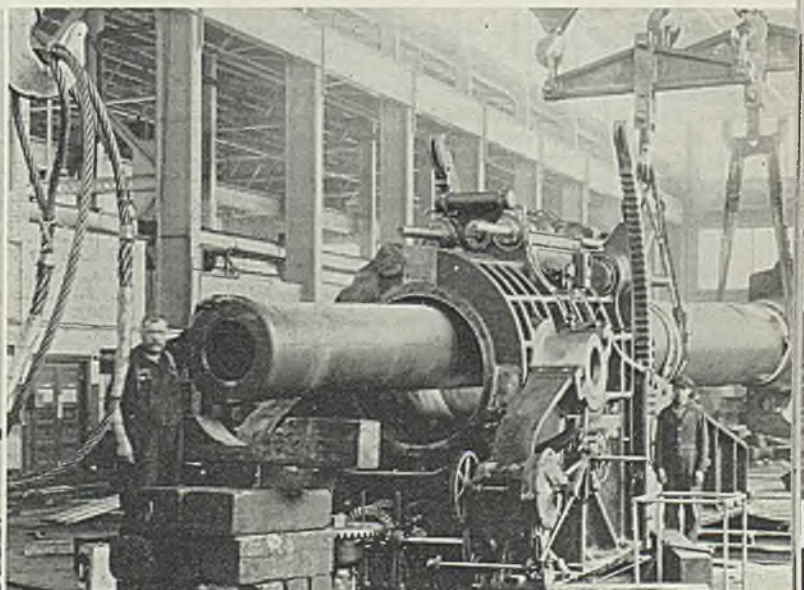
General Electric Co., Schenectady, N. Y., portable ammeters, electric lamps, $3540.30.

General Electric Supply Corp., Spring-

Testing, Mounting Guns

■ **Gymnasticator in action, at left below. This testing machine reproduces the recoiling action of an artillery piece and is used to obtain proper adjustment in the recoil mechanism. Lower right, mounting artillery gun in carriage. Photos by United States Army Signal Corps**





field, Mass., lighting fixtures, $1097.20.
Goefert & Buck, New York, hardware, $3619.12.
Greenfield Tap & Die Corp., Greenfield, Mass., taps, $1065.72.
Haarmann Steel Co., Holyoke, Mass., steel beams, $1900.
Hadley Special Tool Co. Inc., Boston, tools, $7200.
Harvey, A. C., Co., Allston, Mass., deformed steel, $1414.43.
International Harvester Co., Chicago, engines, $1523.90.
International Nickel Co. Inc., Huntington, W. Va., nickel alloy, $42,238.23.
Johnson, Justus & Son Co., Hartford, Conn., dies, $3135.
Jones & Lamson Machine Co., Springfield, Vt., machines, $13,550.
Kelly, John P., Philadelphia, brass castings, $1299.77.
Landis Machine Co., Waynesboro, Pa., machines, $1504.98.
LaSalle Steel Co., Hammond, Ind., steel, $3994.15.
LeTourneau Co. of Georgia, Toccoa, Ga., artillery ammunition, $1,190,000.
Lowell Wrench Co., Worcester, Mass., wrenches, $22,308.40.
Lufkin Rule Co., Saginaw, Mich., scales, $4224.
Lukens Steel Co., Coatesville, Pa., steel plate, $16,703.26.
Lukenweld Inc., Coatesville, Pa., drop forgings, $4202.82.
McClean, Fred G., Heating Supplies Inc., Springfield, Mass., installation of steam pipes, $1948.08.
Mercury Mfg. Co., Chicago, tractors, $1135.10.
Modern Bond Corp., Wilmington, Del., small arms materiel, $12,330.
Modern Tool & Die Co., Philadelphia, gages, $1248.
Morse Twist Drill & Machine Co., New Bedford, Mass., reamers, $1080.
Morton Mfg. Co., Chicago, ammunition chests, $321,079.08.
Murray Mfg. Corp., Brooklyn, N. Y., artillery ammunition components, $142,680.
National Cash Register Co., Dayton, O., dies, $1600.
National Mineral Co., Chicago, small arms materiel, $6029.52.
National Twist Drill & Tool Co., Detroit, drills, $1370.
Niles-Bement-Pond Co., Pratt & Whitney division, West Hartford, Conn., drills, gages, $5106.78.
Otis Elevator Co., Buffalo, steel castings, $1157.36.
Precise Tool & Mfg. Co., Farmington, Mich., gages, $1150.
Prentiss, Henry, & Co. Inc., New York, drilling machines, $2655.
Proctor, S. E. & R. C., Boston, tools and equipment, $1049.81.
Rathbone, A. B. & J., Palmer, Mass., cold drawn steel, $9914.45.
Reynolds Metals Corp., Richmond, Va., aluminum powder, $9087.50.
Roessler Machine Co., Elkins Park, Pa., tools, $6816.
Service Caster & Truck Co. of New England, Somerville, Mass., lift trucks, $2146.
Shipley, W. E., Machinery Co., Philadelphia, grinders, $198,956.14.
Smith, Drum & Co., Philadelphia, washing machines, $2029.
Smithe, F. L., Machine Co. Inc., New York, spinning machines, $51,620.
Standard Gage Co., Poughkeepsie, N. Y., gages, $5508.94.
Standard Pressed Steel Co., Jenkintown, Pa., artillery ammunition components, $2670.
Star Machine & Tool Co., Cleveland, gages, $4367.
Stevens Walden Inc., Worcester, Mass., small arms materiel, $3274.35.
Taft-Peirce Mfg. Co., Woonsocket, R. I., gages, $1486.93.
Veit & Young, Philadelphia, tools, $16,707
Westinghouse Electric & Mfg. Co., Philadelphia, motors, $1575.

Quartermaster Corps Awards

Alan-Lawrence Co. Inc., New York, water mains, Ft. Totten, New York, $3100.
Allen Boat Co., Cretna, La., all steel, single screw diesel-propelled welded distribution box boats, $204,500.
Anderson-Coffey Co., Boston, installation of additions to street lighting system, Ft. Adams, Rhode Island, $15,800.
Autocar Co., Ardmore, Pa., tractor-trucks and chassis, $1,248,963.56.
Bailey, J. W., Construction Co., Seattle, 30 recreation buildings at Ft. Lewis, Washington, $89,220.
Bottenfield, C. I., Balboa, Canal Zone, electrical installations in kitchens of barracks, Ft. Kobbe, Howard field, and Ft. Sherman, Canal Zone, $19,680.
Browning, C. L., Jr., San Antonio, Tex., 24 temporary buildings, Ft. Sam Houston, Texas, $183,575.
Burke, James J., Co., Salt Lake City, Utah, 8 underground magazines, Ogden ordnance depot, Ogden, Utah, $62,900.
Calumet Shipyard & Drydock Co., Chicago, all steel, single screw diesel-propelled welded boats, $212,000.
Central California Construction Co., San Francisco, air corps gasoline fueling system, Stockton airport, California, $75,728.
Cyclone Fence Co., Cleveland, magazine area fence, Ft. Custer, Michigan, $1940.
Dubuque Boat & Boiler Works, Dubuque, Iowa, all steel, single screw diesel-propelled welded distribution box boats, $265,000.
Fugal, Niels, Pleasant Grove, Utah, water lines, Ogden ordnance depot, Ogden, Utah, $52,517.25.
Herring-Hall-Marvin Safe Co., Hamilton, O., field safes, $57,816.25.
Luders Marine Construction Co., Stamford, Conn., all steel, single screw diesel-propelled welded distribution box boats, $306,960.
Mion Construction Co., Atlanta, Ga., tem-

PURCHASES UNDER

(In Week Ended Feb. 8)

Iron and Steel Products

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
American Bridge Co., Cincinnati
American Emblem Co. Inc., New Hartford, N. Y.
American Hardware Corp., New Britain, Conn.
American-LaFrance-Foamite Corp., Elmira, N. Y.
American Locomotive Co., Schenectady, N. Y.
American Welding Co., Pittsburgh
Apollo Steel Co., Apollo, Pa.
Atlas Tack Corp., Fairhaven, Mass.
Bethlehem Steel Co., Bethlehem, Pa.

Blickman, S., Inc., Weehawken, N. J.
Bridgeport Thermostat Co., Bridgeport, Conn.
Budd, Edward G., Mfg. Co., Philadelphia
Buffalo Bolt Co., North Tonawanda, N. Y.
Cincinnati Galvanizing Co., Cincinnati
Colorado Fuel & Iron Corp., Denver

Columbia Steel Co., San Francisco
Columbiana Boiler Co., Columbiana, O.
Commercial Shearing & Stamping Co., Youngstown, O.
Consolidated Supply Co., Portland, Oreg.
Crane Co., Chicago

Crosbee Clark Co., Philadelphia
Crucible Steel Co. of America, New York

Cushman Motor Works, Lincoln, Nebr.
Dohrmann Hotel Supply Co., Los Angeles

Eastern Rolling Mill Co., Baltimore
Edwards, E. H., Co., San Francisco
Electro Metallurgical Sales Corp., New York
Ex-Cell-O Corp., Detroit
Flour City Ornamental Iron Co., Minneapolis
Herring Hall Marvin Safe Co., Hamilton, O.
Highway Materials Co., Jackson, Miss.
Hyman-Michaels Co., San Francisco
Keystone Steel & Wire Co., Peoria, Ill.
Lowell Wrench Co., Worcester, Mass.
Lukens Steel Co., Coatesville, Pa.
Magor Car Corp., New York
Manning, Maxwell & Moore Inc., Bridgeport, Conn.
Marine Specialty Co., Long Beach, Calif.
McArdle & Cooney Inc., Philadelphia
McKay Co., Pittsburgh
Mesker, George L., & Co., Evansville, Ind.
Morse Chain Co., Ithaca, N. Y.
Nathan Mfg. Co., New York
National Iron Works, San Diego, Calif.
National Tube Co., McKeesport, Pa.
Nicholson File Co., Providence, R. I.
Noland Co. Inc., Washington
Norris Stamping & Mfg. Co., Los Angeles
Poor & Co., Canton Forge & Axle Works, Canton, O.
Republic Steel Corp., Massillon, O.
Russell Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Sargent & Co., New Haven, Conn.
Savory Inc., Newark, N. J.
Service Steel Co., Detroit
Sharpsville Steel Fabricators Inc., Sharpsville, Pa.
Smith Bros. Mfg. Co., Findlay, O.
Standard Nut & Bolt Co., Valley Falls, R. I.
Summerill Tubing Co., Bridgeport, Pa.
Talon Inc., Meadville, Pa.

Commodity	Amount
Steel	$145,740.85
Steel beams	15,392.89
Uniform buttons	42,400.00
Fuse parts	114,495.00
Gas cylinders	22,467.50
Forgings	30,433.50
Steel containers	58,650.00
Steel	14,300.69
Nails, brads	15,916.83
Rails, fittings, steel towers, forgings, bar steel	1,777,227.55
Dishwashing baskets	55,500.00
Practice bombs	217,728.00
Parts for bombs	3,409,338.20
Bolts, nuts	22,240.22
Buckets	76,472.14
Nails, reinforcement bars	25,855.30
Cable, rails, bars	25,508.70
Steel containers	58,820.00
Superstructures	30,000.00
Pipe	12,930.99
Valves, cast iron pipe, steel pipe	42,108.00
Tools	12,845.25
Tool steel, bar steel, steel	423,576.15
Fuse parts	582,000.00
Galley and scullery equipment	11,365.65
Sheet steel	24,825.14
Wire rope	17,834.80
Ferromanganese	13,141.45
Tanks	37,625.00
Reels	22,176.00
Safes	57,816.25
Steel bars	25,658.00
Rail, track material	16,569.10
Nails	*21,468.46
Wrenches	22,308.40
Steel rings	32,120.00
Scoops	13,146.70
Valves	34,664.00
Valves	18,270.00
Adapters	14,420.71
Chains, bridles	57,897.25
Airplane hangar	16,355.00
Chains and sprockets	16,377.92
Fittings	42,275.09
Frame nests	10,201.86
Forgings	3,580,199.28
Files	16,481.64
Water closets	197,780.42
Ammunition boxes	664,240.00
Drop forgings	11,230.25
Steel	26,555.60
Bolts, nuts	179,309.76
Bolt hooks	14,500.00
Measures, pans	19,772.00
Steel tubing	18,941.44
Tanks	373,200.00
Shell	128,384.50
Bolts	45,669.34
Steel tubing	11,201.71
Slide fasteners	195,669.32

porary housing including utilities, Atlanta, Ga., $14,210.

National Builders Inc., Minneapolis, officers' quarters and mess, Ft. Snelling, Minnesota, $20,707.

Newport Oil Transportation Co., Newport, R. I., tanker, $55,000.

Philadelphia Depot Factory, Philadelphia, brassards, $2697.38.

Slack, S. B., Decatur, Ga., water transmission line and appurtenances for Atlanta general depot, Atlanta, Ga., $58,-994.20.

Spedden Shipbuilding Co. Inc., Baltimore, all steel, single screw diesel-propelled welded distribution box boats, $267,500.

Sturgeon Bay Shipbuilding & Drydock Co., Sturgeon Bay, Wis., all steel, single screw diesel-propelled welded distribution box boats, $214,000.

Watson Automotive Equipment Co., Washington, semi-trailers, $71,809.53.

Woodcock, O. P., Jacksonville, Fla., temporary housing, including utilities, at 4th corps headquarters, Jacksonville, Fla., $34,940.

Yellow Truck & Coach Mfg. Corp., Detroit, 1½-ton trucks, $124,838.22.

Corps of Engineers Awards

Berger, C. L., & Sons Inc., Boston, collimators, $3549.50.

Bruning, Charles H., Co., Long Island City, N. Y., surveying equipment, $3807.06.

Cunningham, T. W., Inc., Winchester, Mass., housing and facilities at air base, Bangor, Me., $1,011,709.

Davenport Besler Corp., Davenport, Iowa, locomotives, $125,250.

Fate-Root-Heath Co., Plymouth, O., locomotives, $125,250.

General Fireproofing Co., Youngstown, O., office chairs, $3152.50.

Harter Corp., Sturges, Mich., metal stools, $1064.

Ingersoll-Rand Co., New York, boring machines, $4823.60.

International Stacey Corp., Columbus, O., searchlight towers and searchlights, $12,892.

Lufkin Rule Co., New York, steel tapes, $6050.33.

Paving Supply & Equipment Co., Washington, graders, $1950.

Remington-Rand Inc., Buffalo, portable typewriters, $178.52.

Underwood Elliott Fisher Co., New York, typewriters, $1212.50.

Zarkin Machine Co. Inc., New York, plate grainers, $5190.

Medical Corps Awards

McIntosh Electrical Corp., Chicago, sinusoidal machines, $26,035.

Philips Metalix Corp., New York, radiographic and fluoroscopic machines, $15,441.

Shank, E. A., Sign Co., New York, folding bedside tables, $80,800.

Sklar, J., Mfg. Co., New York, aspirating unit, $5258.

Superior Sleeprite Corp., Chicago, steel furniture, $118,991.45.

Air Corps Awards

Bendix Aviation Corp., Pioneer Instrument division, Bendix, N. J., indicator and tube assemblies, drift meters, assemblies, $6,001,995.

Continental Machines Inc., Minneapolis, machines, $207,765.

Crouse-Hinds Co., Syracuse, N. Y., lamp assemblies, $26,586.25.

Curtiss-Wright Corp., Curtiss Propeller division, Clifton, N. J., propeller assemblies, $454,886.45.

General Electric Co., Schenectady, N. Y., superchargers, $18,040,429.78.

Greenfield Tap & Die Corp., Greenfield, Mass., dies and taps, $68,712.50.

Holtzer-Cabot Electric Co., Boston, inverters, $198,000.

King-Seeley Corp., Ann Arbor, Mich., eliminators and valves, $101,660.

Manning, Maxwell & Moore Inc., Bridgeport, Conn., assemblies, $57,500.

Sperry Gyroscope Co. Inc., Brooklyn, N. Y., indicator and controller assemblies, $120,420.

Square D Co., Kollsman Instrument division, Elmhurst, N. Y., tachometer indicators and generators, altimeter assemblies, $4,155,318.75.

Union Twist Drill Co., Athol, Mass., twist drills, $32,546.32.

Wright Aeronautical Corp., Paterson, N. J., aeronautical engines, $67,931.76.

Coast Artillery Corps Awards

Jonson Engineering Co., New York, cable clamps, $2804.14.

Chemical Warfare Service Awards

Acushnet Process Co., New Bedford, Mass., faceblanks, $1425.

American Laundry Machine Co., Cincinnati, drying tumblers, $3111.

Anderson & Ireland Co., Baltimore, hardware, $767.42.

Barcalo Mfg. Co., New York, pliers, $701.

Bliss, E. W., Co., Brooklyn, N. Y., press parts, $1903.20.

Brandt, Chas. T., Bros., Baltimore, welded steel channels, $1296.

Citrin, Charles, & Sons, Brooklyn, N. Y., containers, $2329.21.

Continental Can Co. Inc., New York, canister parts, $51,611.54.

Davis, F. A., & Sons, Baltimore, ice making machines, $1492.50.

DuPont, E. I., de Nemours & Co., Wilmington, Del., electric detonators, $3055.

Eastern Malleable Iron Co., Wilmington, Del., handling rings, $1455.

Federal Tin Co. Inc., Baltimore, tinplate, $2520.61.

Fischer, Charles, Spring Co., Brooklyn, N. Y., steel wire clamps, $4900.

Gries Reproducer Corp., New York, valve testing apparatus, $470.

Hunter Pressed Steel Co., Lansdale, Pa., steel wire clamps, $10,685.

Improved Mailing Case Co., New York,

WALSH-HEALEY ACT—

Iron and Steel Products

	Commodity	Amount
Taylor-Wharton Iron & Steel Co., Easton, Pa.	Cylinders	$10,428.60
Thompson, Henry G., & Son Co., New Haven, Conn.	Saw blades	11,652.00
Tubular Service Corp., Cambridge, Mass.	Steel tubing	25,610.93
Utica Drop Forge & Tool Corp., Utica, N. Y.	Pliers	30,088.00
Walworth Co., New York	Valves	14,065.00
Warren Webster & Co., Camden, N. J.	Booster parts	663,000.00
Waterbury Button Co., Waterbury, Conn.	Uniform buttons	59,003.85
Weaver, Frank M., & Co. Inc., Lansdale, Pa.	Structural steel	10,925.00
Weiskittel, Harry C., Co., Baltimore	Gas ranges	13,485.00
Western Pipe & Steel Co. of Calif., Los Angeles	Steel penstock, buoys	1,628,210.00
Williams, J. H., & Co., Buffalo	Wrenches	53,179.20
Yale & Towne Mfg. Co., Stamford, Conn.	Padlocks, door closers	31,682.00
Youngstown Sheet & Tube Co., Youngstown, O.	Sheet steel	14,769.50

Nonferrous Metals and Alloys

Aluminum Co. of America, Pittsburgh	Aluminum alloys, pigment	$100,099.52
American Brass Co., Waterbury, Conn.	Brass, bronze	13,632.24
American LaFrance Foamite Corp., Elmira, N. Y.	Fire extinguishers	12,279.60
American Metal Co. Ltd., New York	Ingot copper	142,780.00
American Smelting & Refining Co., New York	Ingot copper	122,854.09
Bridgeport Brass Co., Bridgeport, Conn.	Discs	51,040.00
Bridgeport Rolling Mills Co., Bridgeport, Conn.	Cartridge brass	53,448.45
Caswell, Strauss & Co. Inc., New York	Pig tin	536,149.60
Chase Brass & Copper Co. Inc., Waterbury, Conn.	Brass, cartridge and strip brass	187,480.25
C-O-Two Fire Equipment Co., Newark, N. J.	Fire extinguishing apparatus	10,317.60
Greene-Wolf Co. Inc., Brooklyn, N. Y.	Bushings	18,593.63
Grimes Mfg. Co., Urbana, O.	Lamp assemblies	232,530.00
Handy & Harman, New York	Silver brazing alloy	11,580.00
International Minerals & Metals Corp., New York	Slab zinc	34,128.00
International Nickel Co. Inc., New York	Alloy cylinders	42,238.23
National Lead & Oil Co. of Pennsylvania, Pittsburgh	Solder	10,708.04
Revere Copper & Brass Inc., Baltimore	Brass	682,061.12
Waltham Watch Co., Waltham, Mass.	Springs	41,250.00
Wolverine Tube Co., Detroit	Brass pipe	19,425.85

Machinery and Other Equipment

Acme Die & Machine Co., Latrobe, Pa.	Primer detonators	$61,913.80
Acme Machine Tool Co., Cincinnati	Lathes	29,992.50
Aerial Machine & Tool Corp., New York	Releases	10,500.00
Allis-Chalmers Mfg. Co., Milwaukee	Air compressors	47,200.00
American Brake Shoe & Foundry Co., Kellogg division, Rochester, N. Y.	Jig assemblies	11,805.69
American Generator & Armature Co., Chicago	Generators	22,000.00
American Machine & Metals Inc., East Moline, Ill.	Presses, ironers	33,541.00
Baker Hamilton & Pacific Co., San Francisco	Hoists	30,714.50
Bendix Aviation Corp., Eclipse Aviation division, Bendix, N. J.	Generators	222,852.00
Buffalo-Springfield Roller Co., Springfield, O.	Water ballast rollers	34,825.00
Bunell Machine & Tool Co., Cleveland	Stand assemblies	36,208.00
Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati	Grinding machine	17,238.00
Cincinnati Shaper Co., Cincinnati	Shear machines	17,583.00
Climax Engineering Co., Clinton, Iowa	Power unit	63,947.50
Colby, A. C., Machinery Co., New York	Lathes	13,866.00
Consolidated Machine Tool Corp., Rochester, N. Y.	Mills	184,704.53
Continental Machines Inc., Minneapolis	Sawing machines	16,794.00
Continental Motors Corp., Muskegon, Mich.	Generators	11,967.18
Davidson, M. T., Co., Brooklyn, N. Y.	Pumps	143,602.99
Detroit Broach Co. Inc., Detroit	Broaching equipment	44,868.00
DeVilbiss Co., Toledo, O.	Paint spray guns	13,002.50
Eccles & Davies Machine Co. Inc., Los Angeles	Milling machines, shaper, lathes	70,496.05

(*Please turn to Page 44*)

tube containers, $1182.75.
Maclane Hardware Co., New York, shears and pliers, $4885.97.
Manning, Maxwell & Moore Inc., New York, screwdrivers, $934.67.
Manufacturers' Supply Co., Washington, exhauster units, $5220.
Miller Co., Meriden, Conn., brass, $12,017.70.
Myers, F. E., & Bros. Co., Ashland, O., decontaminating apparatus, $4801.20.
Pressed Steel Tank Co., West Allis, Wis., shipping containers, $14,320.70.
Proctor & Schwartz Inc., Philadelphia, screw type closing machines, $24,060.
Raymond Mfg. Co., Corry, Pa., steel wire clamps, $3745.
Revere Copper & Brass Inc., half hard brass, $4000.50.
Russ, Beach Co., New York, vacuum pumps, $1386.
Steel & Wire Products Co., Baltimore, strapping, $1065.
Struthers-Wells Co., Warren, Pa., superheaters, $6825.
Stuber & Kuck Co., Peoria, Ill., tinplate containers, $6238.44.
United Pressed Products Co., Chicago, faceforms, $1250.
Wallace & Tiernan Co. Inc., Newark, N. J., valves, $6880.

Signal Corps Awards

American Radio Hardware Co. Inc., New York, keys, $11,101.20.
Branch, L. S., Mfg. Corp., Newark, N. J., junction boxes, $39,960.
Cannon Electric Development Co., Los Angeles, plugs, $20,250.
Clayton & Lambert Mfg. Co., Detroit, torches, $10,000.
Climax Engineering Co., Clinton, Iowa, power units, $63,947.50.
Cook Electric Co., Chicago, switchboards, $41,455.50.
Ehrick, Fred, Inc., Brooklyn, N. Y., panels $27,782.
Everwear Trunk & Luggage Co., Newark, N. J., chests, $13,882.60.
Folmer Graflex Corp., Rochester, N. Y., camera equipment, $63,130.40.
General Cable Corp., New York, wire, $44,348.50.
Globe Sales & Mfg. Co., New York, panels, $72,073.78.
Harvard Lock Co., New York, mountings, $20,120.
Jackson Electrical Instrument Co., Dayton, O., test oscillator and spare parts, $24,366.10.
Karp Metal Products Co. Inc., Brooklyn, N. Y., boxes, $79,814.
Kellogg Switchboard & Supply Co., Chicago, head and chest sets, $70,845.
National Union Radio Corp., Newark, N. J., tubes, $43,532.70.
Petroff, Peter A., New York, stake crank extensions, legs, $63,335.56.
R.C.A. Mfg. Co. Inc., Camden, N. J., portable public address sets, tubes, sound recorders, $330,629.60.
Radiomarine Corp. of America, New York, radio transmitters, $18,700.
Remler Co. Ltd., San Francisco, plugs, $67,033.50.
Simplex Wire & Cable Co., Cambridge, Mass., cable assemblies, $268,469.34.
Stone, J. M., Receiver for Operadio Mfg. Co., St. Charles, Ill., junction boxes, $31,094.70.
Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y., switchboards, $260,917.20.
Tophams Inc., Washington, chests, $112,050.
Ulmer, A. J., New York, terminal blocks, cases, $42,576.90.
U. S. Rubber Co., New York, cable assemblies with reels, $810,209.80.
Utica Drop Forge & Tool Corp., Utica, N. Y., pliers, $30,088.
Wallace & Tiernan Products Inc., Belleville, N. J., parts for signal lamp equipment, $143,279.30.
Western Electric Co. Inc., Kearny, N. J., headsets, microphones, $938,863.76.

Navy department last week reported the following:

Bureau of Supplies and Accounts Awards

Acorn Insulated Wire Co. Inc., Brooklyn, N. Y., electric cable, $7635.85.
Air Reduction Sales Co., New York, cylinder regulators, $121,100.
Alemite Co. of Maryland, Baltimore, gun fittings, $59,776.00.
Allis-Chalmers Mfg. Co., Milwaukee, centrifugal pumps, $10,444.
Aluminum Co. of America, Pittsburgh, alloy, ingot aluminum, $20,820.
Aluminum Cooking Utensil Co., New Kensington, Pa., steam kettles, $10,700.
American Electric Supply Co., Boston, electric cable, $5415.64.
American Hoist & Derrick Co., St. Paul, steamdriven winches, $32,207.
American Smelting & Refining Co., New York, ingot copper, $180,505.
American Steel & Wire Co., Cleveland, electric cable, $505,416.20.
American Tool Works Co., Cincinnati, radial drill, $7255.
Anaconda Wire & Cable Co., New York, electric cable, $251,737.80.
Anderson Corp., Worcester, Mass., wire brushes, $6960.
Apollo Steel Co., Apollo, Pa., sheet steel, $94,399.41.
Baker-Raulang Co., Cleveland, electric crane truck, $5664.75.
Baldt Anchor Chain & Forge Corp., Chester, Pa., anchor chain, $26,923.75.
Ballantyne, Wm. C., Washington, stock and shipping tags, $58,591.85.
Batteryless Telephone Equipment Co. Inc., Pittsburgh, cable, $25,139.40.
Bay City Shovels Inc., Bay City, Mich., motor truck crane, $14,400.
Bayonne Steel Co., Long Island City,

WALSH-HEALEY PURCHASES

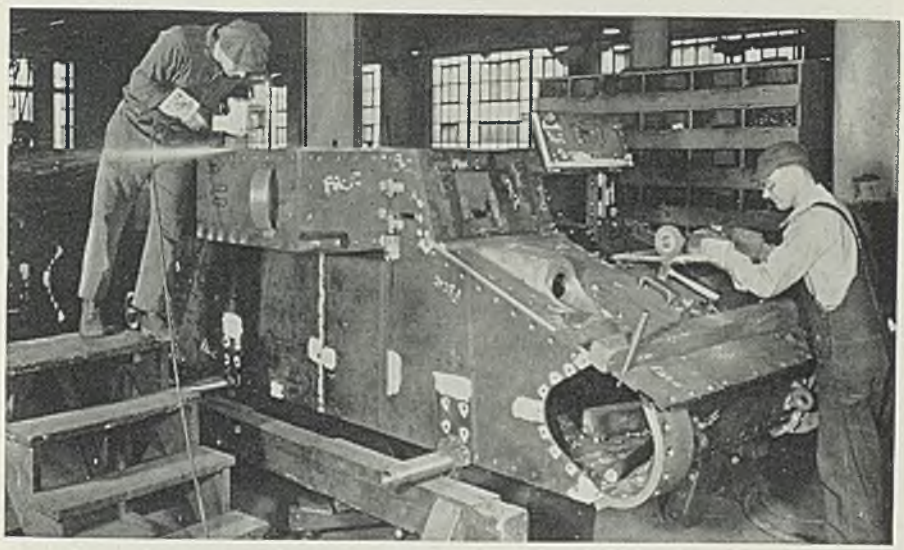
(*Concluded from Page 43*)

Machinery and Other Equipment	Commodity	Amount
Electric Hotpack Co. Inc., Fox Chase, Pa.	Electric bakers	$24,265.00
Fairbanks, Morse & Co., Kansas City, Mo.	Pumping units	13,532.00
Fox Munitions Corp., Philadelphia	Gages	10,926.40
Gallmeyer & Livingston Co., Grand Rapids, Mich.	Grinders	11,483.25
General Steel Castings Corp., Eddystone, Pa.	Foundation plates	120,840.00
George, James W., Detroit	Lathes	55,967.50
Gisholt Machine Co., Madison, Wis.	Lathes	41,078.00
Gordon, Claud S., Co., Chicago	Tool furnaces	17,325.00
Gould & Eberhardt, Newark, N. J.	Shapers	11,594.00
Hall Mfg. Co., Toledo, O.	Grinders	*10,010.00
Hanson-Whitney Machine Co., Hartford, Conn.	Gages	51,537.24
Hardie Tynes Mfg. Co., Birmingham, Ala.	Air compressors	86,186.00
Hardinge Brothers Inc., Elmira, N. Y.	Milling machines	21,279.75
Harnischfeger Corp., Milwaukee	Crawler crane	37,600.00
Harron, Rickard & McCone Co., Los Angeles, Calif.	Milling machines, shaper	50,542.00
Hobbs, Clinton E., Co., Everett, Mass.	Chain blocks	25,268.95
Hydraulic Press Mfg. Co., Mt. Gilead, O.	Press	17,005.00
Ingersoll-Rand Co., New York	Air compressors	17,850.00
Jones & Lamson Machine Co., Springfield, Vt.	Grinding machines	29,496.85
Kearney & Trecker Corp., Milwaukee	Milling machines	10,110.80
Keller, William H., Inc., Grand Haven, Mich.	Pneumatic screwdrivers	19,327.50
Kingston Products Corp., Kokomo, Ind.	Shells	381,000.00
Kinsey, E. A., Co., Cincinnati	Chain hoists	17,864.00
Link-Belt Co., Chicago	Burster parts	84,382.50
Lloyd & Arms Inc., Philadelphia	Lathes	39,906.00
Machinery Sales Co., Los Angeles	Milling machines, shaper, grinders	31,224.00
Michigan Tool Co., Detroit	Worm gear units	436,680.00
Modern Equipment Co., Port Washington, Wis.	Turntables	10,607.20
Monarch Machine Tool Co., Sidney, O.	Lathes	27,667.20
Moore Machinery Co., Los Angeles	Lathes	16,900.00
Natural Asphalt Corp. of Va., Richmond, Va.	Road oil distributors	28,980.00
Niles-Bement-Pond Co., West Hartford, Conn.	Drills	16,776.00
Norton Co., Worcester, Mass.	Grinders	19,902.25
Okura & Co., New York	Planer type millers	52,510.00
Oliver Machinery Co., Grand Rapids, Mich.	Band saws	19,080.00
Otis Elevator Co., Buffalo	Steel castings	*20,000.00
Patterson Tool & Supply Co., Dayton, O.	Chain hoists	23,495.00
Paxton-Mitchell Co., Omaha, Nebr.	Anchors	13,450.00
Peck, Stow & Wilcox Co., Southington, Conn.	Metal working machinery	115,470.60
Perine Machine & Supply Co. Inc., Seattle	Mills	34,002.50
Porter, H. K., Co. Inc., Pittsburgh	Chemical shells	475,408.68
Prosperity Co. Inc., Syracuse, N. Y.	Laundry unit	12,620.00
Pump Engineering Service Corp., Cleveland	Oil pumps	27,450.00
R. & M. Mfg. Co., Royal Oak, Mich.	Gages	16,081.75
Reed-Prentice Corp., Worcester, Mass.	Lathes	117,260.00
Schauer Machine Co., Cincinnati	Lathes	26,401.00
Singer Sewing Machine Co., New York	Sewing machines	10,881.00
Somerville Machine & Foundry Co., Somerville, Mass.	Castings	34,117.27
South Bend Lathe Works, South Bend, Ind.	Lathes	330,244.00
Standard Machinery Co., Providence, R. I.	Bearings	141,120.00
Steel Products Engineering Co., Springfield, O.	Vacuum equipment	54,417.00
Tidewater Supply Co. Inc., Norfolk, Va.	Shapers	11,628.00
United States Hoffman Machine Corp., New York	Laundry unit	27,619.00
Van Norman Machine Tool Co., Springfield, Mass.	Milling machines	25,349.57
Wayne Tool Co., Waynesboro, Pa.	Countersinks	12,817.50
Weaver Mfg. Co., Springfield, Ill.	Jacks, tow bars	14,965.00
Weber & Co., San Francisco	Crane	21,280.00
Wiedemann Machine Co., Philadelphia	Gages	70,112.00
Worthington Pump & Machine Corp., Harrison, N. J.	Compressors, drills	22,974.84
Yates American Machine Co., Beloit, Wis.	Electric moulders	

*Estimated.

N. Y., sheet steel, $16,279.20.
Beech Aircraft Corp., Wichita, Kans., airplanes, $599,948.56.
Bliss & Laughlin Inc., Buffalo, machinery bar steel, $19,544.26.
Brown & Sharpe Mfg. Co., Providence, R. I., milling machines, $16,469.
Buffalo Forge Co., Buffalo, ventilation equipment, $103,233.
Buffalo Pumps Inc., Buffalo, centrifugal pumps, $97,650.
Carnegie-Illinois Steel Corp., Pittsburgh, sheet steel, $380,573.60.
Chambersburg Engineering Co., Chambersburg, Pa., drop hammers, $39,570.
Champion Hardware Co., Geneva, O., window or cupboard catches, $5604.66.
Champion Rivet Co., Cleveland, welding electrodes, $5345.
Chelsea Clock Co., Chelsea, Mass., mechanical clocks, $66,030.
Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati, milling machines, $21,720.
Cincinnati Shaper Co., Cincinnati, press brake, $42,774.
Circle Wire & Cable Corp., Maspeth, Long Island, N. Y., electric cable, $26,355.
Collyer Insulated Wire Co., Pawtucket, R. I., electric cable, $529,473.05.
Columbus McKinnon Chain Corp., Tonawanda, N. Y., coil chain, $21,497.70.
Commercial Acetylene Supply Co. Inc., New York, acetylene cylinders, $11,250.
Crescent Insulated Wire & Cable Co., Trenton, N. J., electric cable, $162,377.
Crown Can Co., Philadelphia, cement tin cans, $10,556.94.
Curtiss-Wright Corp., Curtiss Aeroplane division, Buffalo, aircraft auxiliary tanks, $5974.08.
Dent Hardware Co., Fullerton, Pa., elbow catches, door hooks, snap-bolt hooks, drawer pulls, $28,268.88.
Edison, Thomas A., Inc., Edison Storage Battery division, West Orange, N. J., emergency lamp outfits, $6198.08.
Electric Storage Battery Co., Philadelphia, storage battery testing outfits, $22,590.
Farnham Mfg. Co., Buffalo, roll forming machines, $10,326.48.
Federal Motor Truck Co., Detroit, motor trucks, $7820.
Ford Instrument Co. Inc., Long Island City, N. Y., parts for torpedo directors, $81,804.20.
Gaffney-Kroese Electric Supply Co., New York, electric cable, $36,942.10.
General Cable Corp., New York, electric cable, $537,427.11.
General Electric Co., Schenectady, N. Y., inductor type dynamometers, locomotives, electric cable, $325,163.20.
General Motors Corp., Diesel Engine division, Cleveland, cylinder liners, $7820.80.
Gilbert & Barker Mfg. Co., Springfield, Mass., type M-short adapters, $31,250.
Hager, C., & Sons Hinge Mfg. Co., St. Louis, hinge hasps, $22,602.77.
Hard Mfg. Co., Buffalo, metal letters, $23,628.
Harnischfeger Corp., Milwaukee, welding electrodes, $70,566.50.
Harrington, King & Co., Boston, hammock rings, $7829.64.
Hobbs, Clinton E., Co., Everett, Mass., boat chains, $7213.12.
Hollup Corp., Chicago, welding electrodes, $40,792.50.
Hooven Owens & Rentschler Co., Hamilton, O., diesel engine parts and repair parts for main engine, $73,843.45.
IDL Mfg. & Sales Corp., New York, office shears, $17,500.
International Nickel Co. Inc., New York, copper-nickel alloy, $20,982.
International Silver Co., New York, silver-plated ware, $29,210.46.
Jack & Heintz Inc., Cleveland, airplane starters, electric hand starters, $983,000.
Judd, H. L., Co. Inc., New York, curtain brackets, screw hooks and eyes, $6546.78.
Koppers Co., Bartlett Hayward division, Baltimore, stretcher weights, $13,500.
Lietz, A., Co., San Francisco, boat compasses, $46,690.
Lodge & Shipley Machine Tool Co., Cincinnati, engine lathes, $32,648.
Metropolitan Hinge Co., Brooklyn, N. Y., drawer pulls, $5294.
Miller-Dunn Co., Miami, Fla., diving apparatus, $34,260.
Monarch Machine Tool Co., Sidney, O., engine lathes, $12,520.36.
National Can Corp., New York, paint cans, $26,350.06.
National Electric Products Corp., Pittsburgh, electric cable, $580,562.71.
National Lock Co., Rockford, Ill., wood screws, $7256.15.
Niles-Bement-Pond Co., Pratt & Whitney division, West Hartford, Conn., profiler machines, $49,160.32.
Noland Co. Inc., Washington, weldless chain, $5728.09.
Ohio Nut & Washer Co., Mingo Junction, O., brass, copper washers, $14,636.02.
Okonite Co., Passaic, N. J., electric cable, $753,177.95.
Osborn Mfg. Co., Cleveland, wire brushes, $61,603.28.
Pacific Marine Supply Co., Seattle, portable pumps, $24,148.05.
Parker Appliance Co., Cleveland, tube bending machines, $19,747.28.
Phelps Dodge Copper Products Corp., Habirshaw Cable & Wire division, New York, electric cable, $1,045,862.15.
Pheoli Mfg. Co., Chicago, screws, nuts,

(*Please turn to Page* 115)



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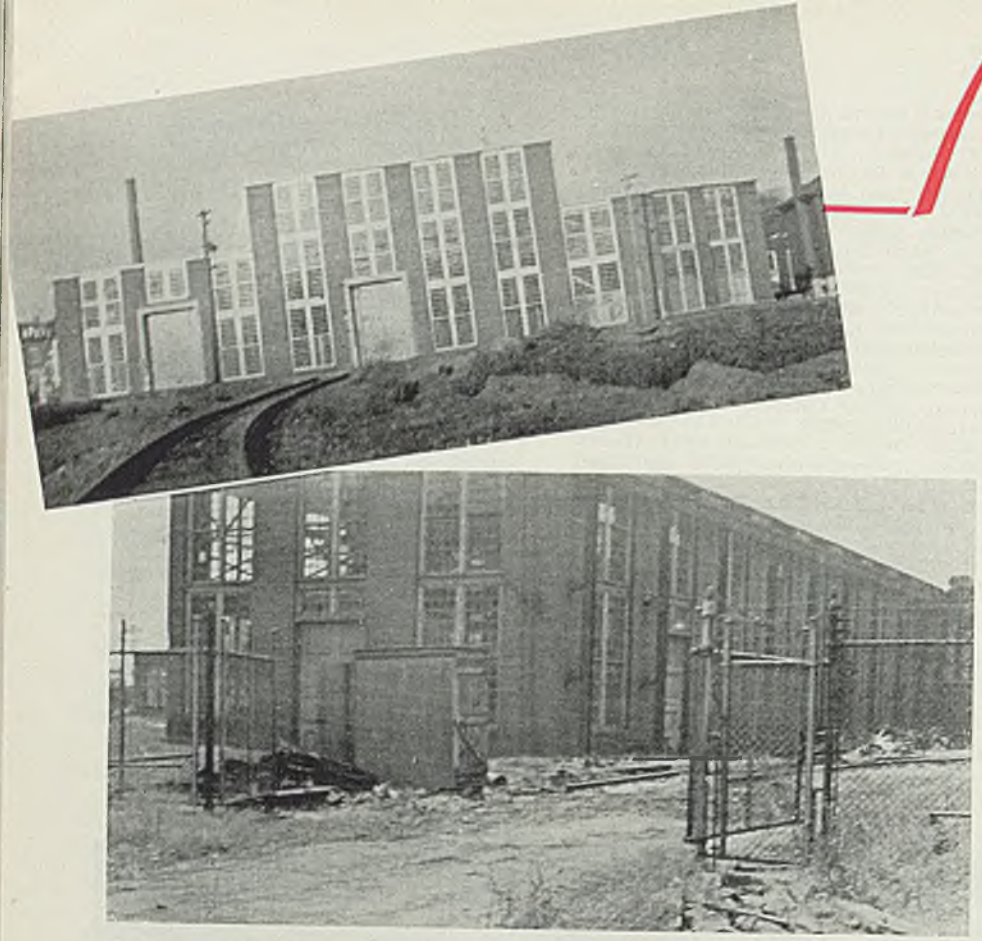
Tank Assembly, Parade

■ Assembly of light tank hull, above, nears completion. After being riveted with specially hardened rivets, all protruding surfaces are ground off. Left, light tanks of the army's first armored division in mass parade formation at Ft. Knox, Ky. Photos by United States Army Signal Corps

New Plants FOR OLD

By GEORGE R. REISS



Before and after views of a plant which was rehabilitated. Building had been idle for years and many spider webs had been spun from shafts that once had made machines hum. Now the plant has become a busy workshop

Idle plants formerly regarded as obsolete and undesirable suddenly have taken on a new value, reports Mr. Reiss. Manufacturers with defense contracts want them badly because, needing only minor alterations and repairs, they are available for immediate production, thus avoiding delays incident to the time required to erect new buildings. Another factor in their favor is that they usually are located close to an adequate labor supply

■ THERE'S gold these days in those abandoned industrial plants—the obsolete steelworks, the ancient automobile factory, the unused fabricating plant and the idle gray iron foundry. The national defense needs factories, many additional factories; and the national defense can't wait for new ones when existing facilities can be made to do.

These old plants which until recently were a drug on the market, literally "eating their heads off" in taxes, insurance, watchmen's wages and maintenance, have suddenly become very much in demand. This is particularly true for the reason that today the supply of desirable idle plants for rent or lease is virtually exhausted.

Thus those abandoned plants—the ramshackle, down-at-the-heel, empty factories with boarded-up windows, but ready for occupancy at once—are really worth their weight in gold, figuratively speaking.

Just an example of the demand that has arisen from the defense program for these old factories . . .

Russell R. Hetz, president and general manager of the Hetz Construction Co., Warren, O., the nation's outstanding liquidator specializing in salvaging and subdividing abandoned industrial plants, foresaw the present "pinch" for enough manufacturing space and acquired more than 1,000,000 square feet of floor space in a half-dozen factories scattered all over the Middle West.

Recently he was asked by representatives of a large company, swamped with orders for tanks and boilers for the United States navy and for metal tubing for airplanes, to quote prices on every piece of industrial property he owns or could locate for sale.

"We're going to need it all," he was informed, "and we'll pay any reasonable price."

Property Changes Hands

Hetz recently sold "on the ground" a large western Pennsylvania plant, which had been idle for many years. A big plant it is, with cranes and other equipment. Big steel companies eagerly bought the old factory buildings and equipment. One of the larger "independents" took two buildings, each 100 by 450 feet, with two heavy cranes; another bought a building, 115 by 700 feet, with five cranes; a steel railroad car manufacturer took a building 75 by 725 feet, and the rest of the cranes were ordered by other steel makers, faced with expanding their plants.

"We've never before bought second-hand buildings or second-hand equipment," explained a representative of one of these steel companies, "but we're really up against it this time."

Every bit of the old plant and the old equipment will be used for national defense work; even the vacant site has been sold for national defense work. It was acquired by an adjoining company, swamped with defense orders, for an expansion program.

These old plants, Hetz explains, are really ideal for defense industries. Most of their cost already has been written off and they are immediately available, requiring only some alterations to be ready to begin production. The defense industries, because of their temporary nature and uncertain future, really cannot afford expensive permanent new buildings when that can be avoided; and neither can they af-

ford to wait for new buildings unnecessarily.

A recent innovation among steel producers has been to dismantle their own abandoned plants and move them to their "going" plants where the buildings can be of some use—something that before was considered unwise and too expensive. It was cheaper then to dismantle the old plants and erect new buildings on the new sites—but not today. For the time element enters into it now.

About 90 per cent of the buildings and equipment which went into one large electric steel plant which was erected recently was used materials—the buildings and the equipment coming from a half-dozen different locations and a half-dozen different kinds of manufacturing plants. That plant today is working nearly 100 per cent on national defense and British government orders, producing chiefly high-grade alloy steels for airplane motors and gun parts.

The national defense boom also has been a real boon to the so-called "ghost towns," those unfortunate communities which stagnated or "dried up" as a result of loss of industrial payrolls for one reason or another. These so-called "ghost towns" also are a boon to the national defense effort—for many of them have good available plants which could be quickly fitted out for production, available supplies of labor which can be readily trained, sometimes plenty of housing facilities, stores and other community services. And many a so-called "ghost town" today is becoming a "boom" town under the pressure of national defense, its workmen again have money, its stores are bright and clean and doing good business, its homes are occupied.

Several years ago, I called on the secretary of the chamber of commerce in one of these so-called "ghost towns" which had lost several old-fashioned hand sheet mills because they were unable to compete with the modern continuous strip mills. The secretary was in a blue funk.

Outlines His Troubles

"We've got to do something to provide some jobs in this town," he complained. "We've got to get our men to work. We've got to get some plants in which they can work. Our town is suffering. Our stores are closing, we've got a lot of empty houses and folks can't pay their taxes."

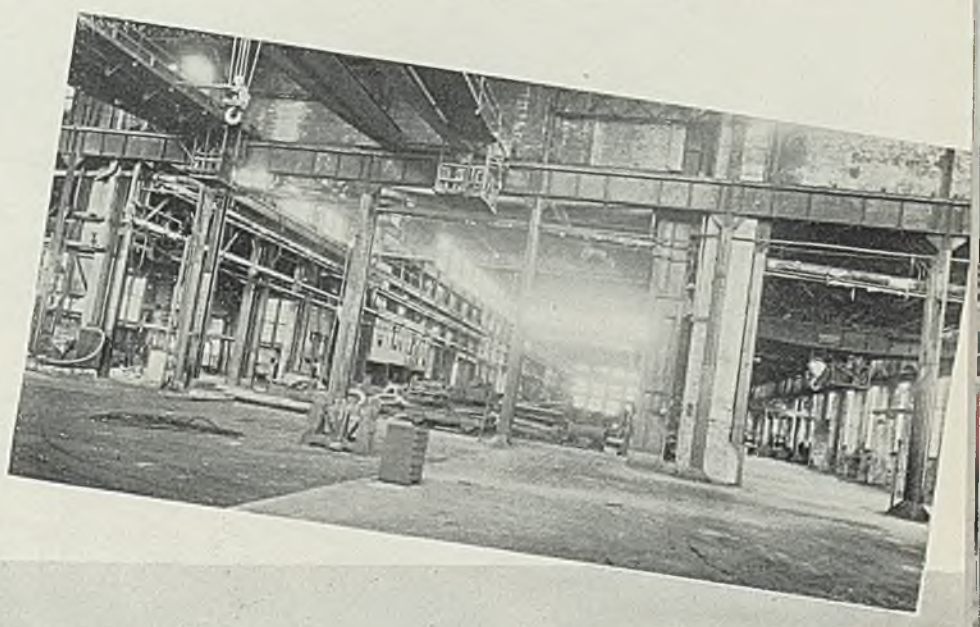
The other day, I called on the same secretary. He again was in a downcast mood.

"We're in a jam," he said. "Do you know where we can find some good machinists—in a hurry? We need them in a couple of our plants very badly."

"But," he added, as an afterthought, "where are we going to find homes for them? There's not a vacant house in town."

Fortunately for the defense program, the problem of salvaging idle plants today can be solved more effectively as a result of the development of specialized technique over the depression years. During that period, when so many plants were idle, it was difficult in most cases to get rid of them at any price—particularly when the plants were large.

Some corporations for years "carried" their old plants, against their better judgment, paying taxes, watchmen's wages, maintenance costs and other expenses in the vain hope that something might turn up to make it possible to operate again, out of consideration for the workmen who had bought homes, for the banks, small merchants, and other industries—and this was lucky



Below, outside view of shop buildings which originally were used in the manufacture of locomotives. Right, interior view of one of the bays indicating how plant was subdivided

for the defense program. Many a plant has been saved for defense production in that way.

Others turned them over for "liquidation"; and Hetz, the industrial liquidator, discovered a method of saving them. Many smaller companies, those employing two or three to two or three dozen workmen and operating in makeshift and often unsuitable factories, couldn't afford to buy these larger plants—but two or three to a half-dozen such companies often could join together and buy one such plant.

By subdividing the large plants, adding a wall or a partition here and there, putting in roadways and rail sidings, providing electric power and gas connections for each part, he created a number of smaller plants. The smaller companies eagerly bought up these smaller units, since the cost generally was far below that of erecting new plants. The demand was especially brisk if the units were located in communities which had good labor supplies and policies, reasonable taxation policies, and a willingness to co-operate.

As an example, a large locomotive company a few years ago decided to dismantle its large plant in an eastern city. The plant was an excellent one, costing more than $1,000,000, but it had been idle for more than a decade, and the locomotive officials had long since given up hope of finding a buyer or of using it again. It had been built for a specific purpose—that of building locomotives—and therefore wasn't suitable for many other purposes. The plant was rapidly going "down hill."

So Hetz was called in to dismantle it. After looking the plant over, he proposed to a representative of the locomotive company:

"I'll tell you what I'll do. You let me handle this job in my own way, and I'll raise your guarantee."

The locomotive company man laughed.

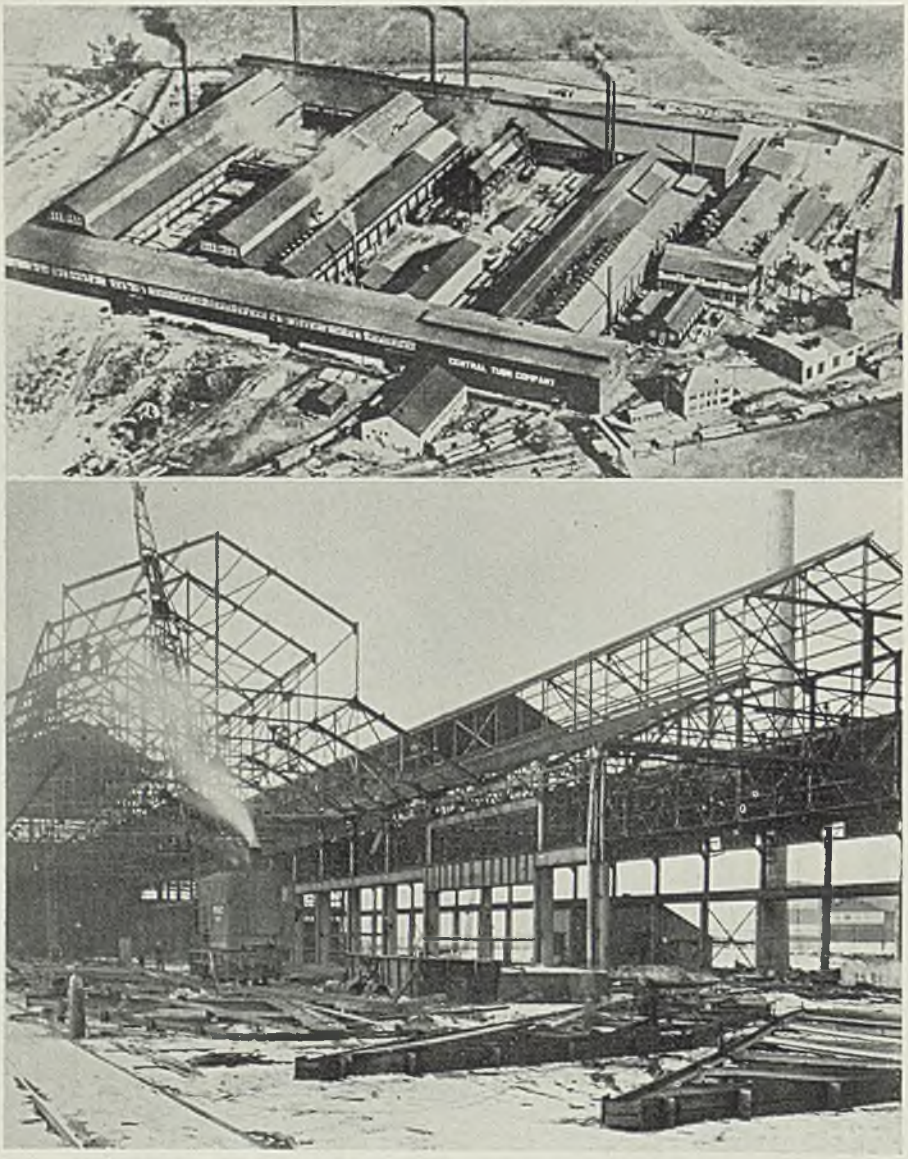
"If you're going to try to sell it . . .", he began. "Well, we've tried that already."

"I am going to sell it," replied Hetz, "in my own way."

No, he couldn't find a big company interested in it, or a single small company able to swing it either. Instead he found four small companies eager for a slice of it, especially after his workmen subdivided the plant into four convenient small plants, each with its own convenient road entrance, railroad siding, gas and water mains, suitable power connection.

A manufacturer of hot water heaters and septic tanks took more than 100,000 square feet of space; a wine company found the large powerhouse suitable for a warehouse; a cigar manufacturer found a high-walled locomotive erecting shop ideal for a new tobacco warehouse, and a bridge fabricator took the rest of the plant.

This is but one of quite a few cases in the last few years in which large plants have been subdivided so as to accommodate small, new industries. The technique involved now is well understood—and it is being employed in mobilizing old plants for defense.



Above, air view of a well-built plant in the Pittsburgh district which was originally constructed for making standard pipe. The buildings and equipment were dismantled and sold to various steel companies. Below, one of the buildings in the process of being dismantled and made ready for shipment to a steel company in the Chicago district

261 Electric Trucks Booked in January

■ Domestic bookings of electric industrial trucks and tractors in January totaled 261 units, according to the Industrial Truck Statistical Association, 208 South LaSalle street, Chicago. Month's aggregate was 222 per cent higher than in the period last year and compared with 301 in December, 1940, the peak.

Total net value of chassis booked in January was $889,441, an increase of 228 per cent over the month last year. Total in December, 1940, was $1,069,903. Bookings of chassis last month included: Nonelevating platform trucks, 14 units with total net value of $25,560; 218 cantilever trucks, aggregate value $757,549; seven crane trucks, total value $39,567; 13 tractors valued at $20,980; and nine special units valued at $45,785.

Detailed information may be secured from the association.

■ Domestic airlines flew 1,042,142,561 revenue passenger miles in 1940, according to Col. Edgar S. Gorrell, president, Air Transport Association of America.

Armco Building Blast Furnace To Aid Armament

■ CONSTRUCTION of a $5,000,000 blast furnace, with daily capacity for 1000 tons of pig iron, at the Ashland, Ky., plant of American Rolling Mill Co., was announced last week by Charles R. Hook, president.

"We are going ahead at this time in order to co-operate with the national defense program," he said, pointing out that much of the output would be available for defense purposes, while the remainder will be used at the Butler, Pa., plant.

This is one of the most important additions to the nation's pig iron production announced since the defense program started.

Work on the furnace, which will be one of the largest in the industry, will begin soon, and is expected to be completed in one year.

A railroad storage yard capable of holding 200 cars, and a 400,000-ton ore storage equipped with ore bridge and car-dumping equipment is included. No coke ovens are contemplated at present as the company will continue to purchase coke from outside sources.

Operation of two other blast furnaces by Armco at Ashland, in conjunction with its open hearths and continuous rolling mill, will be continued.

In the preceding week the company announced that it will construct a steel plant, with annual capacity for 200,000 tons of ingots, near Houston, Tex. (STEEL, Feb. 17, p. 47.)

Republic Pays $9,500,000 For Defense Facilities

■ Republic Steel Corp., Cleveland, has appropriated more than $9,500,000 since the middle of 1940 to increase facilities for producing materials needed in the national defense program, officials said last week.

Included in new facilities are five additional electric furnaces having capacity of 280,000 tons a year; facilities for heat treating and cleaning defense type steels; equipment for producing light armor plate; and facilities for producing aircraft and other special steels. Purchase of a large quantity of specialized machinery also has been authorized.

Improvements have been allocated in Canton and Massillon, O.; Gary, Ind.; Beaver Falls, Pa.; Buffalo; and Gadsden, Ala.

New Light for Liberty

■ Thirty-five thousand Westinghouse fluorescent lamps, comprising the largest single order on record for such lamps, will provide light to help speed production of airplanes for national defense, in a new plant of the Vega Airplane Co., Lockheed Aircraft Corp. subsidiary, Burbank, Calif.

The lamps, 48-inch, 40-watt type will provide illumination for two new manufacturing and assembly floors, a fabrication section, warehouses, drafting rooms and offices.

To control the lamps, correct the power factor and minimize "flicker" or stroboscopic effect, Westinghouse two-lamp ballasts are being used. To date, the airplane company has ordered 10,000 of these units, each of which operates two lamps.

Illustration shows the inspection of lamps at one stage of manufacture.

Westinghouse To Build $3,000,000 Plant for Fluorescent Lamps

Adapted for complete blackout in emergency, a $3,000,000 plant for manufacture of fluorescent lamps will be built by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., at Fairmont, W. Va. Construction is to start immediately.

Built according to modern practice in industrial architecture and design, the 220 x 830-foot plant will be 1-story, without windows or skylight. Roof will be cantilever. Factory's site is a 90-acre tract on the Monongahela river.

Operations are scheduled to start in July, with 800 to 1000 employed. Peak capacity will be 200,000 units per day.

Ready availability of natural gas was reported a factor in location of the factory. Estimated 40,000,000 cubic feet of natural gas per month will be required for capacity work.

Koppers Receives Orders For 119 New Coke Ovens

■ Koppers Co., Pittsburgh, has been awarded contracts for the construction of two batteries of coke ovens, complete with by-product recovery equipment. Awards have combined value of more than $10,000,000.

One battery of 74 Koppers Becker underjet ovens will be built for Monesson Coke & Chemical Co., Monesson, Pa., a subsidiary of Pittsburgh Steel Co. Battery will have a total coal carbonizing capacity of 700,000 tons annually.

Other battery will be of 45 ovens for Weirton Steel Co., Weirton, W. Va., a subsidiary of National Steel Corp., Pittsburgh (STEEL, Jan. 13, p. 25). This battery will have coal carbonizing capacity of about 400,000 tons a year.

Training Young Steelworkers for Higher Defense Jobs

■ THOUSANDS of unskilled or semiskilled steel company employes, the younger, newer men who fill the less responsible jobs around the blast furnaces, open hearths, bessemer converters, rolling mills or laboratories, are studying in their leisure hours to fit themselves for better positions in the defense program. Perhaps never before have ambitious young men enjoyed such broad opportunities for free and valuable training. The government, schools and industry are co-operating to make training facilities available and are footing the bill.

A wide variety of subjects are offered. Industry's vocational courses and the high schools present such subjects as machine shop practice, welding, electrical theory and maintenance, bricklaying, metallurgy and metallography, boiler shop layout, roll shop practice, steam power, mechanical drawing, blueprint reading, rolling mill procedure, patternmaking. In technical colleges co-operating in defense labor training, students obtain such courses as metallurgy, engineering drawing and shop mathematics, production supervision, materials testing, and machine design.

And young fellows are responding to the opportunities. In one small steel city, a college recently opened a group of classes for training steel company employes for better jobs. Capacity was 100 students. Applicants exceeded 500 and represented 18 industrial concerns.

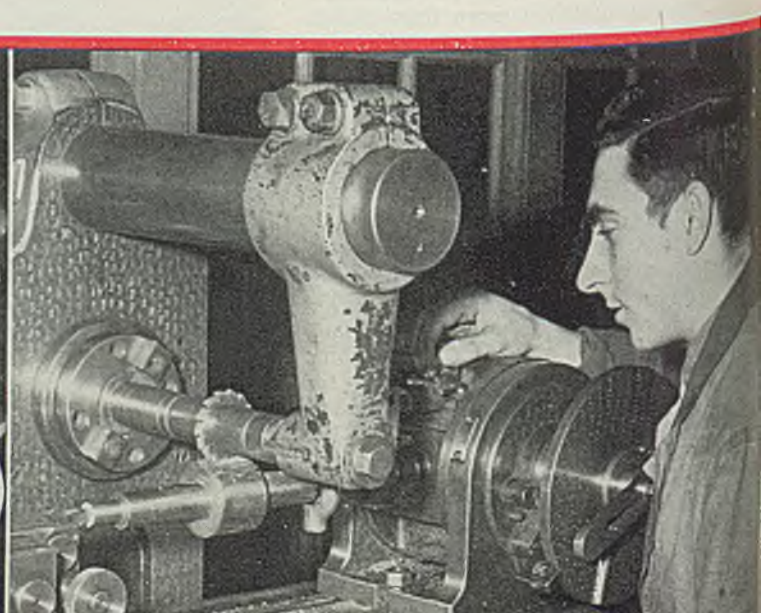
In Youngstown, O., high schools, regular students are given the usual hours in vocational training during the school day. But after the dismissal bells have sounded, the schools' vocational shop really become busy. Early night classes start at 6 p.m. and last until midnight; late classes continue until 6 a.m.

Instructors in many instances are donated by steel companies or other metalworking plants. Some companies also are using their own shops as classrooms.

Top—Steelworker-student, learning to read blueprints, compares a finished pattern with print

Below—Mechanical drawing is one of the more popular courses in today's industry-government sponsored defense training schools

Below—Future machinist learns how to cut a gear in a steel plant's machine shop

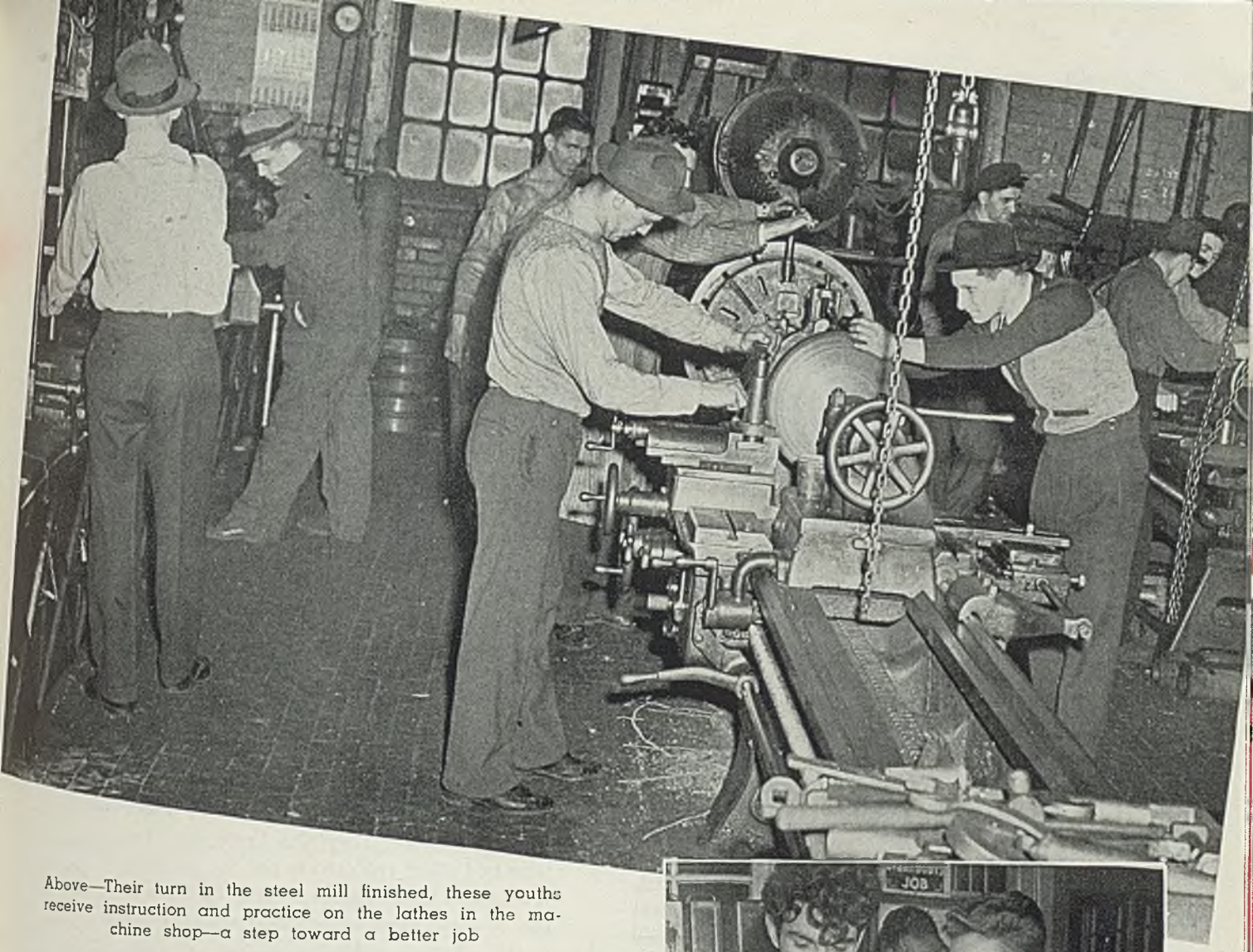


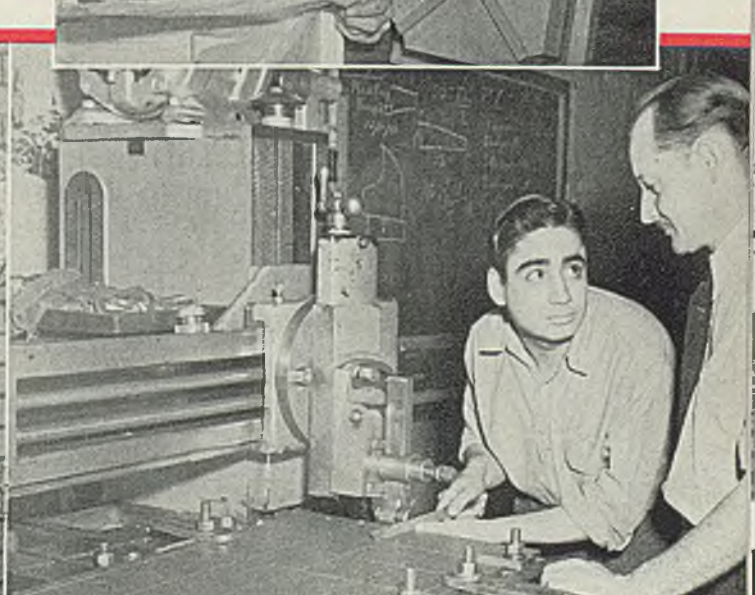
Above—Their turn in the steel mill finished, these youths receive instruction and practice on the lathes in the machine shop—a step toward a better job

Right—Students in patternmaking, an important trade in this machine age, check their handiwork

Lower left—Welders are much in demand by many companies with defense contracts and welding courses attract a large number of students

Lower right—Steel companies have assigned some of their best mechanics to the classrooms to prepare unskilled or semiskilled workers for higher positions. Here one of the instructors gives some hints on a cutting machine





Industrial Doctor Can Solve Idle Capacity Problem

■ IT WOULD be desirable if every unit of capacity in industry could be utilized to the utmost in the defense program. Certainly, 100 per cent utilization would be an ideal achievement.

But such perfection is not possible. Common, easily-understood limitations always cause man's effort to fall short of the ideal. In spite of everything we can do, some capacity will remain idle. Persons who think otherwise are making the mistake of oversimplifying an intricate problem.

♦ ♦ ♦

It is true, as Philip Murray has asserted, that there are plants in the iron and steel industry now operating at less than 50 per cent of capacity. It is true, as others have pointed out, that there are foundries, forge shops and other establishments which have idle capacity.

To some critics the fact that facilities are idle is an indictment against somebody. Some say it is a sign that "big business" is grabbing off all of the "gravy" in defense orders. Others say it is discrimination by OPM or the government.

None of these charges is fully justified. Mistakes have been made. Some of the capacity now idle should be at work.

♦ ♦ ♦

But there is another side to this problem. Just why is a plant idle?

In Case A, the plant has idle capacity because the company lacks funds to put equipment into operating condition. The management is doing a superb job of resuscitating a business that was in dire straits a few years ago. Inwardly, it deserves every good break it can get. Outwardly, an awkward mess of "unbankable" financing must be done before this idle capacity can be made effective.

In Case X, the plant has idle capacity because of poor location, mediocre management and shaky finances. Authorities have investigated the property and pronounced it unsuitable for government work. They recommend transferring the equipment to some other plant.

Industry, government and OPM know these conditions. They also know that the time and effort required to put the capacity to work, if employed on revamping the setups of some other companies, would result in the effective utilization of three or four times as much additional capacity. OPM necessarily is forced to direct its effort where it will do the most good in the shortest possible time.

♦ ♦ ♦

And yet some of the best of this idle capacity should be made available to defense. It is unfair to ask the already too busy OPM to nurse these properties into a healthy condition.

Therefore, why not create a separate organization, functioning under OPM, to act as an industrial doctor, which, with proper assistance, can rehabilitate unfit plants?

When they have been made fit, OPM can divert business to them to fill their now idle capacity.

E. L. Shaner

EDITOR-IN-CHIEF

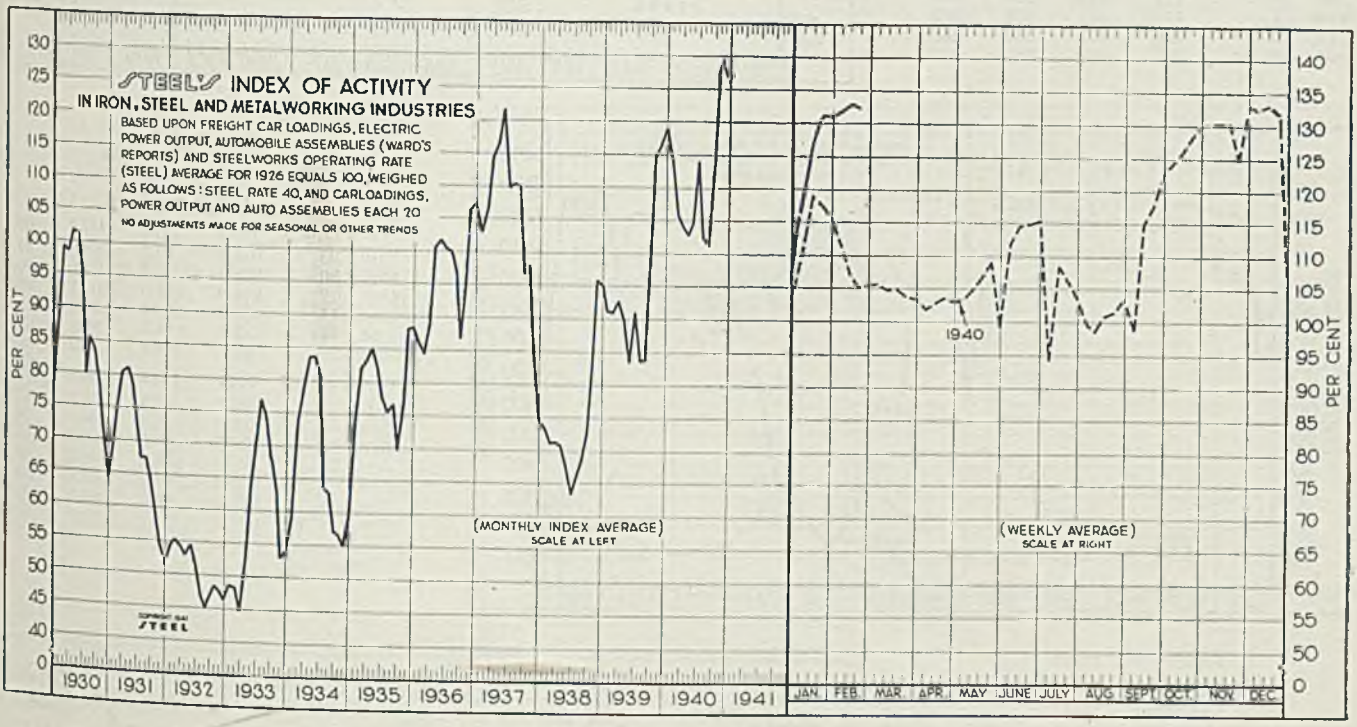
The BUSINESS TREND

New Demand Remains at Near Peak Levels

■ NEW demand continues unabated at high levels. This is particularly true in the capital goods industries, notably those directly related to the defense program. In some intsances, such as in steel and metalworking industries, order backlogs are becoming further extended, with buyers seeking protection as far ahead as the third and fourth quarter this year. Deliveries on certain types of machine tools are not available until the spring of 1942. Incoming business is being carefully scrutinized, civilian consumers' past requirements being used as the basis for allotments.

STEEL'S index of activity eased 0.4 point to 132.3 during the week ended Feb. 15. In the same period a year ago the index declined 2.1 points to 105.1.

Automobile production remained substantially unchanged in the week ended Feb. 15, totaling 127,510 units, compared with the revised figure of 127,675 for the preceding week and 95,050 in the like 1940 period. Automotive interests have lifted output to the highest February rate on record. Forecast for this month's production is 500,000 units, up at least 25,000 from estimates earlier this month. This would compare with estimated 525,000 cars in January last and 422,000 in February 1940.

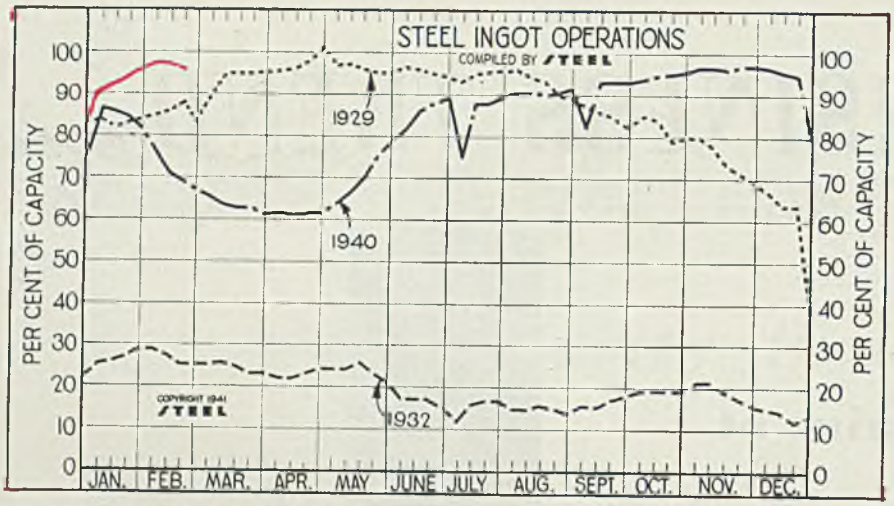


STEEL'S index of activity declined 0.4 point to 132.3 in the week ended Feb. 15:

Week Ended	1940	1939
Dec. 14	132.6	124.2
Dec. 21	132.4	123.4
Dec. 28	107.5	104.0
Week Ended	**1941**	**1940**
Jan. 4	114.5	110.3
Jan. 11	128.2	119.2
Jan. 18	130.8	117.3
Jan. 25	130.7	115.4
Feb. 1	132.0	111.6
Feb. 8	132.7†	107.2
Feb. 15	132.3	105.1

†Revised.

Mo. Data	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930
Jan.	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6
Feb.	.....	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2
March	.....	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2	80.4	98.6
April	.....	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7
May	.....	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2
June	.....	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8
July	.....	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9
Aug.	.....	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4
Sept.	.....	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7
Oct.	.....	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8
Nov.	.....	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0
Dec.	.....	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3



Steel Ingot Operations

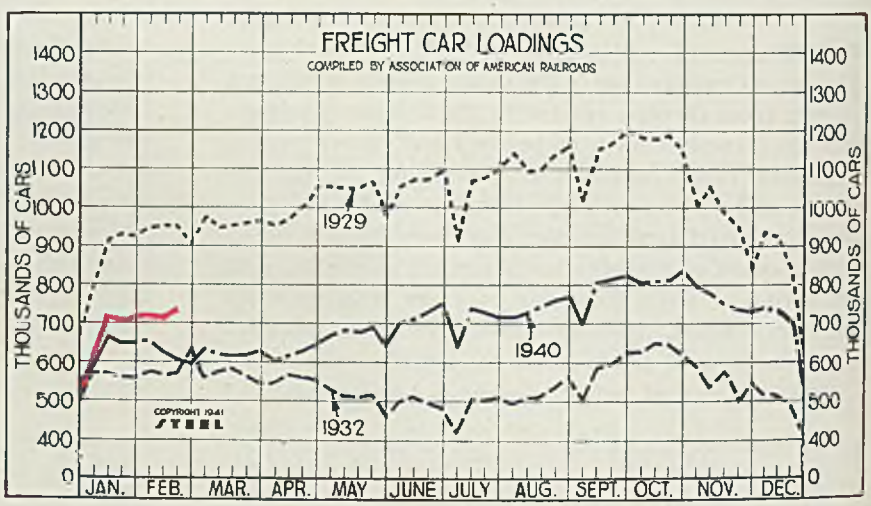
(Per Cent)

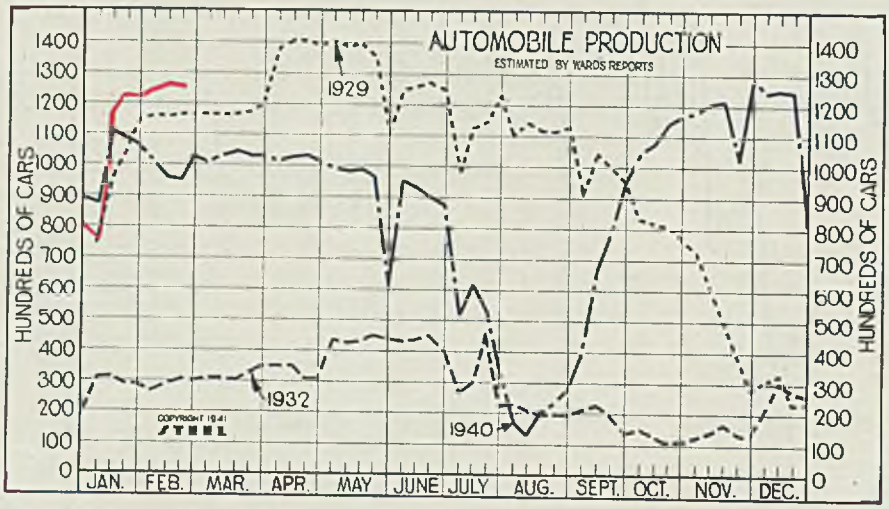
Week ended	1940	1939	1938	1937
Nov. 2....	96.5	93.0	57.5	47.0
Nov. 9....	96.5	93.0	61.5	39.0
Nov. 16....	96.0	93.5	63.0	35.0
Nov. 23....	97.0	93.5	62.0	31.5
Nov. 30....	97.0	94.0	61.0	30.5
Dec. 7....	96.5	94.0	61.0	27.0
Dec. 14....	95.5	92.5	58.0	27.0
Dec. 21....	95.0	90.5	52.0	23.0
Dec. 28....	80.0	75.5	40.0	21.0
Week ended	**1941**	**1940**	**1939**	**1938**
Jan. 4....	92.5	86.5	51.5	21.0
Jan. 11....	93.0	86.0	52.0	26.0
Jan. 18....	94.5	84.5	51.5	29.0
Jan. 25....	95.5	81.5	51.5	30.5
Feb. 1....	97.0	76.5	53.0	33.0
Feb. 8....	97.0	71.0	54.0	31.0
Feb. 15....	96.5	69.0	55.0	30.0

Freight Car Loadings

(1000 Cars)

Week ended	1940	1939	1938	1937
Nov. 9.....	778	786	637	690
Nov. 16.....	745	771	657	647
Nov. 23	733	677	562	559
Nov. 30.....	729	689	649	623
Dec. 7.....	739	687	619	622
Dec. 14.....	736	681	606	603
Dec. 21.....	700	655	574	460
Dec. 28.....	545	550	500	457
Week ended	**1941**	**1940**	**1939**	**1938**
Jan. 4.....	614	592	531	457
Jan. 11.....	712	668	587	552
Jan. 18.....	703	646	590	581
Jan. 25.....	711	649	594	570
Feb. 1.....	714	657	577	553
Feb. 8	710	627	580	565
Feb. 15.....	721	608	580	543





Auto Production

(1000 Units)

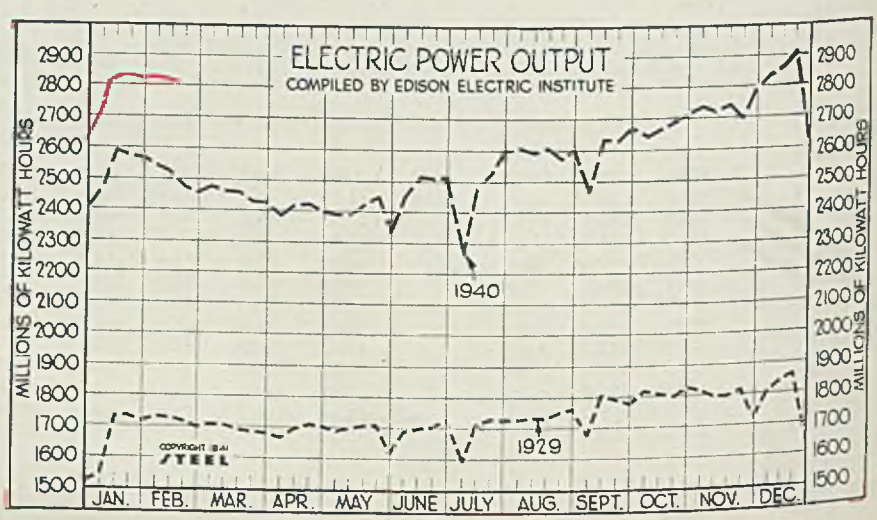
Week ended	1940	1939	1938	1937
Nov. 23....	102.3	72.5	84.9	59.0
Nov. 30....	128.8	93.6	97.8	86.2
Dec. 7....	124.8	115.5	100.7	85.8
Dec. 14....	125.6	118.4	102.9	82.0
Dec. 21....	125.3	117.7	92.9	67.2
Dec. 28....	81.3	89.4	75.2	49.6
Week ended	**1941**	**1940**	**1939**	**1938**
Jan. 4....	76.7	87.5	76.7	49.6
Jan. 11....	115.9	111.3	86.9	54.1
Jan. 18....	124.0	108.5	90.2	65.7
Jan. 25....	121.9	106.4	89.2	65.4
Feb. 1....	124.4	101.2	79.4	59.4
Feb. 8....	127.7†	96.0	84.5	51.4
Feb. 15....	127.5	95.1	79.9	57.8

†Revised.

Electric Power Output

(Million KWH)

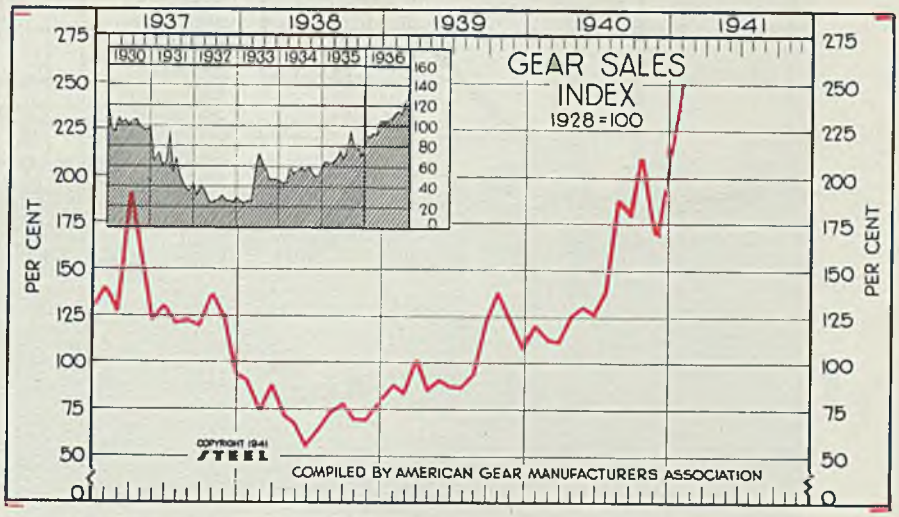
Week ended	1940	1939	1938	1937
Nov. 9...	2,720	2,514	2,209	2,176
Nov. 16...	2,752	2,514	2,270	2,224
Nov. 23...	2,695	2,482	2,184	2,085
Nov. 30...	2,796	2,539	2,285	2,153
Dec. 7...	2,838	2,586	2,319	2,196
Dec. 14...	2,862	2,605	2,333	2,202
Dec. 21...	2,911	2,641	2,363	2,085
Dec. 28...	2,623	2,404	2,121	1,998
Week ended	**1941**	**1940**	**1939**	**1938**
Jan. 4...	2,705	2,473	2,169	1,998
Jan. 11...	2,835	2,593	2,270	2,140
Jan. 18...	2,844	2,572	2,290	2,115
Jan. 25...	2,830	2,566	2,293	2,109
Feb. 1...	2,830	2,541	2,287	2,099
Feb 8...	2,824	2,523	2,268	2,082
Feb. 15...	2,810	2,476	2,249	2,052

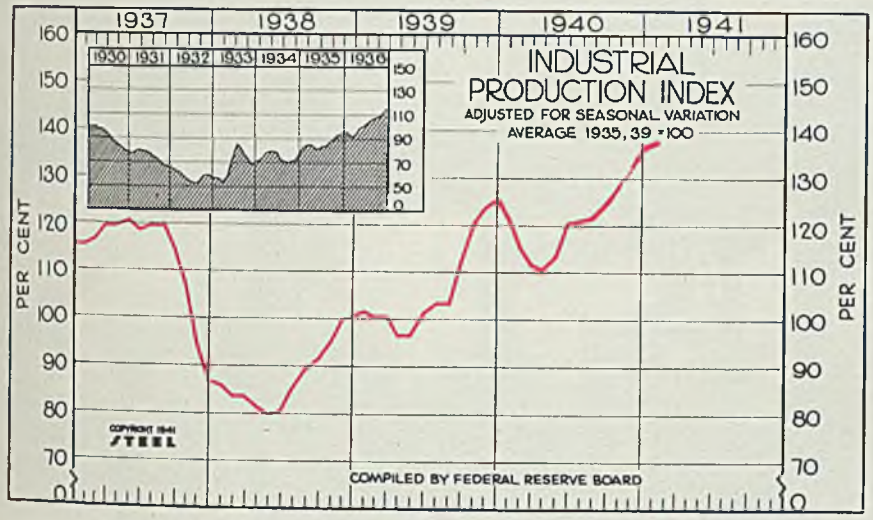


Gear Sales Index

(1928 = 100)

	1941	1940	1939	1938	1937
Jan.	259	123	91.0	93.0	144.0
Feb.	...	116	86.0	77.0	130.5
Mar.	...	114	104.0	91.0	195.0
April	...	128	88.0	74.0	164.0
May	...	133	93.0	70.0	125.5
June	...	129	90.0	58.0	134.0
July	...	141	89.0	67.0	124.0
Aug.	...	191	96.0	76.5	125.0
Sept.	...	183	126.0	80.5	123.0
Oct.	...	216	141.0	72.5	139.5
Nov.	...	173	126.0	72.0	127.5
Dec.	...	208	111.0	81.0	97.0
Ave.	...	155.0	103.0	76.0	135.5





Industrial Production
Federal Reserve Board's Index

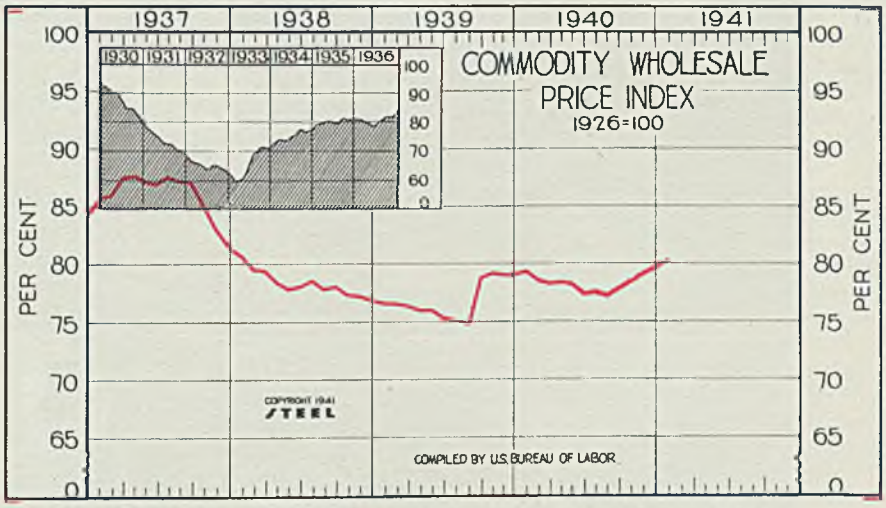
(1935-39 = 100)

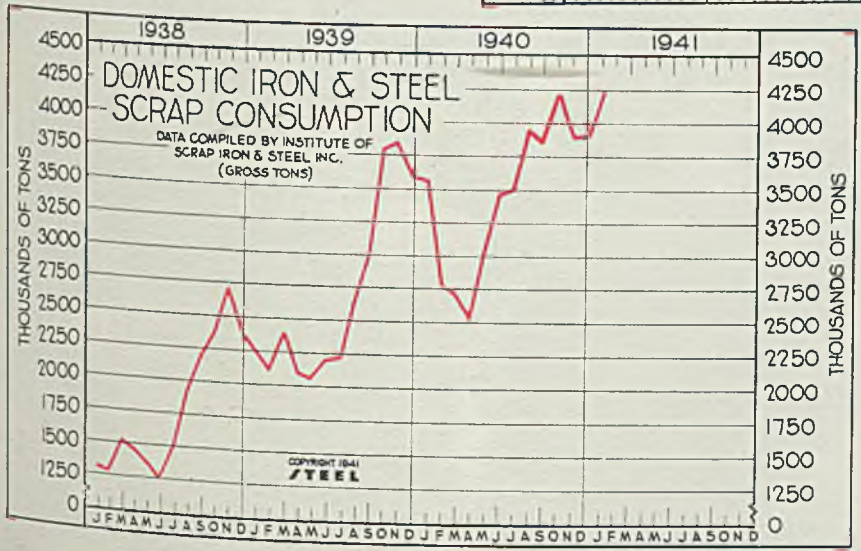
	1941	1940	1939	1938	1937
Jan.	139	122	102	86	116
Feb.	...	116	101	84	117
March	...	112	101	84	120
April	...	111	97	82	120
May	...	115	97	80	121
June	...	121	102	81	119
July	...	121	104	86	120
Aug.	...	121	104	90	120
Sept.	...	125	113	92	115
Oct.	...	129	121	95	107
Nov.	...	133	124	100	95
Dec.	...	138	126	101	87
Year Ave.	...	122	108	88	113

All Commodity
Wholesale Price Index
U. S. Bureau of Labor

(1926 = 100)

	1941	1940	1939	1938	1937
Jan.	80.5	79.4	76.9	80.9	85.9
Feb.	....	78.7	76.9	79.8	86.3
March	....	78.4	76.7	79.7	87.8
April	....	78.6	76.2	78.7	88.0
May	....	78.4	76.2	78.1	87.4
June	....	77.5	75.6	78.3	87.2
July	....	77.7	75.4	78.8	87.9
Aug.	....	77.4	75.0	78.1	87.5
Sept.	....	78.0	79.1	78.3	87.4
Oct.	....	78.7	79.4	77.6	85.4
Nov.	....	79.6	79.2	77.5	83.3
Dec.	....	80.0	79.2	77.0	81.7
Ave.	....	78.5	77.1	78.6	86.3

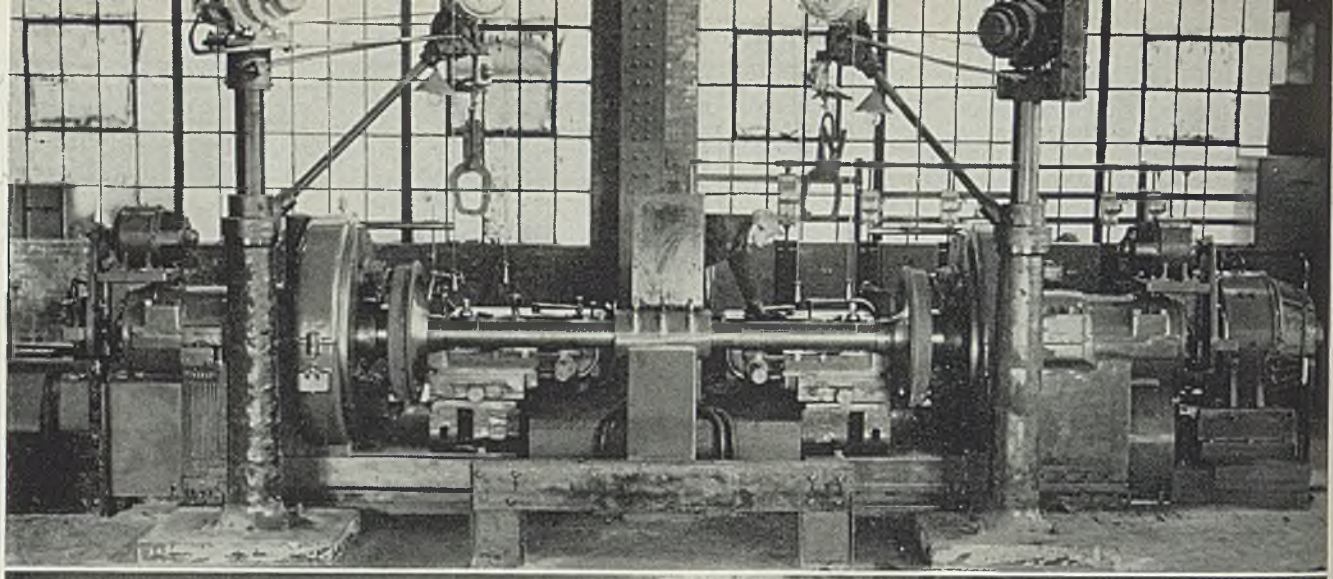


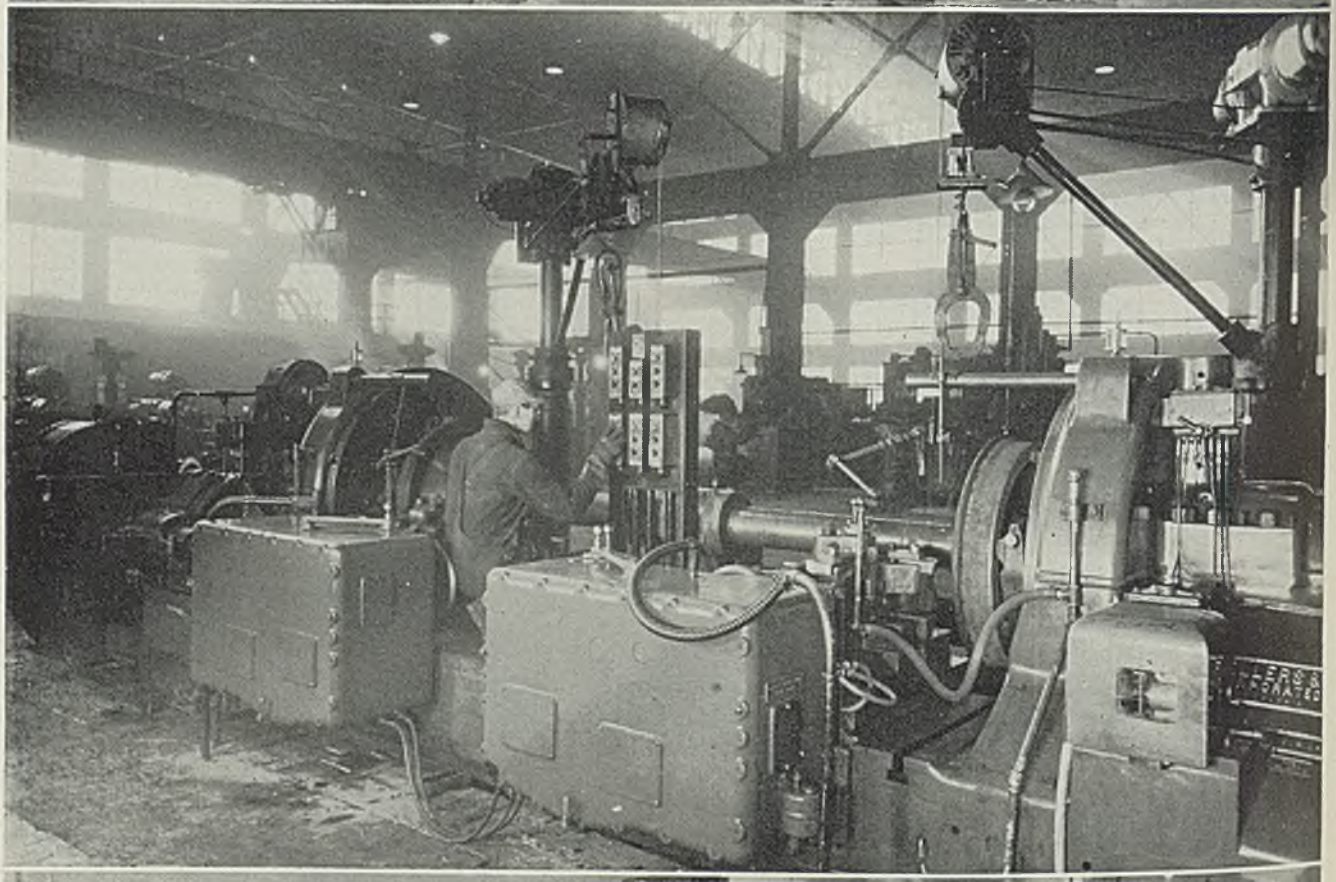


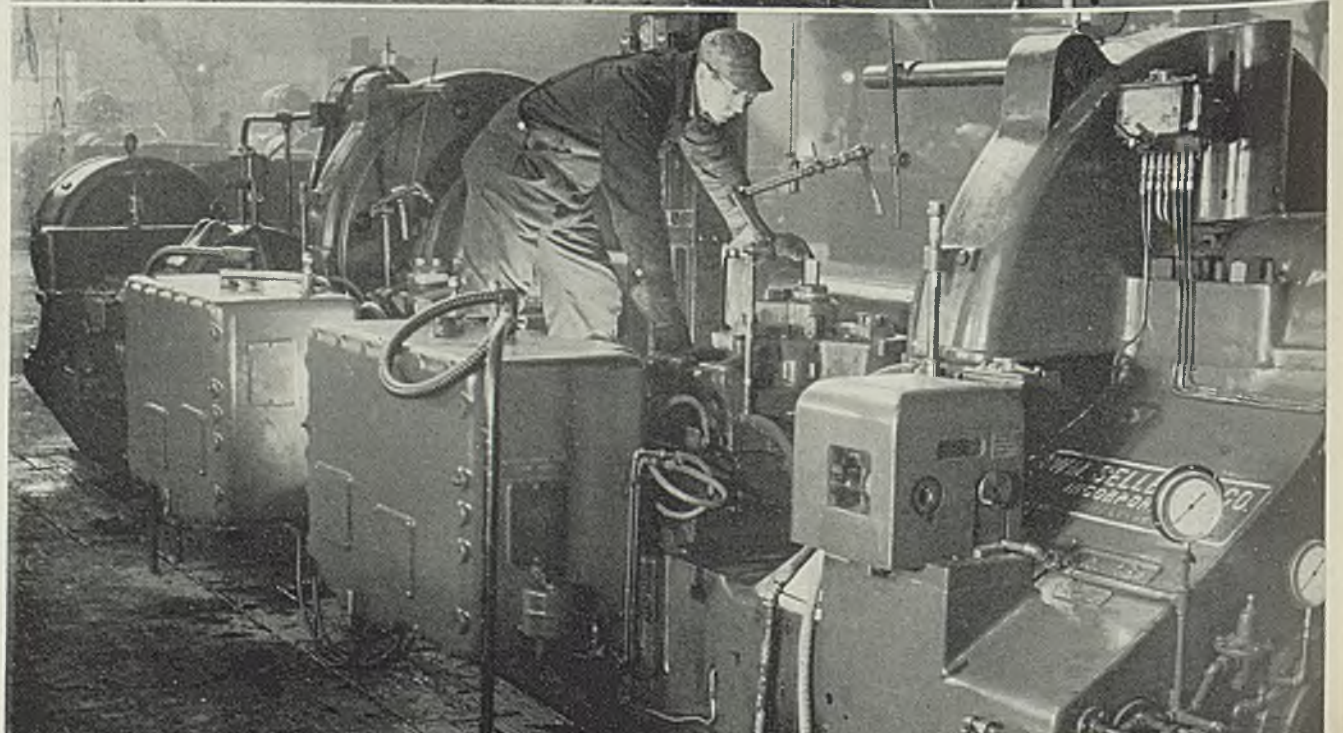
Iron and Steel
Scrap Consumption

(Gross Tons)

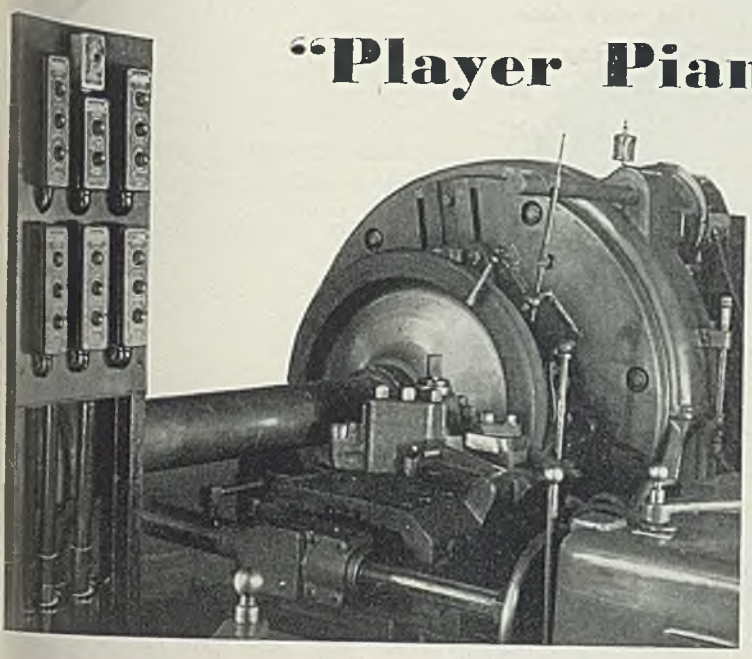
	1941	1940	1939	1938
		(000 omitted)		
Jan.	4,278	3,581	2,257	1,331
Feb.	.....	2,812	2,124	1,306
Mar.	.....	2,728	2,419	1,543
Apr.	.....	2,548	2,114	1,477
May	.....	3,061	2,079	1,387
June	.....	3,482	2,221	1,257
July	.....	3,526	2,247	1,520
Aug.	.....	3,968	2,675	1,953
Sept.	.....	3,876	3,018	2,218
Oct.	.....	4,233	3,809	2,393
Nov.	.....	3,922	3,858	2,732
Dec.	.....	3.950	3,613	2,411
Total	.....	41,687	32,434	21,528
Mo. Av.	.....	3,474	2,703	1,794







"Player Piano" Control Runs Big Lathe Automatically



Unique machine shows what can be done with special automatic controls on complicated machining work. Car wheel webs are contoured without supervision of the operator, action of roughing tools being completely automatic

Fig. 3—Right-hand carriage of lathe, of which there is a duplicate at the left-hand head, showing tool turret and portion of operating mechanism. Truncated cone cutter at left side of turret is roughing tool, while flat blade at right is for finishing

■ LIGHTWEIGHT streamlined trains demand carefully balanced wheels, a requirement met most effectively by machining the wheels all over. For such work, regular equipment at the Johnstown, Pa., wheel plant of Bethlehem Steel Co. has recently been supplemented with a new lathe, Fig. 1, which automatically machines contours of rim, web and hub body, covering entire area of the wheel from intersection of rim face and inner rim edge to intersection of hub body and hub faces.

This lathe which is manufactured by William Sellers & Co., Inc., of Philadelphia, has faceplates at each end for machining two wheels at a time. The wheels are kept parallel and held tight on each faceplate by chucks with grips and cams, and with spindle supported in a journal midway between two faceplates.

The procedure of placing the wheels in the lathe, as indicated by Figs. 1, 2, 3 and 4, is as follows: Tapered and split sleeves are placed in the hub bore of each wheel, one wheel is lifted by hoist and placed in a chuck on the faceplate at the left-hand head, and the end of the spindle is entered into the tapered sleeve. After placing the sleeve in hub of the second wheel, this is lifted into the chuck on the faceplate of the right-hand head. This head then is moved forward by an electric drive and the end of the spindle placed into the tapered sleeve. Finally the grips and cams of the chucks are adjusted.

Machining is accomplished by means of roughing and finishing tools—sets consisting of one tool of each type being mounted on turrets on the separate carriages operating at each end of the lathe. Location and setup of these tools can be seen in Figs. 1 and 3. When the roughing tools are in action, operation of the lathe is automatic. This automatic contouring is controlled by means of a rolled up, perforated strip of heavy paper, the function of which is similar to that of the roll of perforated paper which controls the action of a player piano, a monotype type caster or of a Jacquard loom.

The first step in preparing the automatic setup is to make an accurate layout of the desired contour of the finished wheel on a sheet of drawing paper. Next, this drawing is pinned down in a designated position on the table of an apparatus in which is mounted a templet which is an exact replica of the top view of the round-nosed roughing tool used in contouring. This tool templet is carried on a double-action carriage whose in-and-out and transverse motions in relation to the layout on the table correspond to subsequent motions of the tool slides in relation to the car wheels in the chucks of the lathe.

Connected to this contour tracing apparatus, through the left-hand ends of its "forward-and-reverse" lead screw and the splined shaft geared to its "in-and-out" feed screw, is the synchronized paper perforating unit.

Thus the blank paper strip—feeding from a supply roll at the top of this unit—is drawn in short, exactly spaced, intermittent steps through a slot where punching of "track" and "operation control" holes takes place; thence around a ratchet-operated draw roll whose pins engage the track holes near the edges of the strip; and is wound up on a third roll friction driven from the positively controlled draw roll. Passage of the paper through this unit is similar to that of motion picture film through a projector.

Actual punching of the paper strip is accomplished through a hand lever, the actuation of which also feeds the strip one step at a time and moves the tool templet step by step along the contour diagram. Each movement of this hand lever punches a pair of "track" holes. Punching of the "in," "forward,"

(*Please turn to Page* 91)

Fig. 1. (Top, opposite page)—Sellers dual-head automatically controlled lathe shown here in operation at the wheel plant of Bethlehem Steel Co., Johnstown, Pa., contour machines pairs of car wheels simultaneously and identically

Fig. 2. (Center, opposite page)—Like a player piano, the Sellers contouring lathe will operate automatically under control of roll of perforated paper visible through window of cabinet at right or under the influence of the operator's fingers—in this case on a "keyboard" represented by the electric pushbutton panel at center

Fig. 4. (Bottom, opposite page)—In setting up the contouring lathe, the wheels—with split tapered sleeves in their bores—are loosely chucked on face plates. Then the heads are moved forward electrically until the ends of a heavy, centrally supported arbor enter the tapered sleeves in the wheel bores, thus aligning the wheels. Finally, setting in the chucks is corrected to give true running and the chuck jaws are tightened

One of the trends in forging shell is to lower the amount of work done on the billet—the aim being to reduce wear on the tools and dies, increase production speeds and reduce percentage of excess metal in the shell carcass. Methods and equipment developed to accomplish these results are detailed this week by Professor Macconochie in this, the fifth article in his series on shell production methods

Controlling Metal Flow in Forging

High-Explosive

■ Of this series on shell production which started in the Jan. 27, 1941, issue of STEEL, section one gave some historical background on shell; section two detailed various types of shell and their metallurgy; section three dealt with parting off the billet from the cast slug or rolled bar and with the important task of heating for forging; section four discussed some forging problems and their solution. Section five here presents trends in shell forging methods and equipment; describes the Baldwin-Omes and upsetter-type forging machines.

Next week, section six will detail the factors differentiating labor-saving and time-saving machine tools; the gradual transfer of skills to the machine; development of the lathe—today's most important machine tool; doing things **without** thinking about them; single-purpose lathes versus multi-spindle automatics; Machine Tool Builders' association designs a shell lathe, number of types must be limited; the Ex-Cell-O and Prescott machines; trends in machine-tool design; advantages of the division of labor; man-hours, men and hours.

■ IN PONDERING the problem of how best to forge the body of a shell, we have already noted that there is no ready means of determining which procedure will result in a minimum of forging work. While the actual amount of work done by the forging equipment is not in itself an important matter, since power is cheap, those methods using considerable amounts of power are apt to be accompanied by short life of the tools as well as excessive weight (and hence initial cost) of the equipment. Major trends of the past quarter century therefore incline toward use of lower power. Associated with these developments are large increases in speed and reduction in the percentages of excess metal in the shell carcass.

It has already been noted how the Witter cross roll method, operating in conjunction with sufficient piercing capacity, permits increase in outputs by several hundred per cent as compared with production in 1914-18. For shell of medium caliber, perhaps the most notable advances in the direction of diminished power to pierce are the use of the square billet with rounded corners and the successful attempts now being made to combine the pierce and the draw in one operation which involves the use of a movable bottom in the die. The techniques of 1914-18 centered around solid pots fitted with suitable ejectors and punches which were caused to descend into the hot billet and extrude the metal up around the punch. Drawing in solid dies usually made of chilled cast iron commonly followed, although many smaller calibers were finished without benefit of the draw thus leaving a considerable amount of metal to come off in the turning operations.

Accurate centering of the piercing punch was then, as now, a prime concern of the forge crew, and various more or less elaborate precautions were observed to secure concentricity. The importance of uniform heating was not perhaps as well understood as it is today. Too, billet-heating furnaces were not as well designed. For instance, after dropping the billet

Shell

By ARTHUR F. MACCONOCHE
Head, Department of Engineering
University of Virginia
University Station, Va.

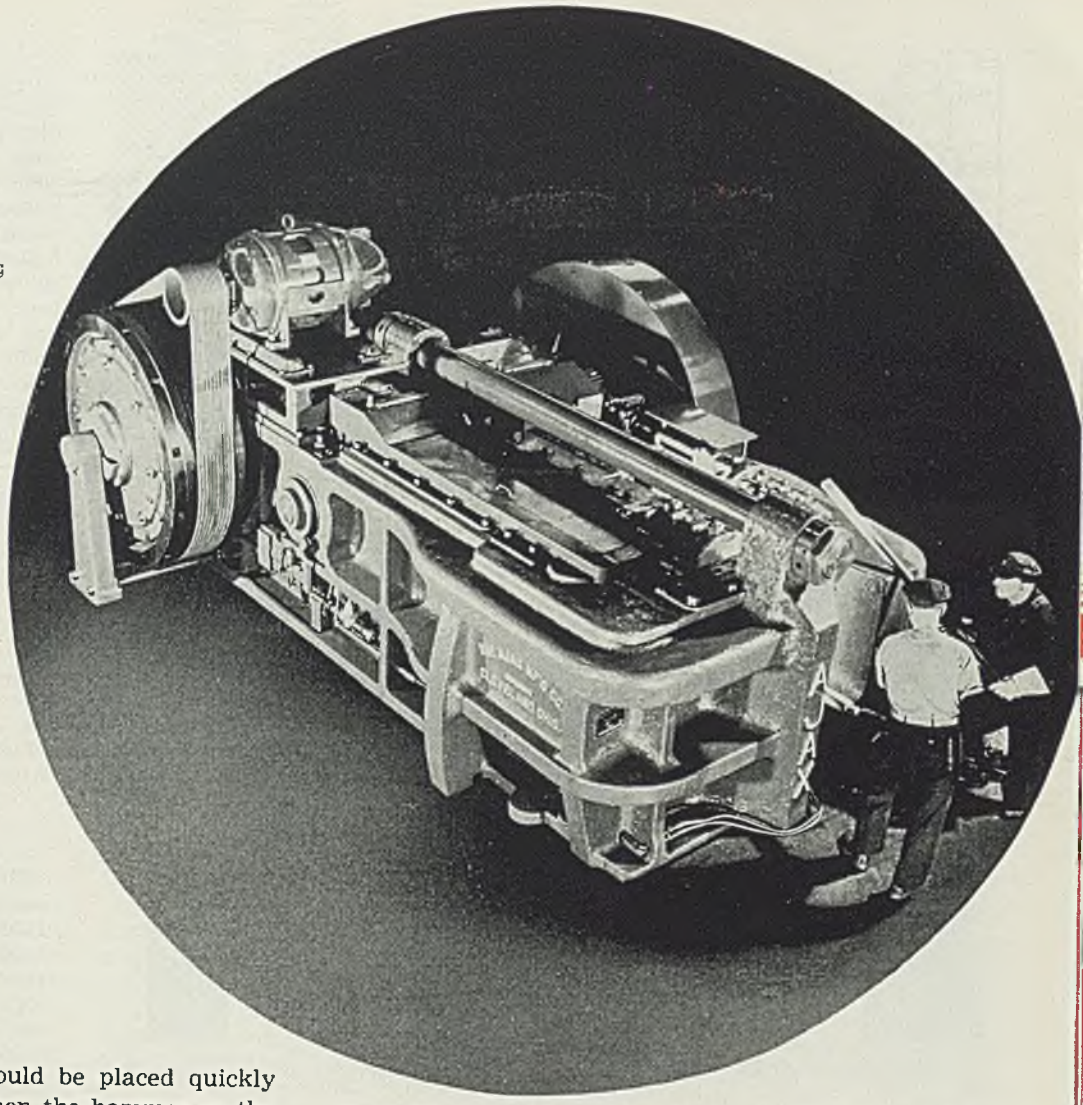


Fig. 1—Upsetting type of shell forging machines is noted for its massive construction. This unit made by Ajax Mfg. Co., Cleveland, is typical. Much larger machines than the one shown have been developed and are now used to forge bars up to 9 inches in diameter

into the die, a guide block would be placed quickly on top, the punch set in and then the hammer or the press brought down to open up the billet. After a few blows to give the punch a good start, it was removed and cooled off in water; then replaced without benefit of the guide and the action continued. All of this took time. Hence rates of 20 or 25 per hour with a crew of four or five men were to be expected.

In the meantime, the bulldozer operating at six strokes a minute had made its appearance. Forging was complete in two operations, piercing and forming of the cup taking place in the first operation, and finish drawing of the blank in the second. The piercing and drawing dies were held in a special holder attached to the bed, while the punches were mounted on the cross-head. Eight punches in all were used, the four inner tools in the row being piercing punches, while the outer pair at either end were the drawing punches. The reason for this multiplicity of tools was to give all a chance to cool, by using both piercing and drawing punches in rotation. This machine was the forerunner of the Baldwin-Omes machine, manufactured in this country by the Baldwin-Southwark division, Baldwin Locomotive Works.

In this Baldwin-Omes machine—at least for calibers below about 125 millimeters—the piercing and drawing operations are combined in one machine, just as in the bulldozer of 1914-18. An important departure from older practice, however, is the use of a split die, Fig. 1, the division being across a diagonal, as it were, to enable the operator to lay the heated billet on the lower portion of the die.

Closure of the two halves of the die centers the billet, which is then pierced by a punch in turn guided by a bushing of high-grade steel. This method assures good concentricity.

The cup then is placed on a drawing mandrel which is elevated for convenience, just as in the older bulldozer, and the blank pushed through a solid ring die. These two operations suffice to produce a carcass which may be held as close to finish size as may be desirable and which also has an acceptable forge-finished cavity.

No Machining of Interiors: All successful forging operations on shell nowadays must be capable of finishing the cavity, except for a sand-blasting operation, since we have virtually given up machining operations on the inside of high-explosive shell for land operations.

As in all shell forging work where cold steel and hot steel are in contact—in very intimate contact—the life of the tools is a matter of prime concern. In the earlier, more or less experimental stages of the Baldwin-Omes machine, a 14 per cent tungsten steel was selected for the punches. This type of steel was no doubt considered on account of its "self-harden-

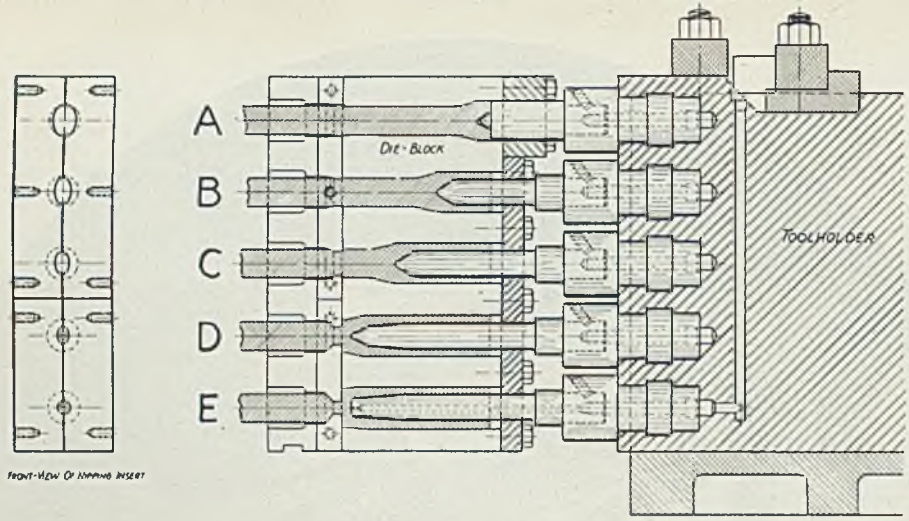


Fig. 2. (Top)—This shows tooling and also shape of the metal in progressive steps in the forging of a 75-millimeter shell by the displacement piercing method using an upsettting forging machine. The completed forging will be half of a double ended forging. Similar setups can be made to use long billets from which shell body is nipped off at last forging stage. Of course, shell bodies are not in all stations of the machine at once as shown here but a single body is worked in each stage in succession from the top to the bottom positions

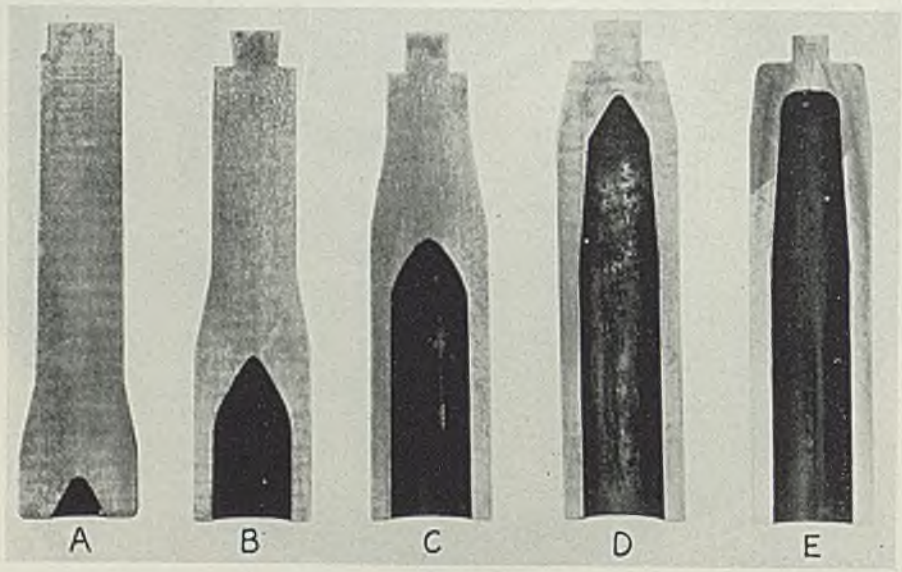


Fig. 3. (Center)—These are cross sections through billets at the various stages of forging shown by accompanying letters in Fig. 2. Note the displacement of metal as the piercer progresses into the billet. Redesign of the cavity end now has been standardized to a form which results in greatly increased piercer life

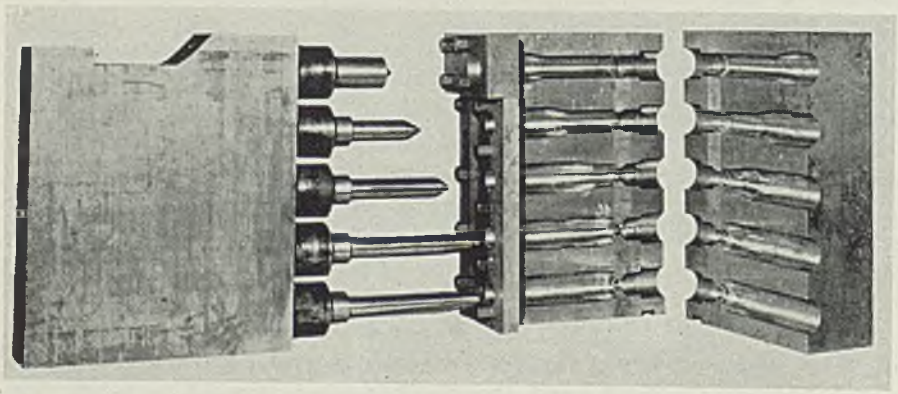


Fig. 4. (Bottom)—Piercing tools and dies for an Acme upsetting forging machine such as shown in Fig. 5

ing" properties, such steels remaining cementitic on cooling in air. The early Mushet steels, the precursors of modern high-speed steels, also contained high percentages of tungsten. However, these high tungsten steels do not stand water cooling very well. So a steel having only some 4 or 5 per cent of tungsten, but with about the same percentage of nickel, has been substituted with excellent results.

Now how does this method compare with the Witter cross roll described in section four? As far as production is concerned, a rate in excess of some 150 or 180 drawn 75-millimeter forgings is not claimed despite a 16 or 17-second cycle from the point where the billet leaves the furnace to the moment when it drops from the machine. This would give us a maximum of 240 forgings per hour. The initial investment in the medium sized Baldwin-Omes machine, capable of handling 75 to 125-millimeter shell, including dies and tools, is about $70,000. For bigger shell up to 155-millimeter, a larger machine costing $120,000 must be used. For the smaller machine, four or five men are required, while the larger unit must have six men for efficient production. Tool life may run as high as 20,000 forgings per set in the case of the medium calibers, and not more than 5000 to 7000 in the case of the larger sizes.

Progress in the art of forging high-explosive shell appears to have moved in the direction of the path of least resistance, at least as far as piercing and drawing techniques are concerned. A reduction in the work required, however, is not the only desirable end to be attained. There is the matter of time of contacts between the relatively cool steel of the punch and the intensely hot steel of the billet, an association which is so close as to cause surprise that forging tools stand up as well as they do. Hence there is an argument for so arranging matters that any action is confined to the shortest possible space of time.

Now if steel at forging heat be considered as a highly viscous fluid into which we might plunge a forming punch in the hope of finishing a shell carcass from the billet in one operation, we should quickly discover that neither punch nor machine could sustain the rate of working necessary to effect the requisite redistribution of metal in the allotted time. Thus, as far as forging machine techniques are concerned, embodying as they do the concept of a die of fixed volume, we are obliged to break up the total process into such a number of steps as will bring each operation within the capacity of both tools and machine.

"One-Shot" Forging: If the various methods of producing the forged body of a shell are carefully considered, we may observe that they contain in varying degrees the primary elements of tension, compression and shear. We might describe the action of the upsetter as a kind of "hydraulic squeeze" in which no attempt is made to roll

or stretch the metal in a longitudinal direction, but in which the elements of compression and stretch in a circumferential direction predominate. If rate of production be any guide, this is evidently not the easiest way to forge a shell, although the multiplicity of operations characteristic of the upsetter, each of which is of relatively short duration, should be conducive to an extension of tool life.

Now suppose instead of closing the bottom of the die, we provide a movable element, whose rate of descent (assuming the die to be mounted vertically) is under such control that at the end of the action the space between the punch and the die conforms to the desired shape of the finished forging, we might be able to complete the job in one operation. The total effort required, however, must be so reduced by introducing the element of longitudinal stretch that the action can take place within the time the punch can stand contact with the hot steel. If at the same time the pressure required for the operation is much reduced—say as low as 40 tons in the case of 75-millimeter shell—then the manufacture of shell forgings in one operation is within the realm of practical possibility. Experimental work along these lines already has met with considerable success in Canada.

Upsetting: In making shell by one familiar upset method, bar stock is either sawed, sheared or nicked and broken to a length which will make two shell forgings. Using one end of the bar as a tong, the other end is raised to forging heat and placed in position against the stationary half of the opened split die. Closure of the die pinches the bar powerfully and the first "upsetting" or "buttoning" operation, A in Fig. 2, takes place. This squeezes up the end of the bar to the full outside diameter of the finished carcass and is the only operation of the series in which shortening of the blank takes place, the remainder being piercing or opening up operations. Fig. 2 shows the tool layout for this process. Note the cylindrical bar in place at operation A in the first die impression, after the tool has acted upon it. The shape of the piece after the first upset, is shown at A, Fig. 3, in half section. It will be understood, of course, that in practice no cutting off takes place until both forgings are complete.

The progressive advance of the punch in the second, third, fourth and fifth operations (six operations are now recommended) is indicated at B, C, D and E in Fig. 2 with resulting shaps from each respective operation shown in Fig. 3. No further change in length either by shortening or extrusion past the punch is produced, the action merely squeezes out the metal to fill that portion of the die designed to accommodate it. Meantime, the nicker plate near the left hand end of the die progressively necks down the bar, see sections, Fig. 3, to form the connection portion of small diameter between the shell forging and the bar. Apart from the metal left on the outside for machining, this neck constitutes the only waste in the forging and amounts to but a small fraction of a pound of metal, since the cavity is, of course, forge finished.

At one time there was some dispute as to the practicability of forge finishing the cavity of high-explosive shell. However, it has been well established that several methods of making shell employ sufficiently close tolerances to avoid the necessity for machining—a very expensive and time-consuming operation with which shell manufacturers were painfully familiar during 1914-18.

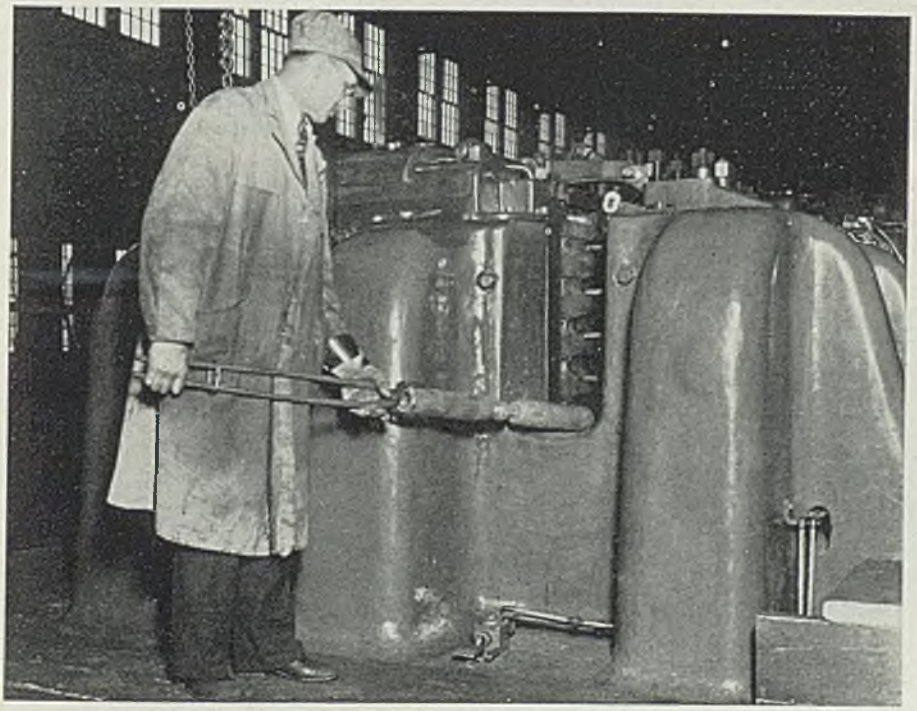
Cavity Shape Changed: To facilitate forging, the older design of cavity with a flat bottom and fillets, necessitating a very blunt punch, has been superseded since the Spring of 1940 by a cavity which calls for a punch with a hemispherical end. All designs of the Ordnance department now employ this shape of cavity save the 3-inch anti-aircraft shell. This is a much more favorable shape for piercing, the tendency to score the piercer being very much reduced and the tool life increased to some 6000 or 7000 forgings per piercer in the last two operations and about twice this number in the other operations.

Since there is no relative movement between forging and die in the upsetter method—except to a small extent in the very first operation—we would expect die life to be considerable. This actually is true since impressions in the die blocks are good for about 20,000

Other Articles on Production of Ordnance

■ **This is another of STEEL'S series of articles on ordnance manufacture. For others already published, see issue of Feb. 17, 1941, p. 58, for Shaping Steel to Form High-Explosive Shell; Feb. 10, 1941, p. 67, for Checking the "Inside Job" on Guns; Feb. 10, 1941, p. 54, for Heating Billets for Shell Forging at National Steel Car Corp. Ltd., Hamilton, Ont.; Feb. 3, 1941, p. 54, for Composition and Metallurgy of High-Explosive Shell; Jan. 27, 1941, p. 44, for Background Information on Shell Making; March 11, 1940, p. 38, for Design and Modern Methods of Making Shrapnel Shell; Dec. 2, 1940, p. 50, for Operation and Construction of Bofors Anti-aircraft Guns; Oct. 14, 1940, p. 160, and Jan. 6, 1941, p. 219, for How Technical Progress Aids Defense; Jan. 13, 1941, p. 48, for Some Typical Shell-Forging Methods; Jan. 20, 1941, p. 54, for Recommendations on Heating Billets for Shell Forging; Jan. 20, 1941, p. 74, for Making Cylinders for Packard V-12 Torpedo-Boat Engines.**

Fig. 5—Working end of dies for an upsetting machine built by Acme Machinery division, the Hill Acme Co., Cleveland. Note foot control conveniently placed for operating the machine. Dies used are detailed in cross section in Fig. 2



or 25,000 operations per sinking, and the dies may be redressed four times.

The operation of an upsetter calls for a crew of about six or seven men who will produce about 65 to 75 shells of 75-millimeter size per hour. However, a highly skilled crew could probably improve on this figure—85 being about the upper limit possible with this method.

Instead of using a bar which is only long enough to make two shells, shell may be forged off the end of a bar, initially about 10 feet long, granted adequate furnace facilities. The tools and dies employed in this method are essentially the same as previously described except that the nicker plates are arranged to pinch the forgings entirely off the bar in the last operation, and shear knives may be provided to cut off the distorted end of the bar prior to the next operation. To facilitate handling, a simple counterbalance or manipulator is used at the upsetter to support the entire weight of the forging and bar during transfer from one die to another.

The crew is disposed as follows: First man is operator who does the actual forging. Three helpers are required at two furnaces. Another man must swab the piercers with hot die lubricant and direct water upon them after each forging is completed to keep them in condition. The last man handles the forgings from the machine to the air blast which cools the forgings rapidly. This is an important operation as it brings up the specified hardness and strength of the steel without the necessity of subsequent heating and quenching.

High-duty forging machines adapted to the forging of shells of medium caliber may cost anywhere from $55,000 to over $100,000, depending on the make and service required. Considering the weight of metal in these machines—one machine making 75-millimeter shell weighs 300,000 pounds—they are not expensive. Among the considerations governing their design are of course the primary necessity of resisting the enormous pressures required for forging by the upsetter method. This primary pressure produces forces of great magnitude tending to force the dies apart. Should this happen, lop-sided upsets and heavy flash on the shell body result. Thus only a bed frame of unusual strength and rigidity will answer the purpose and the end result is very impressive indeed, if only regarded as a massive expression of the founder's art.

However, these huge heat-treated steel castings, see Fig. 4, with their heavy walls and thick sections exhibit the care which has been taken to secure proper distribution of metal. The frame of the machine is made as short as possible and very deep and may have to be set below the floor line for convenience in operation. Some notion of the loads imposed on forging machines in action may be gained from the size of the tie bars which contribute the final quota of strength and resistance to deformation.

Other major concerns of the designer include the problem of slide alignment. The National Machinery Co., Tiffin, O., has supplied an effective answer in the shape of what they call their "over-arm" and "under-arm" slides, which carry extensions guided by "outboard" bearings. In the case of the heading slide, the pitman operates within the curved "over-arm" curve of the slide, in a very compact arrangement which avoids any large distance between the thrust of the pitman and its point of application to the billet being forged.

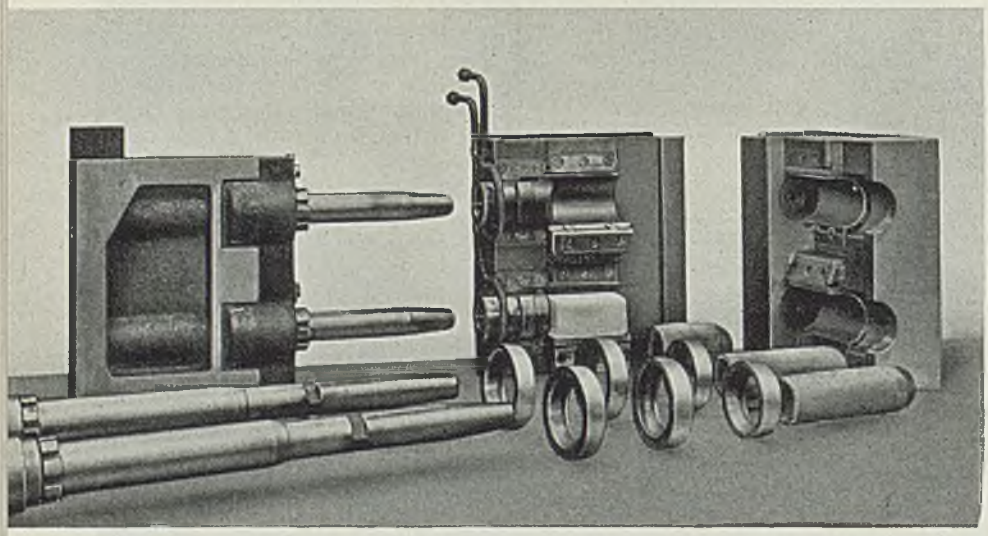
Of equal importance is the under-arm slide, which insures correct matching of the two halves of the die. Obviously, if there is wear or misalignment of the moving parts which are concerned in this action, the result is a mismatched forging. An arm, cast integral with the slide, extends under the stationary die to an outboard bearing in the opposite wall of the bed frame. The moving half of the die is thus rigidly supported between two bearings. The necessity for this construction will be readily understood when account is taken of the variable position of the center of side pressure tending to open the dies; and when it is realized that we are dealing here not only with a mechanism designed to effect accurate closure, but also with a shearing machine.

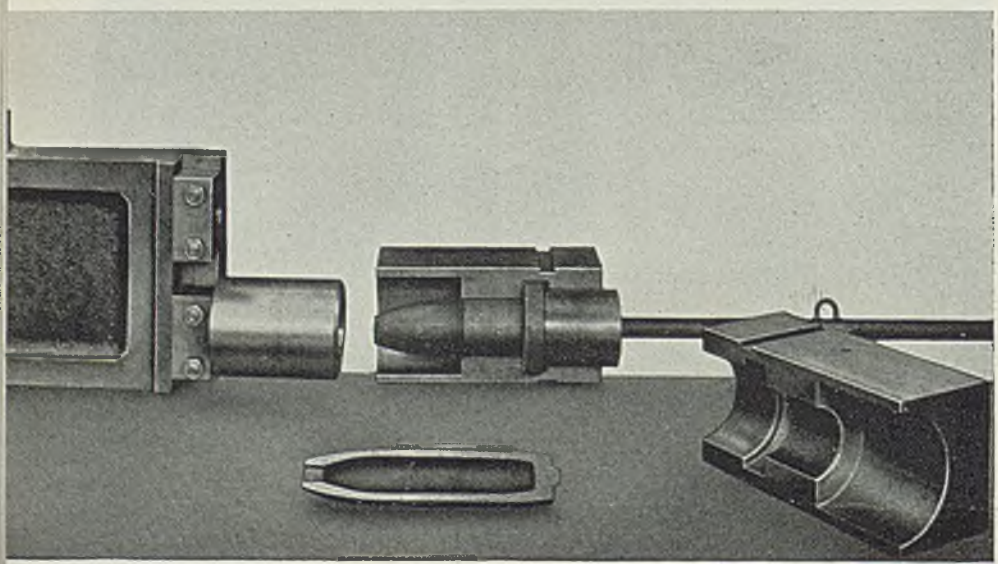
Not the least interesting feature of the forging machine is the means whereby closure of the two halves

(*Please turn to Page 92*)

Fig. 6. (Top)—These are piercing and drawing mandrels and patented split dies of the Baldwin-Omes shell-forging machine

Fig. 7—Dies which permit shell nosing in the same machine, Fig. 6. Photos Figs. 6 and 7 by courtesy of Baldwin-Southwark division, Baldwin Locomotive Works, Philadelphia





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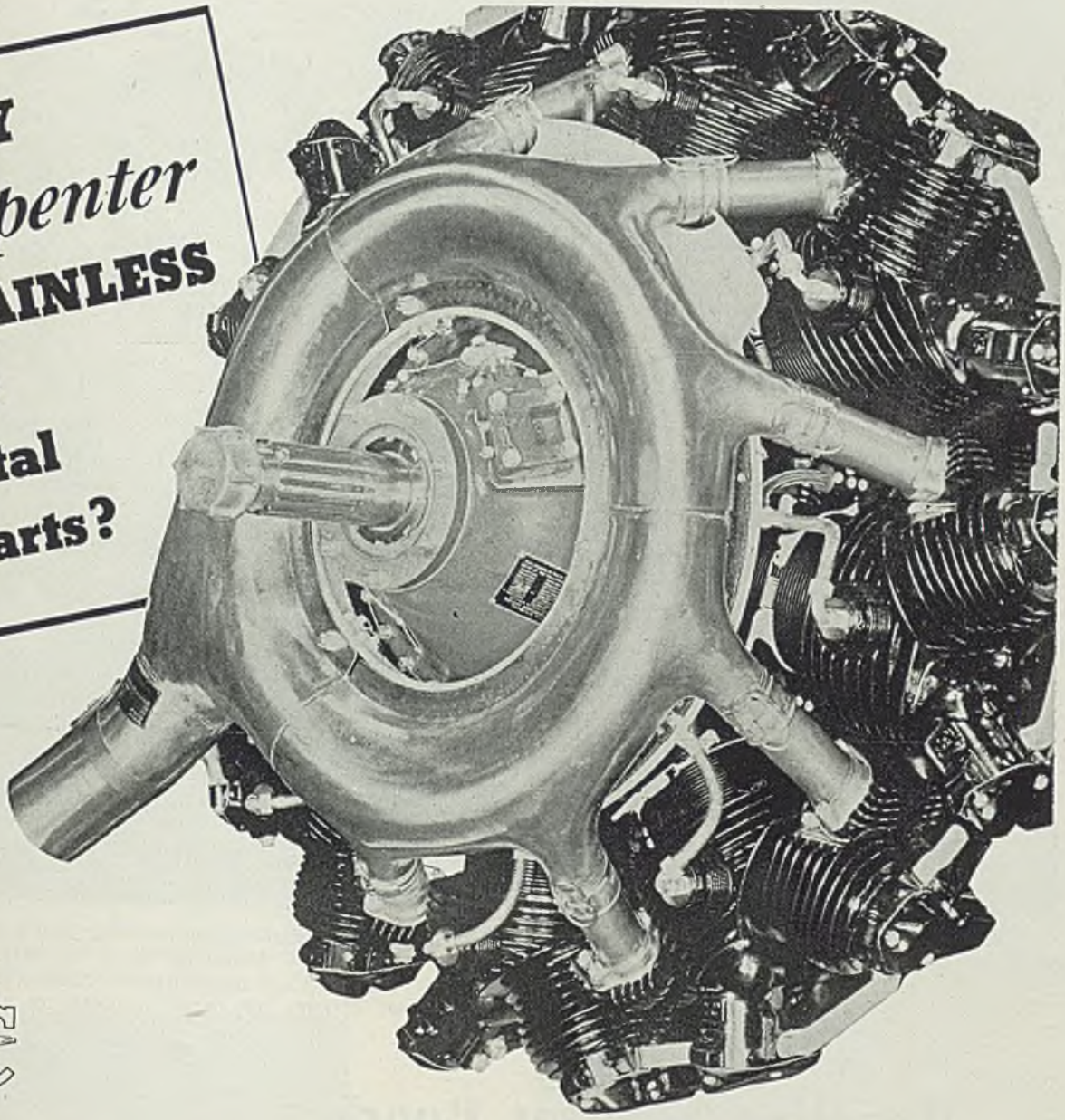

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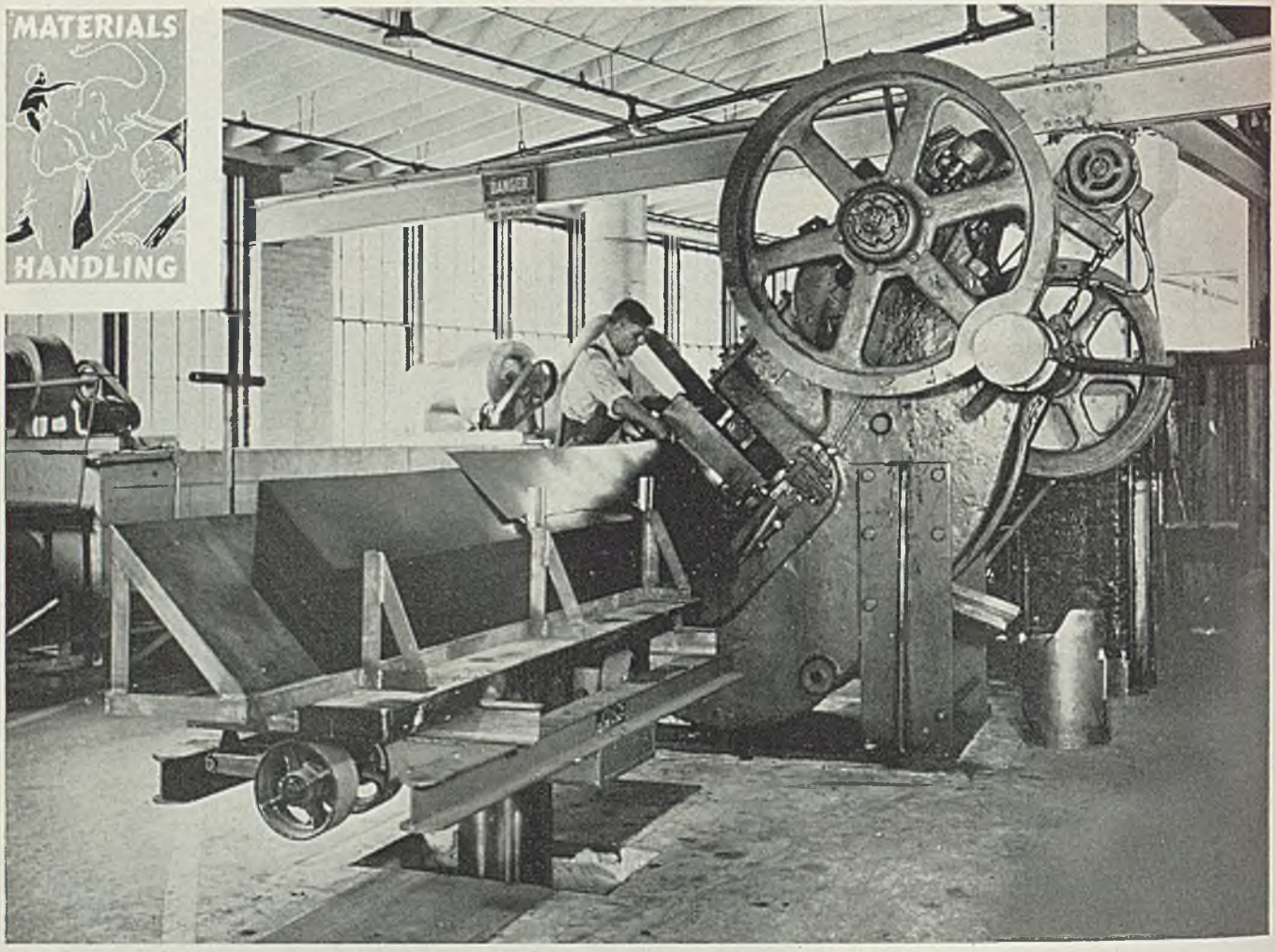

View from feeding side of press showing special hand truck with sloping top and pneumatic lift in floor. Note how guides at top of the sheet pile raise sheet from pile and offset it so operator can grip it easily to feed to press. Blanks slide out between press uprights into metal container at extreme right

Handling Time at Punch Press Cut in Half

A novel hand truck, supplemented by a built-in floor lift, cuts major handling operations from ten to three in feeding a punch press and affords a 50 per cent reduction in handling time. Method appears to have wide application possibilities. Perhaps you, too, could obtain similar economies in your own plant

■ TYPICAL of the work that can be greatly improved by providing adequate mechanical handling facilities to and from the operations are those incident to use of punch presses. Often a series of punch press operations can be set up with conveyors between the presses so feeding sheets into the beginning of the line is the only handling the operator needs to do to put the work through a whole series of blanking, stamping and forming operations. For description of typical handling setups of this type, see STEEL, April 10, 1939, p. 62 and STEEL, April 17, 1939, p. 59.

Realizing the importance of efficient handling, Reliance Electric & Engineering Co., Cleveland, has revised a number of its operations to the end that more efficient handling has greatly improved the entire process. A high-speed lacquering line was set up to place a coat of insulating material on electric steel sheet from which alternating and direct-current motor laminations are subsequently punched, see STEEL, Dec. 4, 1939, p. 54. More recently, a special handling arrangement was worked out to facilitate separating the disk into rotor and stator laminations as described in STEEL, May 27, 1940, p. 66.

Intermediate between these two series of operations, the sheet must go from the coating line to be blanked into disks. Here a particularly efficient arrangement has been worked out which not only makes the press operator's work much easier but also has cut in half the time required for this blanking operation.

Originally the 10 x 3-foot sheets coming from the coating machine were cut the short way into 10 pieces, each 1 x 3 feet. These were stacked into piles about 2 feet high and fed by hand into the press. By the new arrangement, the 10 x 3-foot sheet is sheared the long way into three strips, each 1 x 10 feet. This, in conjunction with the special

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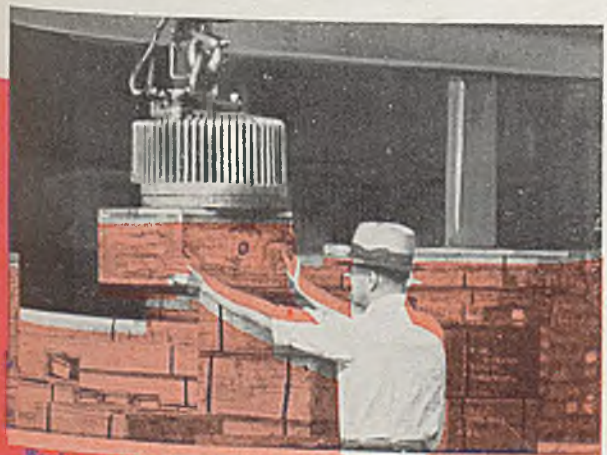

Warehouse steel is handled quicker and safer with a magnet. There's no slings to slip or hooks to tear out — the lifting power is distributed over the entire load.

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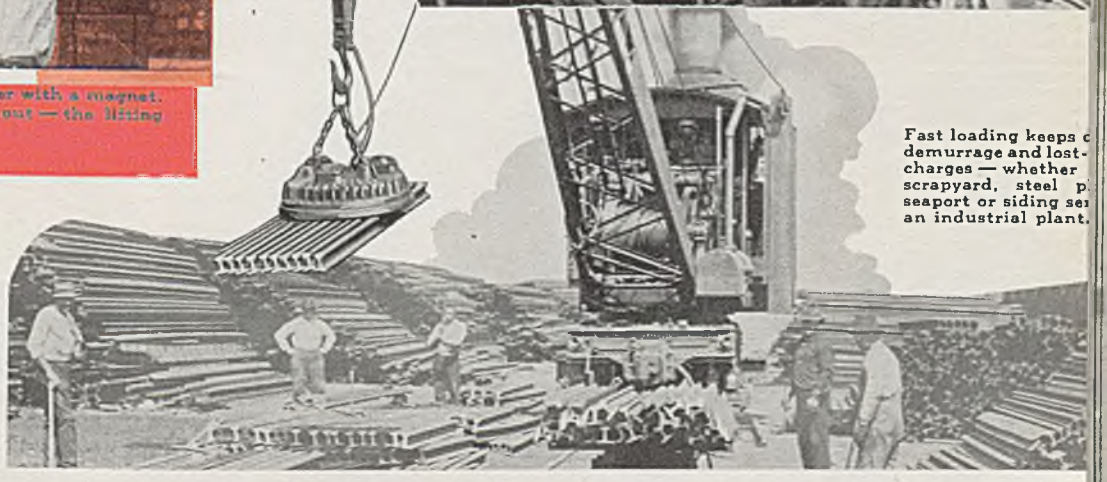

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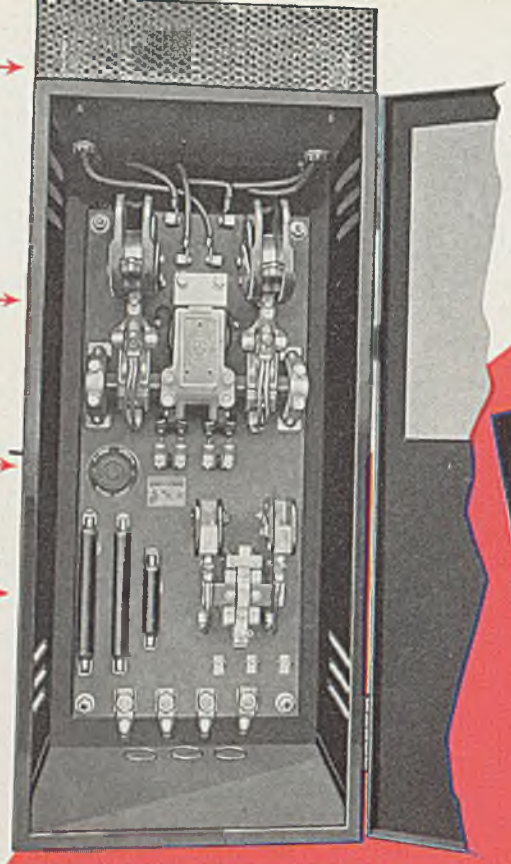


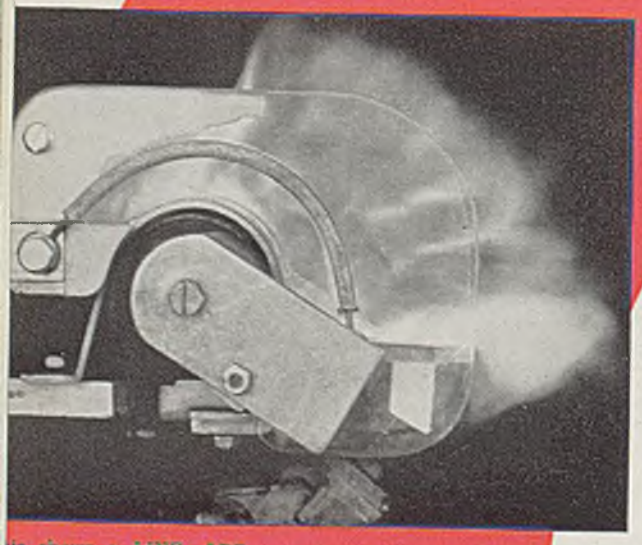
This Magnet Controller Has a REPUTATION for Low Up-keep Cost

Opening the current to a magnet is a tough assignment. No ordinary contactor could long stand up under the vicious arc — caused by the big coil and mass of steel — every time the magnet is deenergized. But the EC&M *Automatic-Discharge* Magnet Controller is especially designed for this service with main contactor of special LINE-ARC design.

This controller operates with less wear . . . less expense for up-keep than any previous type. There is no destructive burning which wears away arc shields; contacts, of unusually high Brinnell hardness throughout their entire thickness, last longer because they operate cooler due to the LINE-ARC principle.

The LINE-ARC principle is simple . . . and automatic. There's nothing to adjust or wear out. At the instant the contacts start to separate, the arc is automatically transferred from the contacts to the arcing-plate and circular guard over the blow-out coil. Here, the arc can do no harm. It is stretched out in a line, centered *between* but *not touching* the arc shields. Hence — cool contacts — no burning of arc shields, and the name — LINE-ARC.

Many magnet users have replaced old controllers with the EC&M *Automatic*. They know that lower up-keep and faster operation (quick release of the load) will pay for this improved controller quickly. Write to-day for 2-color folder giving data on this controller for any make or size of magnet.



...is shows a LINE-ARC ...ntactor, specially fitted ...th glass arc shields, hand-...g a 300% load. The glass ...s neither harmed nor ...udged and is still in ...rvice at the EC&M Factory ...ere visitors may witness ...is convincing demonstra-...n of the LINE-ARC ...inciple.

Quick Release of Scrap

Quick Release of Brake Shoes.

*An Exclusive EC&M Feature, assuring instantaneous release of ANY type of load—*one* setting for scrap—*one* setting for rails—*another* for baled scrap, etc. No compromise, but a fast release of every load.

THE ELECTRIC CONTROLLER & MFG. CO. E C & M CLEVELAND, OHIO

HEAVY DUTY MOTOR CONTROL FOR CRANES, MILL DRIVES AND MACHINERY • BRAKES • LIMIT STOPS • LIFTING MAGNETS AND

for Any Make or Size of Magnet—Use the

handling equipment that will be described, has made it possible to reduce the number of major handlings at the punch press from ten to three. The handling time saved amounts to approximately 50 per cent. Of course different size sheets involve different cutting layouts, but this particular example is typical of the savings effected.

Accompanying illustration shows the new hand truck which has been built specially to handle the 10-foot sheets of electric steel. Each truck will carry 3 tons of sheet at a time, which is piled on a surface that has a slope to match the angle of tilt of the press platen. This makes unnecessary any additional positioning of the sheets as they are taken from the pile and inserted between the blanking dies.

Sheet from the coating machine is sheared and stacked on this special hand truck which then is rolled into position over the combination air-hydraulic lift set alongside the press. The top I-beam bars of the hydraulic lift frame rest on the floor and thus extend above the floor level when the lift is in the lowered position. However, the hand truck is provided with wheels which span the frame and thus permit the truck to be rolled into position over the lift frame. The truck has two I-beam cross bars fastened on the under side of the floor of the truck. These are positioned so they contact the frame of the lift when the lift is actuated to elevate the sheets.

Control of the position of the air-hydraulic lift is provided by an air valve located within convenient reach of the press operator. This affords a quick means of positioning the sheets exactly the working level of the press and allows ready correction of the height of the pile is reduced in feeding the press.

The hand truck, in addition to providing a sloping surface for the stack of sheets, is fitted with angle-iron uprights over which are fitted freely sliding sheet guides containing hardened vertical steel rolls. Lower edges of the sheet rest against these uprights. This arrangement also facilitates feeding . . . . in this manner: Prior to moving the sheet lengthwise from the pile, the operator frees the top of the sheet by pulling it toward him and then letting it slide back against the guides. As the top sheet does so, it slides back onto knife-edge projections on the guides which raise the lower edge of the sheet slightly above the rest of the sheets and at the same time offset its upper edge a couple of inches beyond the edge of the sheet pile. As the operator pulls the top sheet toward him, the guides have dropped tightly against the surface of the remaining sheet, thus assuring that the knife-edge projection catches the upper sheet as it is dropped back. The decreased area left in contact with the sheet below and the better hold provided by the projecting edge of the top sheet make it an easy matter for the operator to slide the sheet lengthwise into the press. The ten blanking operations then follow in sequence just as rapidly as the operator can trip the press and feed the sheet.

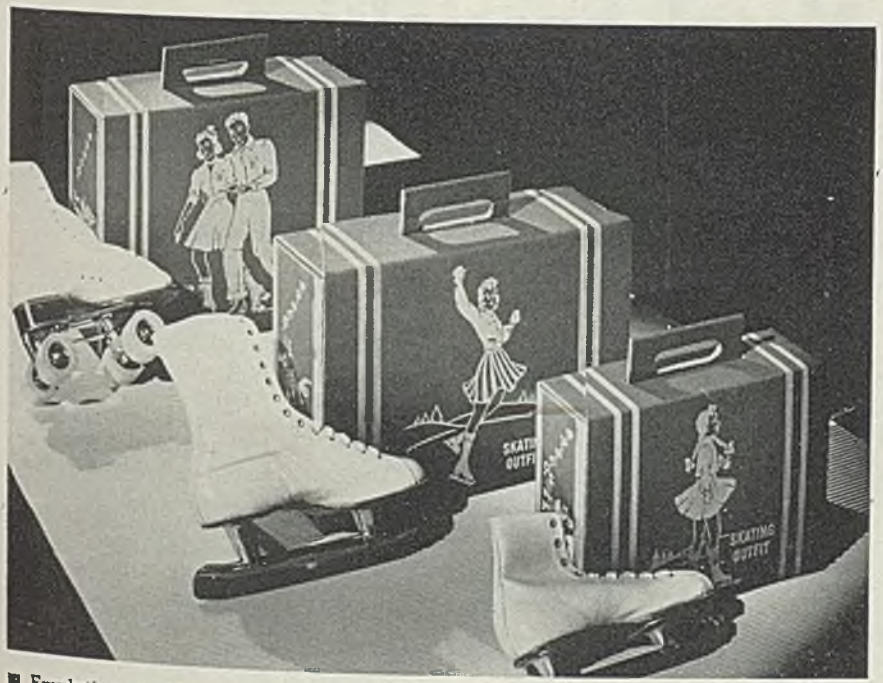
Each blank requires approximately 1 square foot of sheet surface for this particular piece. Size varies, of course, according to size of motor or generator.

The press itself has not been changed in any manner—simply the feeding method revised. Even the blanks involved are the same size as was mentioned before—that is, about 1 square foot for this particular job. The disk blanked out by the operation slides down a chute between the uprights of the press into a metal basket immediately behind the press as is shown in the accompanying illustration. From this point, it is trucked to succeeding operations.

Skeleton material is pushed through the press to the left of the operator in the illustration, where it is bundled and taken away.

The new method of cutting the sheet utilizing the special truck with sloping top and positioning fixtures cuts the number of handlings of the steel sheets from ten to three and reduces handling time approximately 50 per cent. There is no reason why similar important reductions in press time cannot be obtained on many other punch press operations if equal thought is given to getting material alongside and into the press.

Dual-Purpose Containers for Steel Skates



■ Emulating modern airplane luggage, the corrugated paper containers in which Basco roller and ice skates are now packed and shipped serve a dual role—they serve as a display package and a carrying kit. A creation of Hinde & Dauch Paper Co., Sandusky, O., these packages, in sets of three, make up the family group of boxes

Booklet Embodies Short Cuts for Checking Gears

■ A new 44-page booklet of special value to gear production men and engineers is offered by Michigan Tool Co., Detroit. It presents in simple form short cuts of practical everyday assistance to those whose work involves the cutting and checking of gears.

Included are change gear formulas and tables for hobbing machines, formulas and tables for checking gears by the ball method and pin method, a table on hobbing speeds, complete tables of decimal equivalents of fractions for use with the change gear formulas, etc., as well as hob-checking equipment information, and formulas for calculating hobbing time.

Actual examples, applying the formulas, are given in each case. A limited number of these booklets (bulletin No. 270) are available free of charge to users of Mitco ground form gear cutting tools, Michigan gear production and Sine-Line gear checking equipment, as well as to shop executives and engineers.

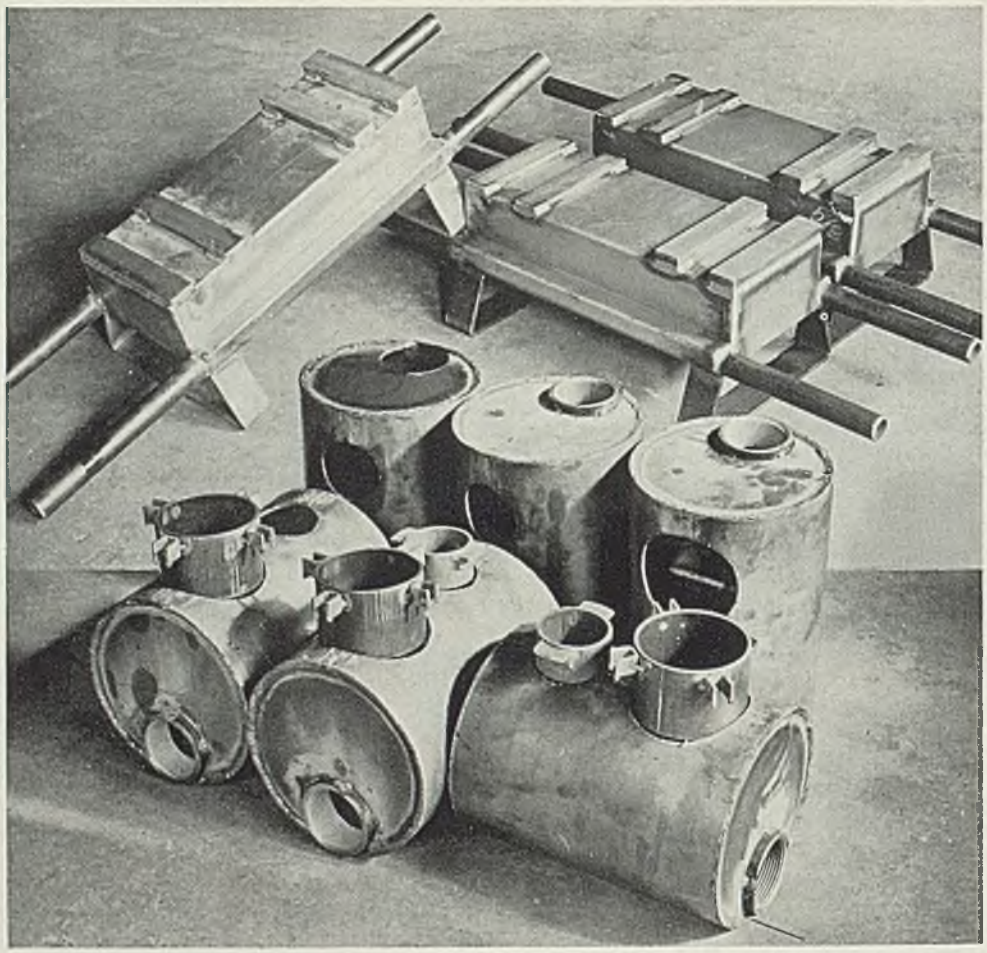


Fig. 1—Mounts for a portable motor-driven blower made from sheet metal are shown in upper portion of illustration. Below, pressure tanks for a fuel oil delivery system

How Neilson Brothers Weld Sheet Metal Specialties

Fabrication of sheet metal specialties by arc welding is a highly successful business for Neilson Brothers Inc., Brooklyn, N. Y. The methods they have developed and their application to typical jobs are detailed here

■ THE FABRICATION of sheet metal specialties as practiced in the shop of Neilson Brothers Inc., Brooklyn, N. Y., is notable for the uniform precision and workmanlike execution of all details in a production program which includes an extremely wide variety of shapes and sizes fabricated largely from relatively thin material. In the case of many of the products manufactured, it would be possible to overcome the major portion of the welding assembly difficulties if elaborate jigs were to be used. However, the volume of work is not large enough to absorb the cost of such fixtures.

The same fine results in relatively small production lots are obtained by methods developed here especially for such work. One part of the system for getting high quality work is the use of metal cutting and forming equipment which is adequate for the purpose. The shop is well equipped with shears, rolls, brakes and other machinery, all of which is up-to-date and of ample capacity to do a first-class job of preparing the parts for final welding assembly. Too, maximum employment of forming and bending saves making many welds.

The second important factor is the training of workmen in the skillful handling of the plant equipment. The specialization of operations is encouraged because it is recognized that the detail of having all materials perfectly formed goes far to relieve the difficulties that are ordinarily encountered in welding thin sections.

Perhaps equally important is the ability of the management to cooperate with customers in the perfection of designs and in adjusting designs in such a way as to improve production. This frequently involves a considerable amount of development and experimental work. The firm believes that it is good business to deliver shapes that are neatly welded and precisely fitted. Therefore, they habitually give this careful attention.

The few examples illustrated here show how successfully one shop can turn out special sheet metal fabrications which have all of the earmarks of large production jobs. The small rectangular stand, Fig. 1, with handles is made for a portable motor and blower. Here the requirement is for a light weight but sturdy mount, so constructed as to maintain perfect alignment of the motor and blower. The body of this mount

is formed from a single piece of 10-gage cold-rolled steel. End plates of ¼-inch steel serve as stiffeners. The pads on which the motor and blower are mounted are cut from ¾-inch bar stock, and the handles are 1-inch pipe.

This assembly might seem at first glance to require a rather elaborate jig to set up the assembly for a precise welding job. However, it is accomplished very easily by using four large C-clamps. A piece of ½-inch bar stock supports the underside of the formed sheet metal body. The pads are held in place for tacking by a short length of channel iron. This assembly is secured by the clamps and tacked, after which the final welding assembly is comparatively easy. The feet are formed from 2 x ¼-inch hot-rolled bars.

Welding Conditions Different

An entirely different set of welding conditions is presented by the small pressure tank, Fig. 1, which is 12 inches high and 9 inches in diameter. The shell of this little tank is 10-gage sheet and the heads are 3/16-inch plate. There is a baffle inside which does not show in the illustration. Welded into the ends of the tanks are 2½-inch extra-heavy couplings. One of the side attachments is a short length of 4-inch seamless tubing to which are welded lugs for ½-inch bolts and another length of 2¾-inch seamless tubing which carries lugs for engaging a locking device. Obviously a large part of the welding involved in this assembly closely resembles ordinary pipe welding designs. The welder has the advantage of being able to adjust his work to the most favorable position, along with the disadvantage of working on material much thinner than ordinary pipe.

These are types of assembly which would be difficult for an organization that was accustomed to working largely on plate thicknesses. The Neilson shop has the advantage of using equipment which is specially designed for thin work such as the Wilson "Wasp" in Fig. 2 and operators who are trained and experienced in this class of welding. Through continuous application these welders maintain the skillful touch which avoids burning through or overheating and produces the smooth even weld beads that are required on these particular jobs.

One of the specialties of this shop is the fabrication of dust collecting systems. The one illustrated in Fig. 2 is 7 feet high and 24 inches in diameter. The shell is 16-gage sheet. This collector has a number of inlets and outlets and clean-out doors and other specially designed attachments all of which are arc welded. Inside the collector illustrated 14 bags 6 inches in diameter are suspended. The dusty air is forced through these bags which act as filters. It is one of several designs which Neilson Brothers have devised for food plants, paint factories, ink plants, etc.

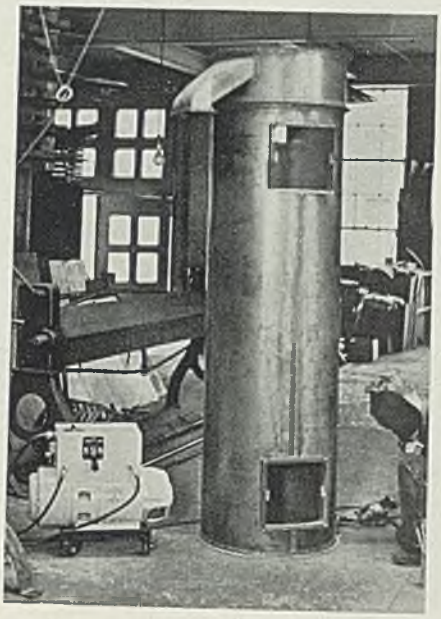


Fig. 2—Dust collector tower and midget welding unit, a Wilson Wasp, used in its fabrication

♦

Develops Paint for Corrosive Conditions

■ A new grade of Koroseal paint, Koroplate, developed to protect metal surfaces against chemical reactions and recommended for service wherever extremely corrosive conditions disqualify any other kind of paint or coating is announced by B. F. Goodrich Co., Akron, O. Base of the paint is a synthetic material created from polyvinyl chloride, which is derived by a series of chemical reactions from coke, limestone and salt.

The paint is liquid at room temperatures and requires no heating before application. At ordinary temperatures it can be either brushed or sprayed, and can be thinned with either brush or spray thinners when necessary. It is made only in semiglossy black. Also, it must be used in conjunction with a Koroseal primer with similar characteristics.

When thoroughly dry, the paint resists all acids except concentrated formic and acetic, and is not affected by brass, chrome, nickel, cadmium, zinc, copper, silver or tin plating solutions. In addition, such solutions are not contaminated or fouled by the thoroughly dried paint, although it is not recommended for constant immersion in liquids.

Uses New Alloy For Valve Stems

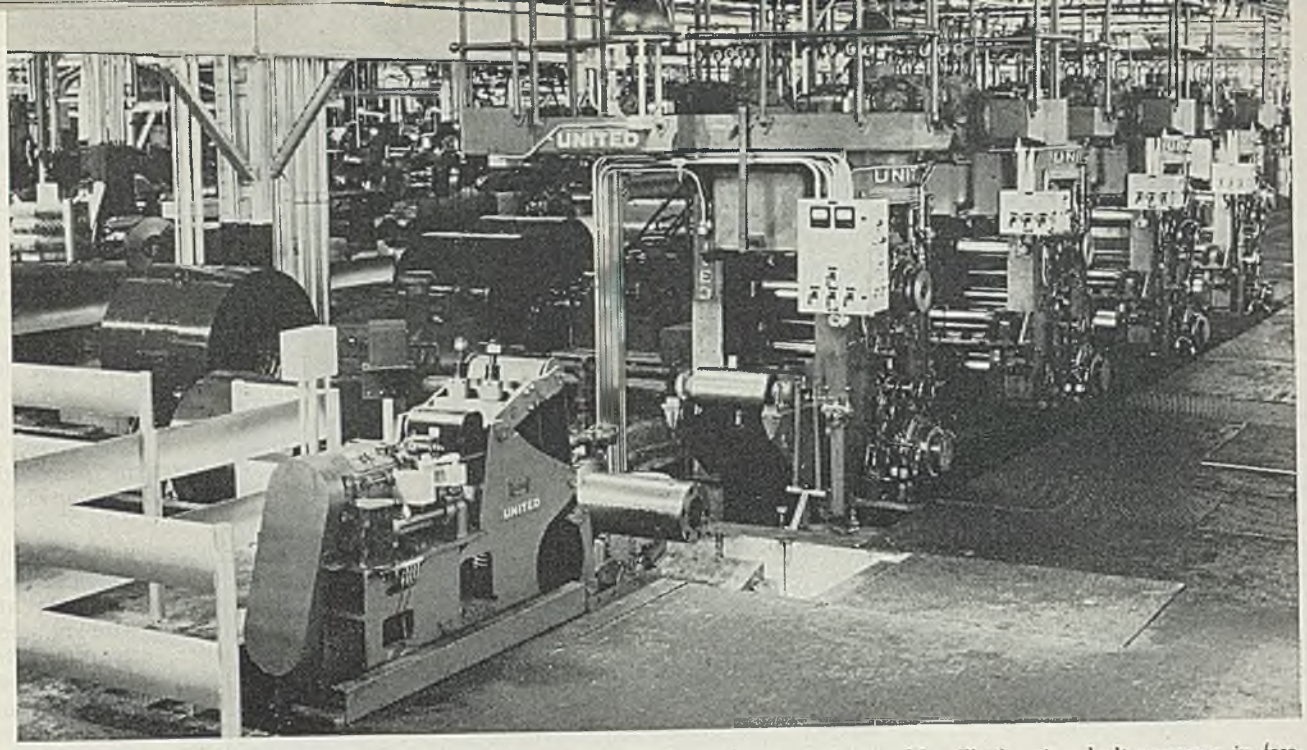
■ A new longer wearing alloy called Hancodur is now being used for its valve stems and bonnets according to Hancock Valve division of Manning, Maxwell & Moore Inc., Bridgeport, Conn. A self-lubricating alloy, it was developed expressly for use in this company's superfinished 500-brinell bronze valves.

Repeated breakdown tests indicate that stems and bonnets of this alloy outwear other stems and bonnets by six times. These stems also have a tensile strength of 90,000 pounds per inch.

The company states it is now offering its full line of superfinished 500-brinell bronze valves with stems and bonnets of this alloy at no increase in price.

Fabricates Huge 100-Ton Truck by Welding

■ One of the first duties of this huge welded steel 100-ton truck is to transport for the Bonneville Power administration eight large 100-ton transformers from railroad cars to the substation at Vancouver, Wash. Fabricated with Metal & Thermit Murex chromium copper electrodes by Isaacson Iron Works, Seattle, it is shown here with a test load of 108 tons



Delivery end of new 4-stand tandem cold mill showing belt wrapper in foreground for directing forward end of strip onto reel

MODERN COLD STRIP MILL

New tandem installation of the Acme Steel Co. has new features incorporated in its design including wide speed range of first two stands, use of full face of rolls when working narrow widths, precision rolling facilitated by screwdown arrangement and location of auxiliaries in basement

By C. A. RICHARDSON
Sales Engineer
United Engineering & Foundry Co.
Pittsburgh

■ ALL THE LATEST proved features of modern design, both mechanical and electrically, are embodied in the new 10/14 & 25 x 22-inch 4-stand tandem cold strip mill of the Acme Steel Co., Riverdale, Ill. which was built by the United Engineering & Foundry Co., Pittsburgh, and placed in operation Oct., 1940.

This addition to Acme's cold rolling capacity was prompted by the increased demand for strip and steel strapping. The new mill will be used principally for producing widths under 12 inches and thicknesses from 0.007 to 0.025-inch.

In order to further reduce the usual operating costs accompanying such a unit and meet the specific rolling requirements, a few new and novel features were incorporated.

A wide range of speeds was made available on the first two stands by the use of change gear drives in addition to 3:1 direct-current variable-speed motors. Automatic shifting entering guides permit rolling narrow stock over the full face of the roll or strip of full width. All four entry guides are of the latest type used in tandem rolling, having air-operated top half and built so that they can be withdrawn from the mill as a unit to facilitate roll changing. All guides are moved in unison by push-button control from the operator's pulpit, thus permitting each successive strip to be passed through the mill with its path partly overlapping the previous one. This arrangement gives the utmost in roll life when rolling relatively narrow stock.

A motor-operated belt wrapper is located at the delivery end of the mill, as shown in the illustration. This unit is designed to receive the maximum width of material as well as the range of narrow widths at the point of delivery on the roll face and to feed it on the tension reel without requiring the attention of the operator.

The backup rolls, 25 inches diameter, are arranged for the use of a wide range of work roll diameters permitting the greatest roll life where it affords the most economy. All work rolls, except the top units on the last two stands, are driven which results in using the rolls in a range of 14 to 6½ inches diameter.

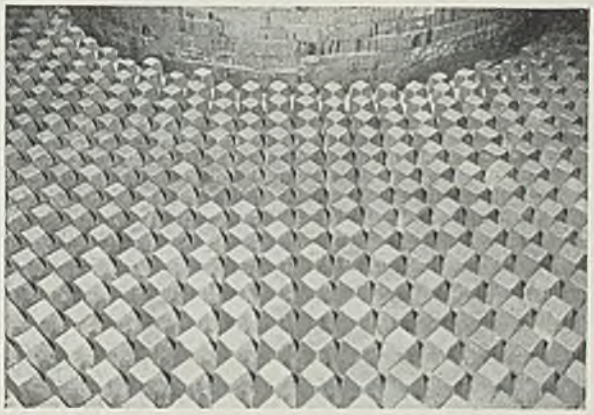
The backup rolls are carried in Morgoil bearings except for the top backup rolls of the last two stands, where tapered roller bearings are incorporated.

Each roll stand is equipped with United's fully-enclosed, compact, patented design of screwdown having two motors connected by a magnetic clutch with cone worm gearing and high ratio to each screw for precision rolling, as well as patented selsyn indicators which greatly enhance the efficiency of the screwdown operation.

A hydraulic roll changing rig for each stand is located just below the floor plates opposite each mill and by using the roll balance hydraulic system, the entire roll assembly of each mill may be independently removed or replaced. Such roll changing equipment and

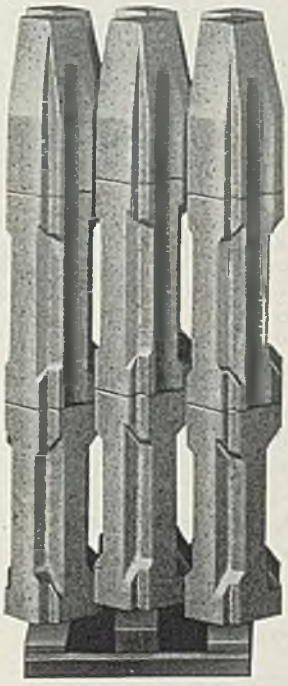
Rebuild Your Blast Furnace Stoves

With the Only Stove Checker Shape
That Guarantees
Complete Cross-Circulation of the Gases
and Thereby
Equalizes Their Flow Throughout the
Entire Checker Chamber
Producing the Turbulence Necessary
For High Heat Transmission



INLET CHECKER

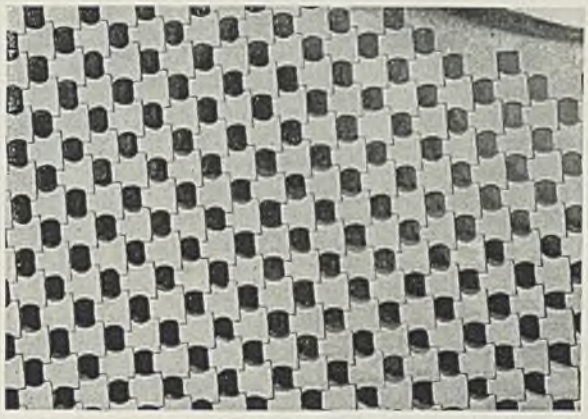
The Three Open Joint Shapes



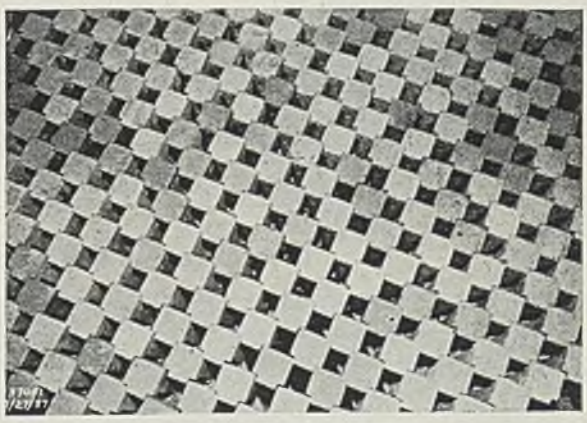
1 Course Inlet Checkers

Upper 30%, Top Checkers

Lower 70%, Straight Checkers

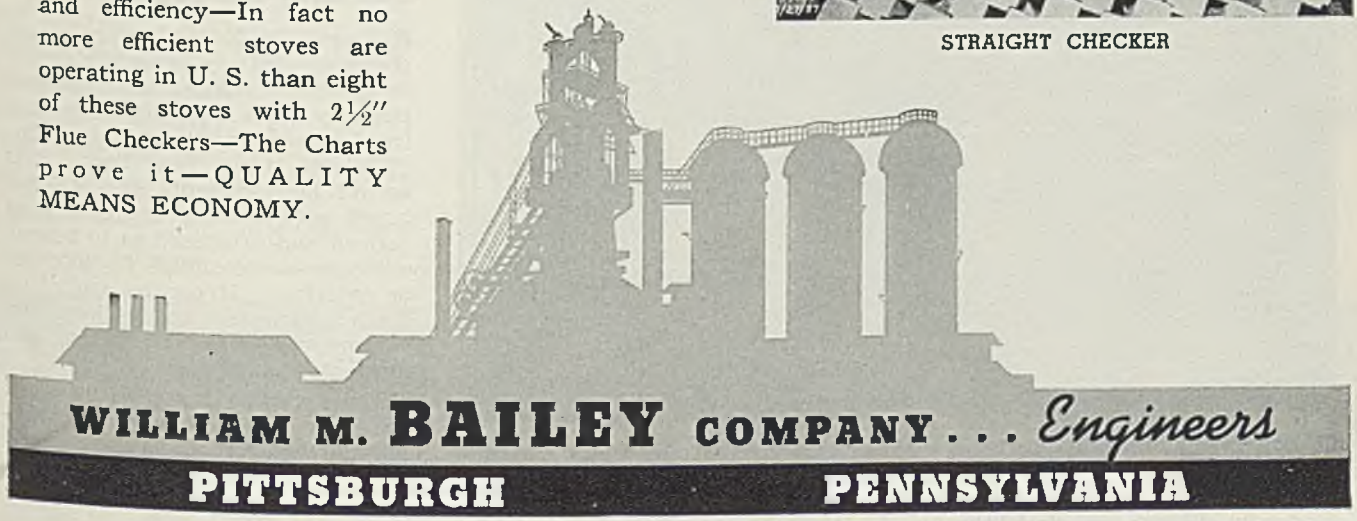


TOP CHECKER



STRAIGHT CHECKER

Six years continuous operation of this design have proven its structural strength and efficiency—In fact no more efficient stoves are operating in U. S. than eight of these stoves with 2½" Flue Checkers—The Charts prove it—QUALITY MEANS ECONOMY.



WILLIAM M. BAILEY COMPANY . . . *Engineers*

PITTSBURGH PENNSYLVANIA

European Agents—Ashmore, Benson, Pease & Co., Ltd., Stockton-on-Tees, England

the chocks of rolls being held in place by a patented latch arrangement, provide doing this work in the least time.

The last stand is equipped with pressuremeters for indicating and recording rolling loads.

At the delivery end of the mill is located a patented Klein type tension reel, 16½ inches diameter, with separate motor and drive. The coils are removed from this reel drum when collapsed by an hydraulic coil lift and stripper. In this case and on other late installations, the stripper plate being controlled separate from the coil lift has the advantage of moving this unit into or out of position with or without a coil being wound on the reel drum, therefore enhancing speed of operation at this point.

In order to have the best operating and handling facilities about the mill and adjacent equipment, the tendency has been to locate the auxiliaries in a basement near the mill. In this installation a large and well-constructed basement extends for a distance greater than the entire length of the mill, and in width from the face of the mill motors to a distance beyond the outer ends of the roll changing rigs.

A sub-basement of this size is required to house the oil system for the Morgoil bearings, coolant system for the strip being rolled and other auxiliaries such as pumps, strainers, etc., with ample space for inspecting and maintaining same.

In designing and manufacturing the oil lubrication system for the oil bearings on the mills, drive and pinion stands, the strip coolant system, the hydraulic system for the roll balance and coil handling equipment at the tension roll, the engineers considered the possibility of later adding a fifth stand.

The latest proven electrical features available are a part of this installation. The mill is geared for a maximum speed of 2200 feet per minute which is obtained by the use of a 400-horsepower motor at 350/1050 revolutions per minute on the first stand and 500-horsepower motors at 350/1050 revolutions per minute on the remaining three stands.

♦

New German Technical Bulletins Are Listed

■ In spite of war conditions in Europe, 13 bulletins were issued by the Kaiser Wilhelm Institute for Iron and Steel Research of Dusseldorf, Germany, in 1940. Some of them are of more than usual interest, according to W. Trinks, head of the department of mechanical engineering, Carnegie Institute of Technology, Pittsburgh. Here are the titles as listed by Professor Trinks:

1—Investigation of a wrought iron medieval gun used for shooting five-pound stone balls. 8 pages.

2—On the transformations of manganese steels. 12 pages.

3—Deep drawing tests with sheets and strips of alloy steel. 16 pages.

4—On the fatigue strength of helical springs with and without surface injuries. 22 pages.

5—The fundamentals of plastic deformation. 24 pages.

6—Results in (magnetising) roasting of ores containing iron carbonates. 12 pages.

7—Influence of front-tension and of back-tension in the cold rolling of strip on a twelve-roll cold mill. 16 pages.

8a—Loss of strength in annealing cold-rolled deep drawing strip as a function of time.

8b—Bright annealing of cold-rolled deep drawing strip steel in a continuous furnace; 8a and 8b are together in one bulletin of 28 pages.

9—On the problem of creep strength of heat-resisting steels at temperatures of 1110, 1300 and 1470 degrees Fahr. 12 pages.

10—Comparative bending tests of chromium - molybdenum heat - treating and case-hardening steels. 20 pages.

11—On the behavior of cast iron and of malleable iron under alternating stress. 35 pages.

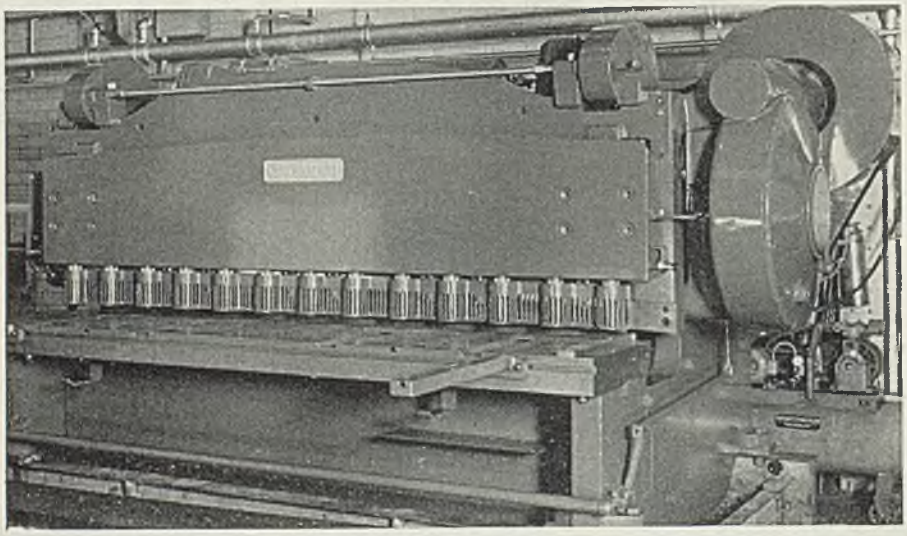
12—Determination of the modulus of elasticity of vibratory stresses in a test piece. 10 pages.

13—The evaluation of X-ray reflection pictures. 4 pages.

The range of subjects is wide enough to satisfy both metallurgists and mechanical engineers. The latter should be particularly interested in bulletins Nos. 4, 5 and 7. The latter bulletin shows the effects in cold rolling much more clearly than any former publication and permits the checking of theoretical calculations. All these bulletins are printed in the German language.

As long as the United States is officially neutral these bulletins are obtainable, either by direct order (Verlag Stahleisen, Dusseldorf) or through international book and magazine agencies. They are not cheap by any means; the cost is approximately 9 cents per page, plus postage, which is high if air mail is used.

Plate Shear for the Navy

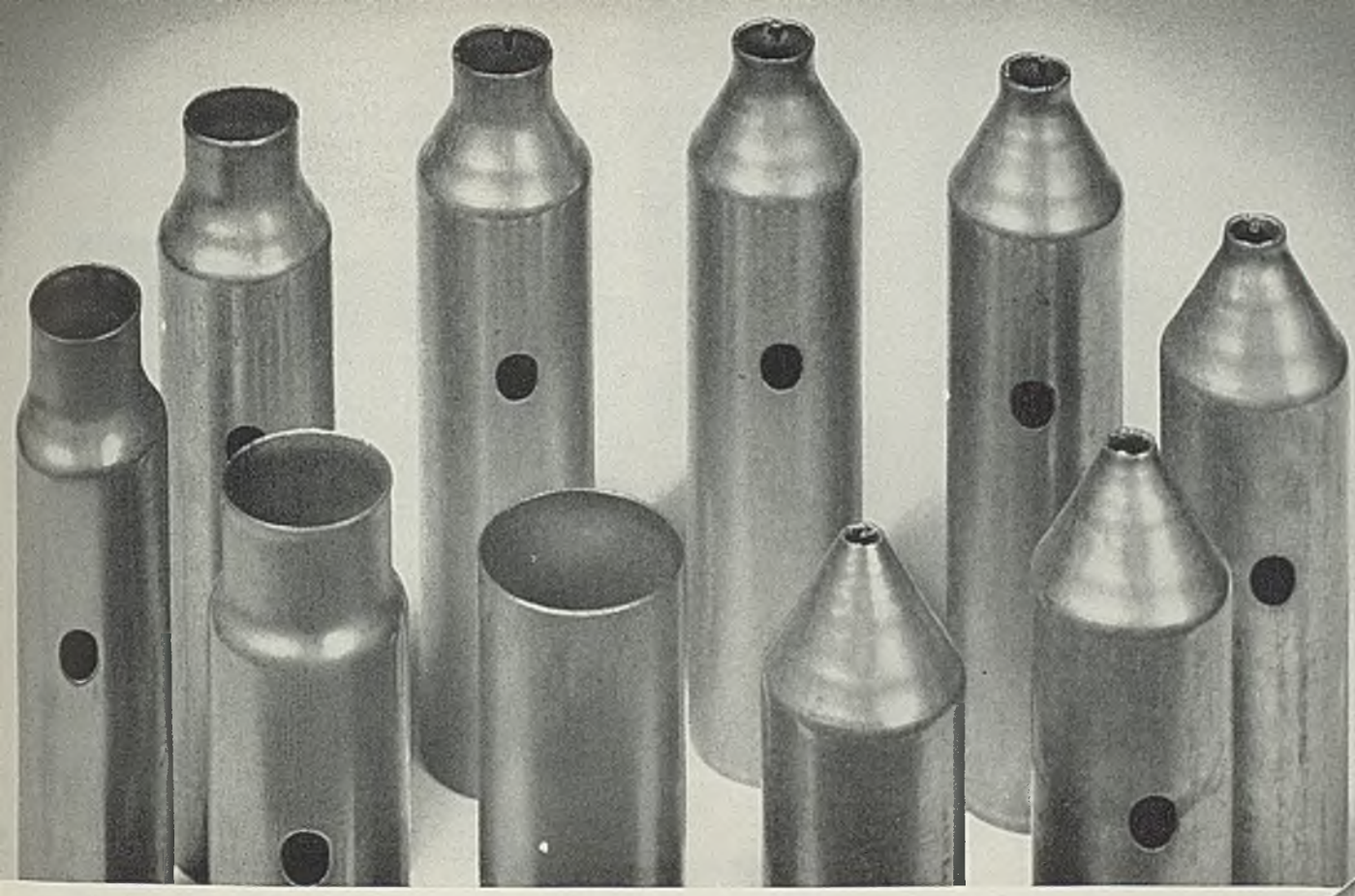


■ Featuring a fluorescent light beam shearing gage, hydraulic holdowns, micrometer ball-bearing back gage and four solid one-piece knives, this 88,000-pound plate shear was recently built for the navy by Cincinnati Shaper Co., Cincinnati. It has a capacity of 1-inch mild steel 12 feet long and is constructed of rolled steel plate

Introduces New Coating for Metals

■ A new Wet-X-Hale cement plastic recommended as a protective as well as decorative coating on metals, particularly fresh galvanized steel and iron, is announced by Rogear Co., 11 Water street, New York. It is an oil base cement product, combined with various aggregates, so ratioed and processed as to become a tough flexible finish for interiors or exteriors. It can be applied on fresh galvanized iron without pretreatment, the material setting and hardening quickly.

The material is applied by brush or spray gun and is both insulating and waterproof. It also does not peel or crack, is fire retarding and washable, according to the manufacturer.



Your parts costs will drop ___%

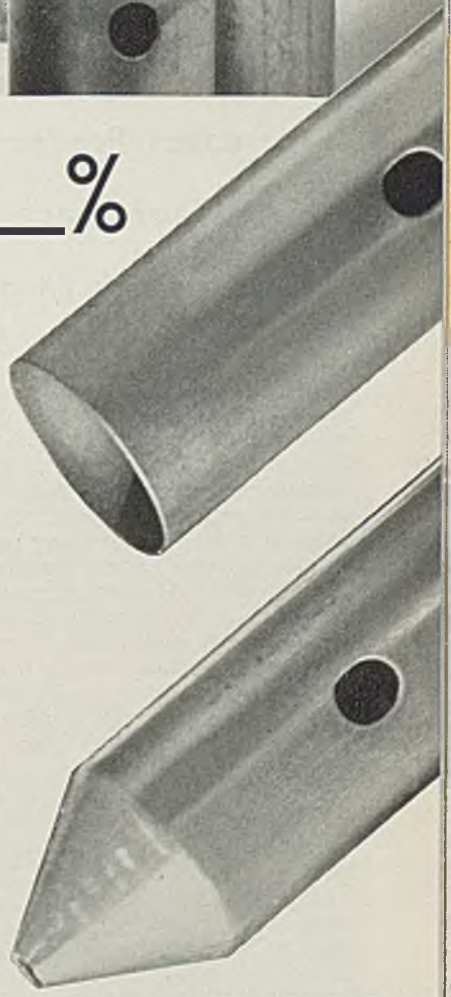
● If your case is similar to many encountered by Steel and Tubes engineers in the production and application of more than a billion feet of tubing, it is quite probable that you can reduce costs by changing to Republic ELECTRUNITE Tubing.

Because it is electric resistance welded, Republic ELECTRUNITE Tubing offers many advantages. One of these—uniformly high ductility—is demonstrated above in the formation of a vacuum cleaner nozzle part. Round 1¼" O. D. x 20 ga. steel tubing* is fed into a 10-stage rotary press which in successive stages reduces the outside diameter of the tube from 1¼" to ¼" within 1" of the length. The hole is punched in the wall before forming. The machine produces 218 pieces per hour at a cost at least 50% lower than the cost of the next cheapest method.

In addition to being uniformly ductile, Republic ELECTRUNITE Tubing is consistently uniform in diameter, wall thickness, concentricity, hardness and fine, smooth finish suitable for thin coatings of enamel or metallic platings.

How much can you save with Republic ELECTRUNITE Tubing? That depends upon the nature of your product, methods of fabrication, equipment and type of material previously used. That is why the percentage space above is left blank—to be filled in when your figures are compiled. Steel and Tubes engineers will be glad to work with you and your engineers. For further information, write Steel and Tubes Division, Republic Steel Corporation, Cleveland, Ohio.

Specification: SAE 1010, cold-rolled, burr-removed, unannealed.



REPUBLIC

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ELECTRUNITE

ELECTRIC RESISTANCE WELDED TUBING

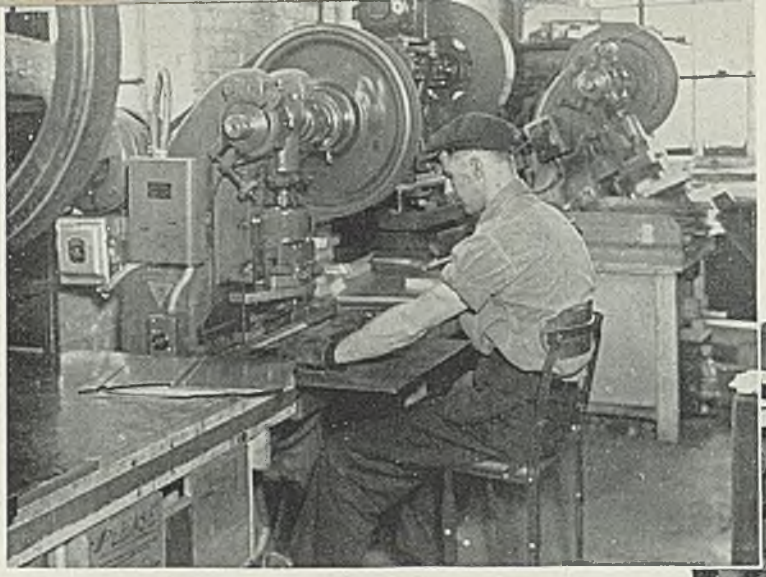


Fig. 1—This is start of the drawer production line—a series of punch press and welding operations. Fig. 2—End of drawer production line shown below—assembling backs of drawers in place by spot welding

By FRED B. JACOBS

MODERN FINISHING PRACTICE

—Increases Production Greatly

—Cuts Floor Space Requirements

—Clears Work Through Plant Faster

Here is shown how a small fabricating shop expedited production several hundred per cent by reducing baking time from hours to minutes. Also floor space required for finishing operations is made smaller, fire hazards are reduced, and completed work is cleared through the plant in better time since it now can be packed immediately as it comes off the finishing line

■ CONSIDER the enormous amount of paper work involved in modern business of all classifications. What becomes of these myriads of records? . . . While some of these records are kept for only a day or a week, others may be kept months or years—some are retained permanently. Human memory being what it is, dependable permanent records and quick access to them are important. When need for reference does arise, it is a task indeed to look through hundreds of dusty bundles of papers which often are stored in a basement or other out-of-the-way place without much regard to classification.

This condition of affairs, especially as it pertains to banking institutions, led W. F. Regenhardt a few years ago to design and patent a simple, efficient filing system for storing records in a clean and orderly manner. On Mr. Regenhardt's designs and patents was founded the business of the Steel Storage File Co., Cleveland. These files are made in various sizes to meet diversified needs, the most popular sizes being for the storage of standard 8½ x 11-inch sheets. The legal size is also popular, while large quantities for standard 3 x 5-inch filing cards are made, too. Designed especially for storing inactive records, their cost is in line with their purpose, yet they have all structural and functional features, are reinforced so they can be stacked room high if necessary without danger of collapsing. Further, an ingenious locking device locks all units vertically and horizontally.

This combination of features is made possible by a number of interesting production operations, a few of which are illustrated and described here. The stock is received at the factory in the form of steel bars and sheets, a popular sheet thickness being 24-gage. The sheets or bars are unloaded from flat trucks by a monorail handling system and deposited in piles on the shop floor. The sheets are cut to size on light power shears as these have proved as economical on this comparatively light work as large power shears. Of course it is impossible to buy sheets of a size to meet exactly all requirements. However, there is little waste because scrap from the shears is used for making followers, label holders, handle holders and other small parts needed for the finished product.

While rectangular sheets are cut to dimensions in a foot-power shear, there are other stock sizing operations performed under punch presses. Corners, for instance, are cut off in special shearing dies. This operation is efficient, especially in cases where the stock is not too bulky.

Two production lines are maintained. On one, drawers are made; shells or cabinets being constructed on the other. Drawers are made on

a line of punch presses starting with Fig. 1 and completing the drawers in Fig. 2.

It is necessary to reinforce both cabinets and drawers to make them strong enough to withstand the strain of ordinary use—done by bending the edge of the stock over to a 180-degree angle. This operation is generally performed under a power bending brake in a series of dies as shown in Fig. 3. As a rule the brake is operated by two men. One man passes the stock to the machine operator. Two operations are synchronized, two pieces being in the press—one completed at each stroke. The first step is to bend the margin of the stock to a 90-degree angle. Then it is passed along to another set of dies which complete the bend, forming the 180-degree angle. Thus the stock is bent over to form a stiff rib. An ingenious accessory of the bending brake is a mirror set to show the operator just when he has brought the stock against the stops where the second or completing bend is made.

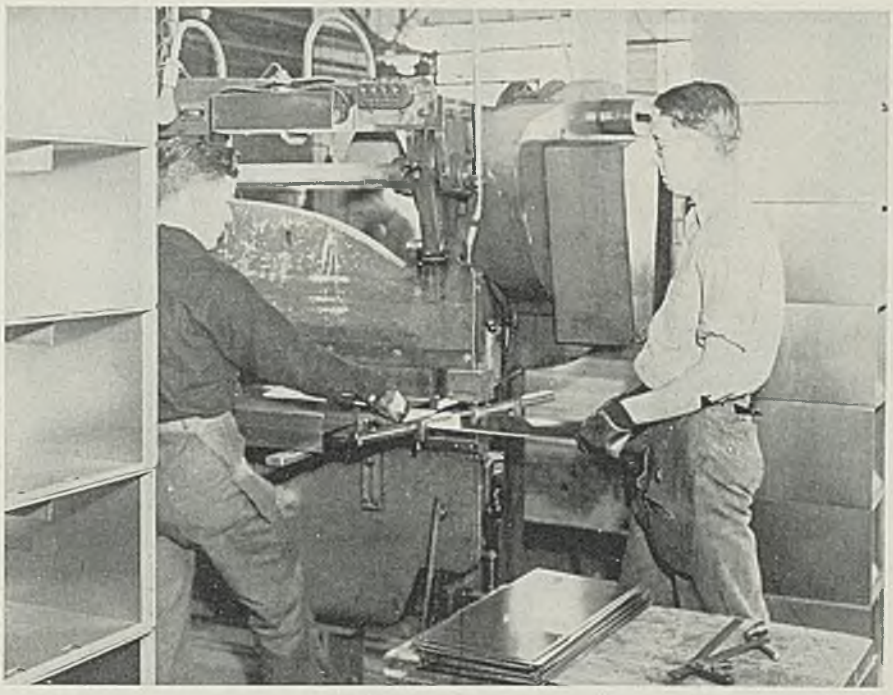


Fig. 3—This power bending brake is fitted with a series of dies to handle a multiple-bending operation

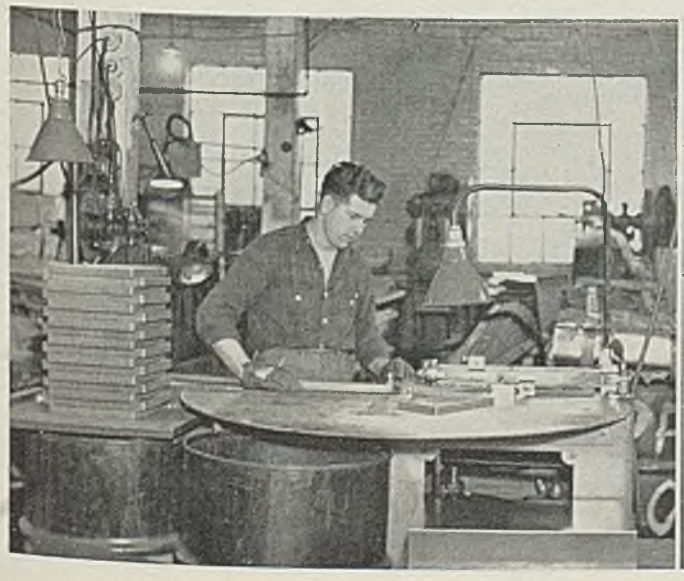
The shell or cabinet production line starts with the operation illustrated in Fig. 4. This operation consists of bending 90-degree angles on bar reinforcements to be welded into the openings of the shells or file cases. This machine is adjustable so any desired square or rectangular size of reinforcement can be formed readily. After the machine is set up correctly, the operator feeds flat steel bar stock, usually ⅛ x ⅝-inch against a stop. Then the forming head moves in with an arc motion and bends the stock to a 90-degree angle. The stock is again fed forward for the second bend forming another 90-degree angle. The stock is again fed forward for the second bend forming another 90-degree angle, and so on until the square or rectangle is completed.

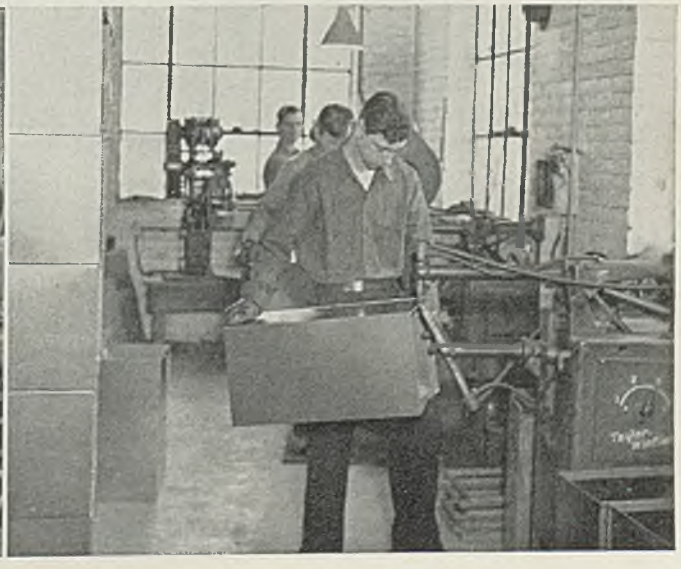
All component parts of cabinets and drawers are fastened together by spot welding, and this method also is used for permanently fastening the reinforcements in place. In Fig. 5, the operator in the foreground is welding an interior reinforcement into the opening of the shell or case. The lower electrode on the spot welder is set at an angle to allow clearance in handling the work. Spot welding holds the parts together securely and permanently. At the same time it is a rapid joining process when compared with older methods.

Another spot welding operation is shown in Fig. 2. In this instance, the operator is spot welding the backs of file drawers in place. Note in this illustration, too, that the upper electrode is set at a slight angle to provide clearance.

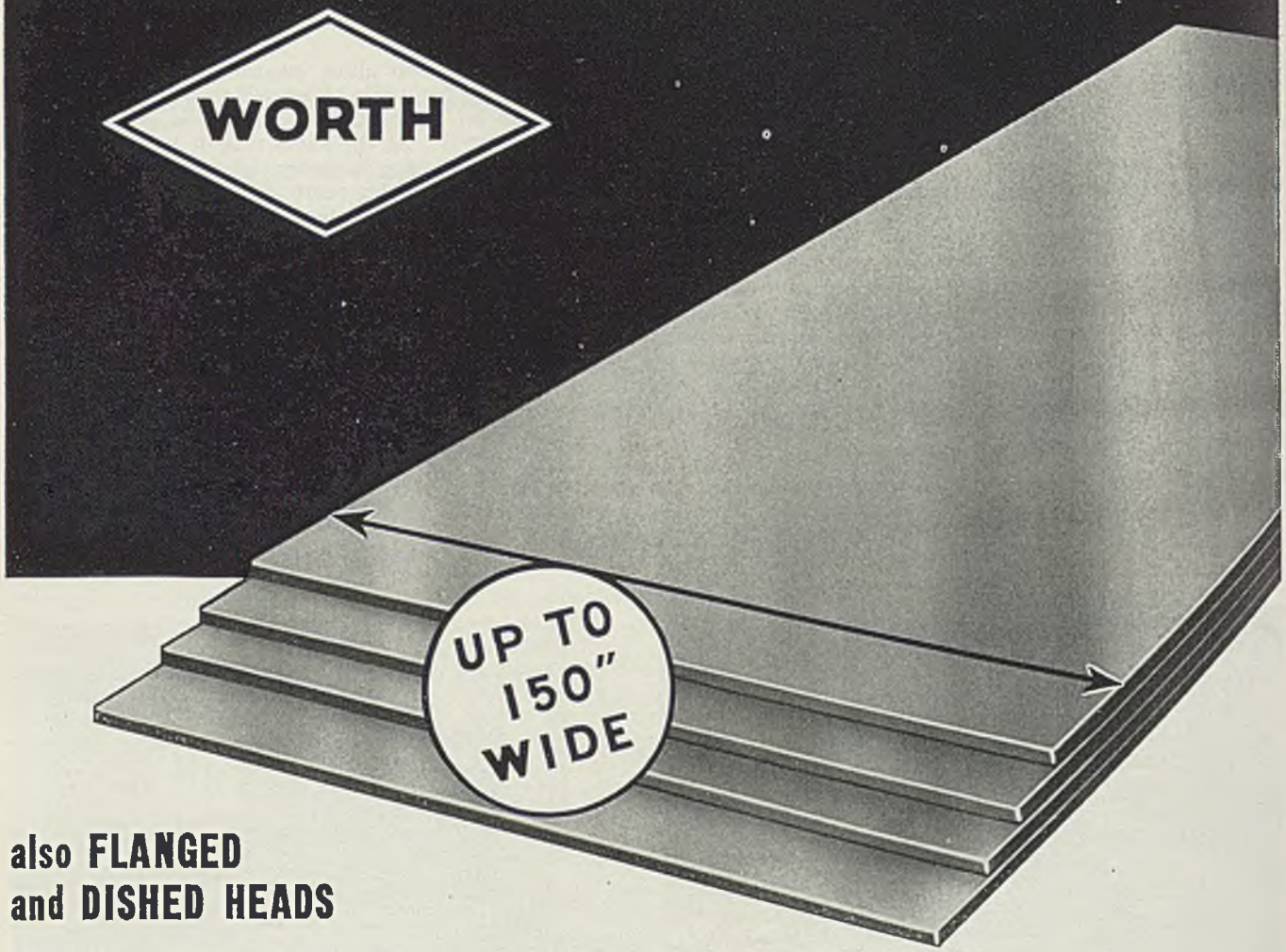
After all manufacturing operations are completed, the cabinets and drawers are finished attractively in a specially prepared baking lacquer. The lacquer used is a warm green, slightly darker than what would be termed medium. It not only prevents rust, but also

Fig. 4—Reinforcing frame inserts are made by bending bar stock. Stops on it can be set to produce rapidly square or rectangular frames throughout a wide range of dimensions. This versatile unit, at left, is an important production tool here. Fig. 5—Here, at right, an interior reinforcing frame is being spot welded to stiffen the shell or case of a file cabinet





WORTH
SHEARED STEEL PLATES



also FLANGED and DISHED HEADS

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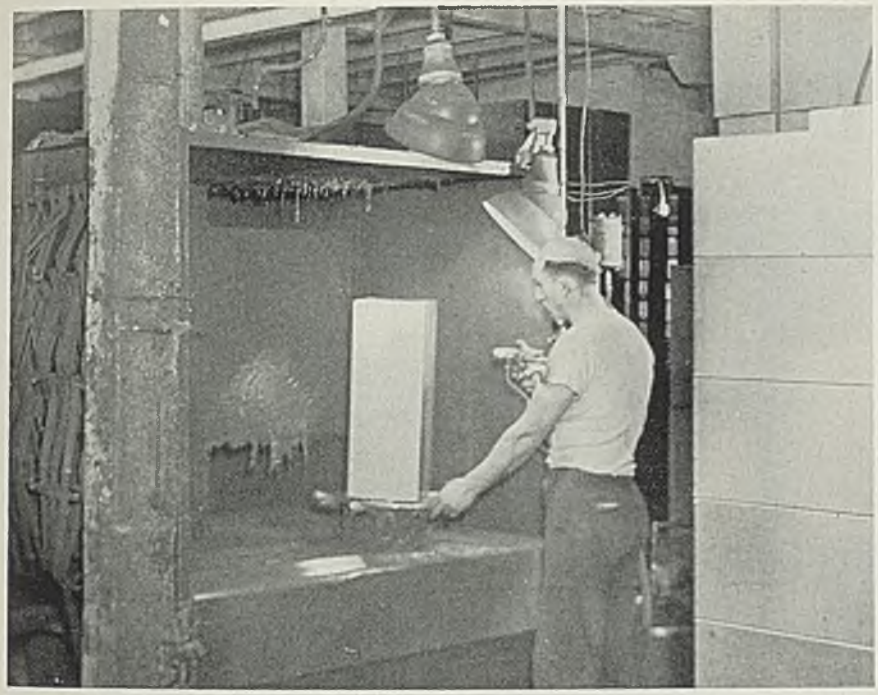

Fig. 6—Spraying lacquer on file cabinet shells which are placed on a turntable which greatly facilitates the work. Spray booth is equipped also with large floodlamps and exhaust system

brings about a pleasing appearance. The lacquer is sprayed in place as shown in Fig. 6. Note that the operator places the work on a turntable which permits all surfaces to be reached readily with the spray gun. These operators become quite expert and can spray a given part in one-tenth of the time necessary to lay the lacquer on by brushing. As Fig. 6 shows, spotlights are trained on the work to give good visibility. Fumes are carried away by an exhaust system.

The lacquering operation is carried out by two men. As soon as the part is sprayed by the painter, it is passed to his assistant who hangs the work on a conveyor chain while the next part is being sprayed. The assistant also sees to it that the spray-gun operator has a pile of work within easy reaching distance.

The sprayed sections are baked in the tunnel-shaped oven shown in Fig. 7. It is 22 feet long and equipped with one-hundred-fifty-two 250-watt infra-red lamps, 76 being located on each side of the tunnel. The conveyor chain carrying the sprayed work travels at a rate which allows the sections to be exposed six minutes, the time consumed in passing through the oven.

The infra-red lamps produce a temperature of 350 degrees Fahr. in the metal, rapidly curing the enamel. The conveyor, in addition to providing room for a loading area near the spray booth, extends through the oven and through a cooling zone at its far end. An exhaust stack is located here to carry off volatile matter. At the back of the tunnel, an operator unloads the parts, inspects them carefully and touches up any spots that may be in evidence. Touching up is done with a brush using the same type of lacquer as in spraying. Touched-up places dry just as hard in the air as they would in the tunnel, only the time required is somewhat longer.

At the back end of the tunnel, the conveyor chain goes around a reel and returns to a forward position where another reel is provided. Thus the chain is a continuously operating belt. Production has been expedited several hundred per cent through the use of the infra-red drying oven as baking time has been reduced from hours to minutes. Were it not for this process, considerable additional floor space would have to be provided for drying racks. As it is, the work can be wrapped in paper and packed immediately in shipping cartons.

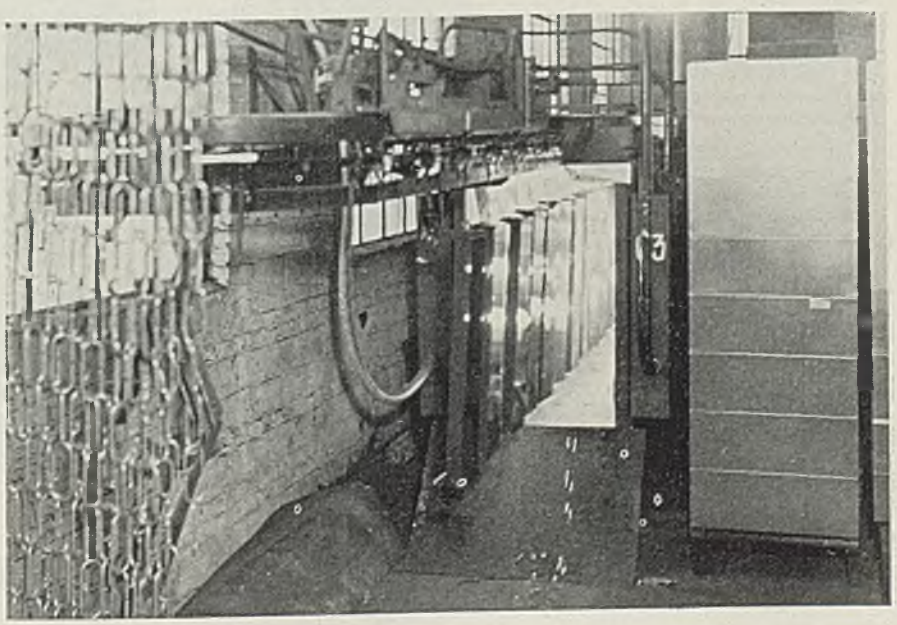

Fig. 7—Work is carried through this oven by continuously moving chain conveyor which travels at a speed giving six minutes exposure to the 152 250-watt infra-red lamps producing a temperature of 350 degrees Fahr. on the work

Shows Adaptability Of Metals to Design

■ Spanish ornamental ironwork, Italian altar lamps, old French cooking molds, Navajo and Alaskan Indian jewelry, and modern American sculpture are among more than 250 examples of the adaptability of malleable metals to creative design on display in a public exhibition at the Cooper Union Museum for the Arts of Decoration.

Spanning thirty centuries, the exhibit, which is entitled "With Hammer and Tongs," demonstrates how craftsmen through the ages have found an inspiring medium of expression in the malleability, or capacity to be shaped by hammering or pressing, characteristic of gold, silver, copper, brass, wrought iron, tin, pewter and lead.

Distinction is drawn between casting, in which the metal is reduced to a molten state and poured into a mold, and the more difficult art of making the metal "flow" by pressing and beating it, Miss Mary S. M. Gibson, curator of the museum, explains.

American, European and Oriental craftsmanship is shown in a variety of objects, ranging from iron gates to gold watch cases.

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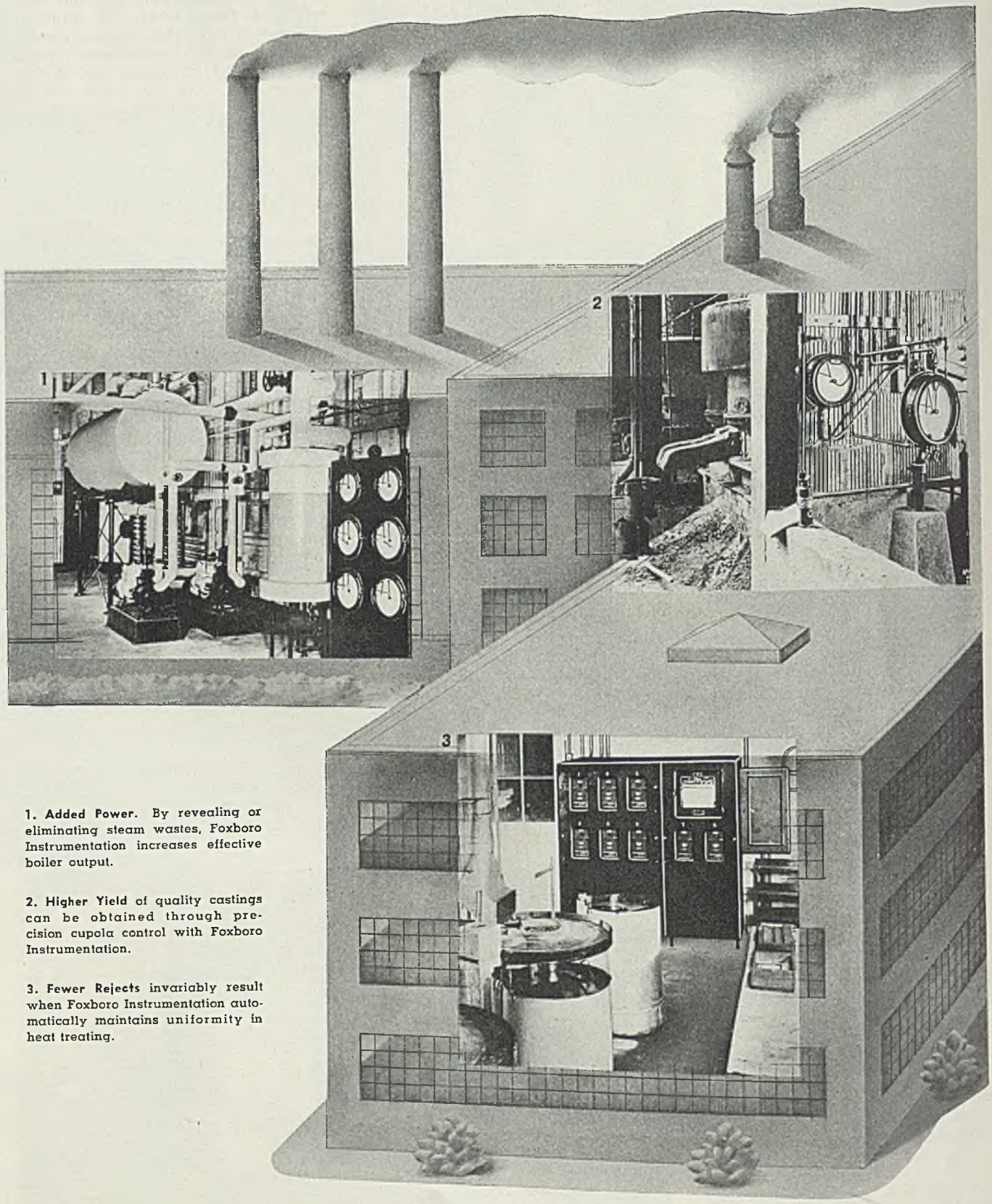

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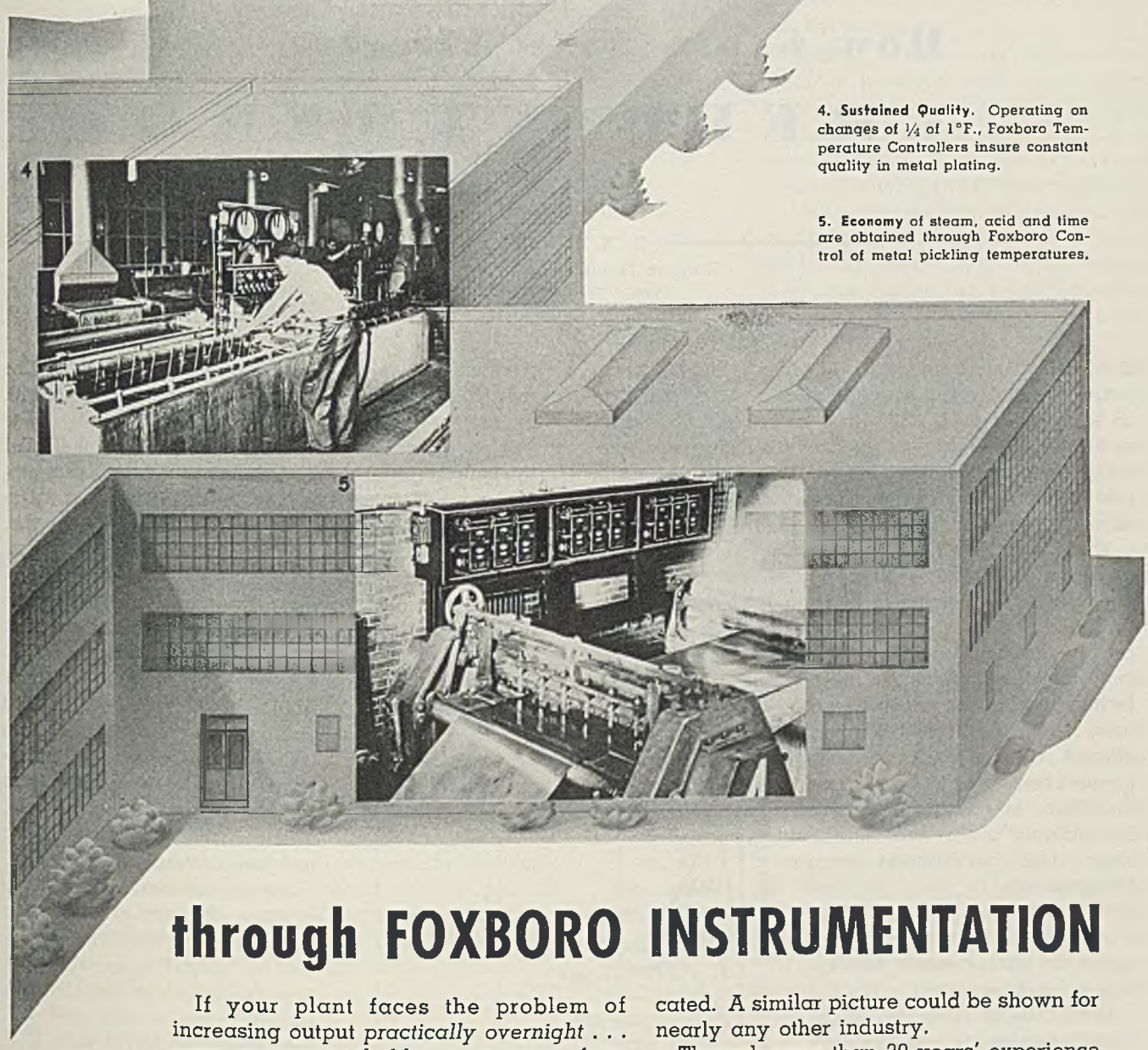

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How Grain Size Affects CREEP STRENGTH

By S. H. WEAVER
Turbine Engineering Department
General Electric Co.
Schenectady, N. Y.

■ WHAT tipped us off to the connection between grain size and creep strength was a study made on 18 samples of SAE 4330 steel as creep temperature of 840 degrees Fahr.—creep strength from these tests being correlated against size of the structural grain that existed in the various samples. This indicated an optimum grain size for maximum creep strength.

To investigate this subject further, it was decided to make:

—Special creep tests to find out if there is an optimum grain size when the creep temperature is above the "lowest temperature of recrystallization" and also to determine variations in the optimum grain size for differently alloyed steels at the same creep temperature.

—Tests to find the variation in optimum grain sizes in the same steel for different creep temperatures.

—A uniting of these data into a creep-strength-temperature-grain-size characteristic for carbon-molybdenum steel.

Grain size in these investigations refers to the existing predominant grain as evidenced by definite boundaries of previous austenitic grains, ferrite grains, Widmanstatten areas or pearlite patches in steels containing several types of grains, the type which has a preponderance in size should influence most the physical characteristics.

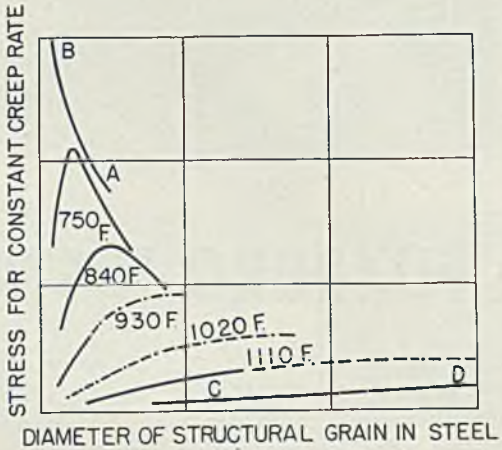

Fig. 1—Relation of creep strength, grain diameter and temperature of steel

Grain-Size Series Creep Tests: This series of tests was to determine whether steel at creep temperatures above the "lowest temperature of recrystallization" had a maximum creep strength obtained by a corresponding optimum grain size when there was no appreciable difference in the microstructure in each grain; or whether the creep strength merely increases with grain size until influenced by a changed structure within the grain. Four alloy steels of chemical composition shown in Table I with eight heat treatments each were given 2600-hour creep tests. The four heats were made in a basic arc furnace with aluminum slag reduction, each heat weighing 350 to 375 pounds. Cast into 6 x 6-inch ingots and rolled to 1-inch round bars, uniform microstructure was assured by giving the bars a diffusion treatment to eliminate segregation of ferritic banding. After this, bars were annealed at 1600 degrees Fahr. for 5 hours and microstructure examined in a longitudinal section of the bar for any remaining trace of ferritic banding. Minimum temperature and time to effect a cure were respectively 2280 degrees Fahr. for 6 hours, for 4 hours, for 10 hours and 2000 degrees Fahr. for 4 hours. Bars were protected from decarburization and scale by encasing them in steel tubes with capped ends, a ⅛-inch hole relieving the air pressure within.

Subsequent heat treatments to produce different grain sizes in the same steel are listed by letters in Table II. Creep-test bars were 0.505-inch in diameter with 12-inch gage length, and test conformed to ASTM code E22-35T. Creep tests on steels 1, 2 and 3 were made at 1022 degrees Fahr. with 1112 degrees Fahr. for steel 4. A constant load was applied for the first 1000 hours to give a comparison of both the creep rate and the plastic elongation at the end of that period with the different grain sizes existing in the same steel. In each case the creep test was immediately continued by an additional 1000 or 2000 hours as a step-down or decrement-relaxation test to find the creep stress which would produce a constant creep rate of 1 per cent per 100,000 hours. Throughout this article, creep strength is expressed in terms of pounds per square inch for a rate of 1 per cent elongation per 100,000 hours.

The air-cooled heat-treated steels tested in creep at 1022 degrees Fahr. have an acicular microstructure

Special creep tests determine optimum grain size when creep temperature is above the "lowest temperature of recrystallization," also determine optimum grain size for differently alloyed steels at the same creep temperature. Other tests show variation in optimum grain size in the same steel at different creep temperatures. These data are united to produce a creep-strength-temperature-grain-size characteristic for carbon-molybdenum steel

over the entire metal section. Steel 4, tested at 1112 degrees Fahr., has a high grain-coarsening temperature. Three of the different heat-treating temperatures produced approximately the same grain diameter whether air-cooled or furnace-cooled. The grain growth characteristic of steel 4 prevented the different heat treatments from producing a spread in the size of the grains so the tests did not furnish detailed evidence of the effects of grain size upon creep.

The tests do show, for steels with a narrow grain-coarsening range, that the different heat-treating temperatures up to the coarsening temperature produce only a negligible change in the creep properties. The creep properties of the air-cooled steel 4 at 1112 degrees were very inferior to those for the same steel with furnace-cooled treatment. The exceptions are items with the 2280-degree Fahr. heat treatment.

It is recognized that the grain size influences a critical cooling rate which separates the production of a pearlite from an acicular formation in the carbides. The larger grains require a slower cooling rate to produce a pearlite structure. The critical cooling rate was exceeded for the larger grains given by the heat treatment H where the carbide formations are acicular. Repeated attempts were made to produce lamellar pearlite in the largest grain size by isothermal or direct transformation treatments, but the results with these steels were always a much smaller grain size in both ferrite and pearlite grains.

Results: These tests indicate that the four annealed steels in long-time creep at 1022 and 1112 degrees Fahr. are more consistent and superior in creep properties than the same steels in the air-cooled and drawn condition.

—With an apparently constant microstructure in each of the annealed steels, the creep stress for a constant creep rate varies with the structural grain size that exists in the steel during the creep elongation.

—The creep stress attains a maximum creep strength which corresponds with an optimum size of the structural grain.

—The bend for a maximum value in the creep strength vs. grain diameter curve for the annealed steels can apparently be produced by grain size alone.

—When both grain size and change of structure enter into creep for the larger-grained steel, the decrease in the creep strength is greater. This applies from structural changes from pearlite to either the acicular or martensitic forms.

—The optimum grain size is different for each of the four differently alloyed annealed steels, the range in grain diameter not exceeding a 1 to 2 ratio.

Optimum Grain Size and Temperature: A statistical study of creep tests with 0.5 per cent molybdenum steel shows that the maximum creep strength and the corresponding optimum grain size both change with the temperature of the creep test. Equivalent methods for the long-time step-down creep tests used are described in "Flow of Steels at Elevated Temperatures" by F. P. Coffin and T. H. Swisher in "Transactions of the American Society of Mechanical Engineers," Vol. 54. These steels in the conditions tested have the structural grain size rated in grain size numbers given in ASTM specification E19-33.

At 1022 degrees Fahr. there are seven creep tests upon annealed steels which indicate a maximum creep strength of about 12,000 for a No. 2 optimum grain size. Note creep strength is expressed in terms

Fig. 2—Typical microstructures. Left, mixed structure of steel 4 given heat treatment EE (see Table II). Fig. 3—Grains containing acicular structure, developed in steel 2, given heat treatment H. Fig. 4. (Right)—Grains of ferrite and pearlite in steel 2, given heat treatment G. All are shown at 100 diameters

of pounds per square inch for a rate of 1 per cent elongation per 100,000 hours throughout this article. Steel 5 with a large No. 2 grain and acicular or Widmanstatten structure in the carbide areas gave 12,300 creep strength. Steel 6, a developmental composition with a No. 2 grain and pearlitic carbide areas gave 11,500 creep strength. Because these two steels gave different carbide structures for the furnace-cooling rate of 45 degrees Fahr. per hour, this rate must be near the critical cooling rate for a change in carbide formation at the No. 2 grain size in this grade of steel.

Another interesting point is that steel 5 was given a previous diffusion treatment of 2280 degrees Fahr. for 10 hours. Part of this stock was specially annealed to produce a No. 7 uniform grain size with a creep strength of 2450, thus showing a 1 to 5 creep-strength ratio in the same stock steel but heat treated at different temperatures to give different grain sizes.

At 932 degrees Fahr., there are six long-time tests which indicate a maximum creep strength of 18,700 for an optimum grain size on the small side of No. 4. Three of the tests were cut from steam pipe now in service operation and tested in the "as installed" condition.

At 842 degrees Fahr., a No. 6 grain size is given for steel 8. This test point represents commercial practice in carbon-molybdenum steel castings. Various heat-treating cycles from 1600 to 2000 degrees Fahr. were made and the creep strength ranged from 9300 for a 1600-degree Fahr. anneal to 25,600 for a 1750-degree Fahr. controlled-cooling cycle which produced a broken dendritic, acicular carbide formation with a No. 6 grain. This

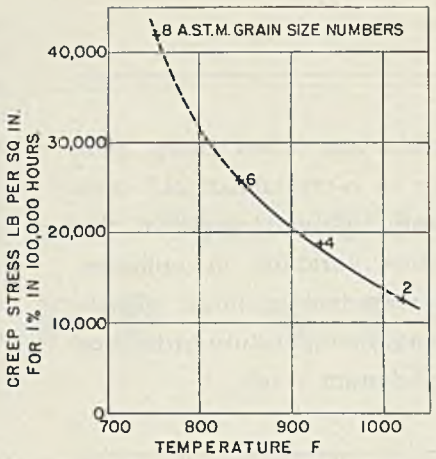

Fig. 5—Maximum creep stress and optimum grain size for different temperatures with approximately 0.5 per cent molybdenum steel

is the same optimum grain size found for the nickel-chromium-molybdenum alloy in a previous investigation.

At 752 degrees Fahr., a No. 8 grain size is given for steel 9. The creep strength was so high for this fine-grain steel that no further search was made for the optimum grain size. In fact, design working stresses for this type of steel are so far below the creep strength at the last two temperatures that more exact values are only of theoretical interest.

Maximum creep strengths of 0.5 per cent molybdenum steel are plotted against creep temperature in Fig. 5. The corresponding number for the optimum size of the structural grain is given at each test point. Each numeral in grain size is spaced along the curve by approximately equal temperature increments. The finest grain, No. 8, appears at the lowest-temperature end of the curve, and the coarsest grain, No. 2, is at the highest-temperature part of the curve. Total range in grain size is about the maximum found in commercial steels.

The maximum-creep-strength points on the curve are acicular in microstructure owing to the usual air-cooled heat treatments; only the 1022-degree Fahr. steel was derived from creep tests upon annealed steel because of the long-time stability of structure at the higher creep temperature and because the larger optimum grain size becomes acicular unless a longer time is allowed for cooling through the transformation-temperature range of the steel. The curve indicates that the maximum creep strength and optimum grain size are each functions of the creep temperature.

Results from the creep tests summarized in Fig. 5 under approximately constant conditions of type of steel and microstructure indicate:

—At the lowest creep temperature, the finest-grained steel has the greatest creep strength.

—At the highest creep temperature, the coarsest-grained steel has the greatest creep strength.

—At intermediate creep temperatures, an intermediate grain size has the greatest creep strength.

—The maximum creep strength and the corresponding grain size each vary as a continuous function of the creep temperature.

Creep-Strength Characteristics of Carbon-Molybdenum Steel: It is possible to formulate relationships between creep strength, grain size and creep temperature for carbon-molybdenum steel by utilizing some of the general properties of metal with the characteristics and data found in the creep tests. The lower limiting condition for the creep problem is that at the lowest temperature at which creep can be measured for the small constant-creep rate used here. The maximum creep strength is given by the finest grain diameter. The trend to the lower limit is represented by the curve AB in Fig. 1.

The upper limiting condition is that at the highest creep temperature, but below the transformation temperature of the steel; the maximum creep strength is given by the largest grain diameter. The trend to the upper limit is represented by the curve CD in Fig. 1.

Since the finest-grained steel possesses the greatest total length of boundaries, that steel should have the maximum creep strength from the lowest creep temperature up to the equicohesive temperature. Then a discontinuity in grain size is supposed to occur. Beyond the equicohesive temperature and up to the

TABLE I—Composition of "Grain Size" Steels

Heat No.	Chemical Analysis C	Mo	W	Cr	Ni	Mn	Si	P	S
1	0.21	0.95	....	....	0.17	0.44	0.32	0.010	0.014
2	0.20	0.94	....	1.66	0.08	0.44	0.39	0.025	0.014
3	0.20	....	1.70	1.75	0.28	0.34	0.22	0.015	0.012
4	0.20	0.48	....	5.24	0.18	0.53	0.63	0.015	0.012

TABLE II—Grain Size Heat Treatments

(Applied after the diffusion treatments)

A—1600 F, B—1740 F, C—1880 F, D—2280 F } 5 hr.—A.C 1200 F—3 hr.—F.C.

E—1600 F, F—1740 F, G—1880 F, H—2280 F } 5 hr.—F.C. 1200 F—3 hr.—F.C.

AA—1650 F—5 hr.—A.C. 1200 F—3 hr.—F.C.

EE—1650 F—5 hr.—F.C 1200 F—3 hr.—F.C

FF { 1650 F—1 hr.—O.Q.
1600 F—1 hr.—F.C. 1200 F—3 hr.—F.C.

A.C. denotes cooled in still air.
F.C. denotes furnace cooled at average rate of 45 F per hr.
O.Q. denotes oil quenched.

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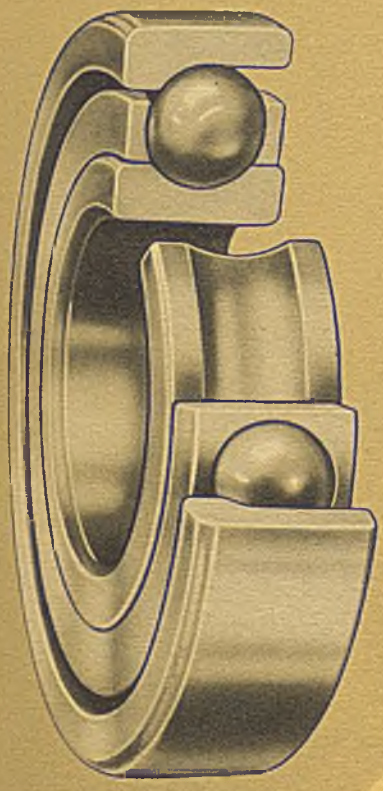

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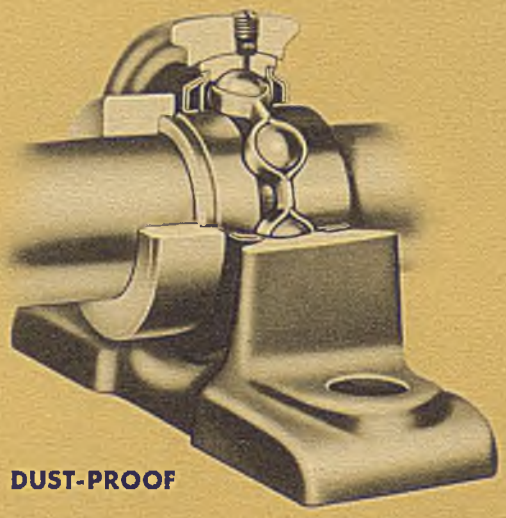
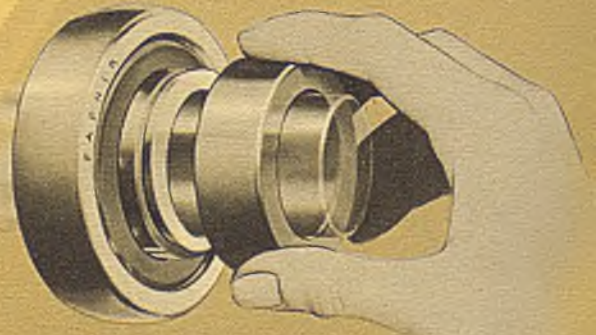
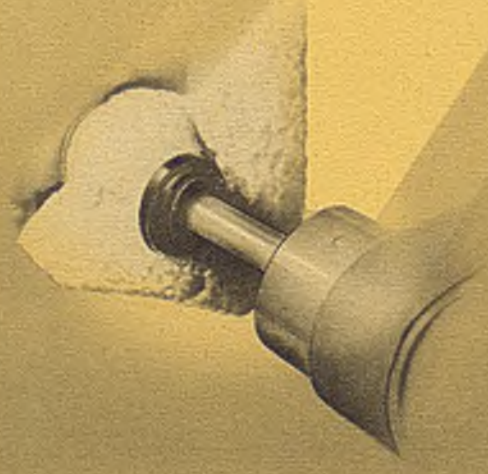


DUST-PROOF

COMPACT



SIMPLEST ASSEMBLY



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dependable transmission unit line. The Fafnir Bearing C
New Britain, Connecticut.

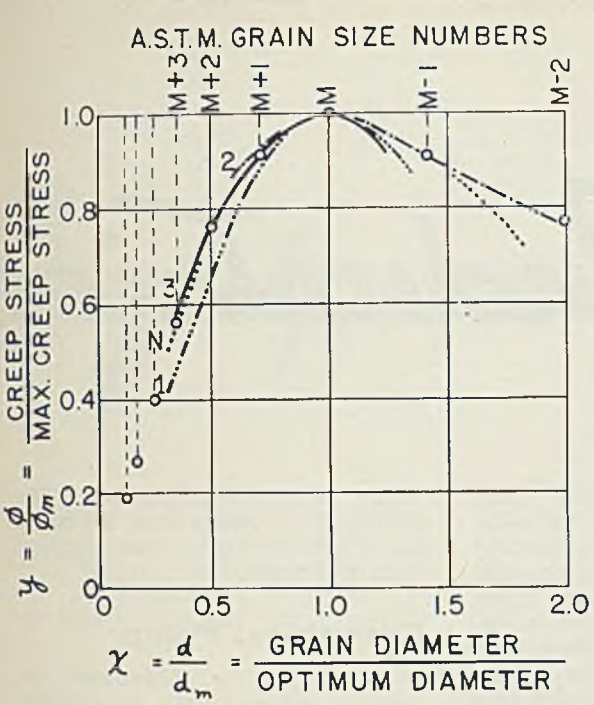
LCJ FLANGE CARTRIDGE
Bolts to a frame or housing

LC CYLINDRICAL CARTRIDGE—Press-fitted into a machined bore

L TYPE
Single Seal

LD TYPE
Seal and Shield

FAFNIR
Ball Bearing
THE BALANCED LINE
MOST COMPLETE IN AMERI



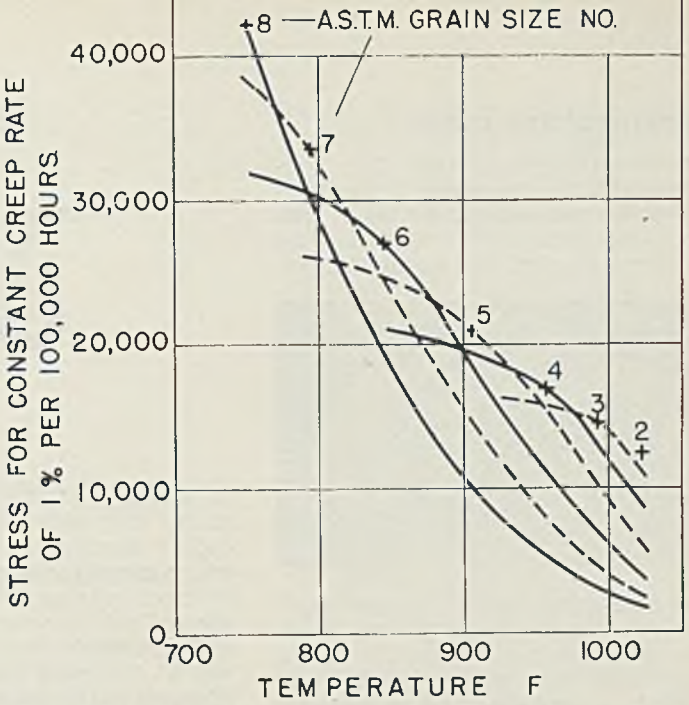


Fig. 6—Shape of creep stress vs. grain diameter curves for different temperatures and steels, left above. Fig. 7. (Right)—Creep strength curves for constant grain size in 0.5 per cent molybdenum steel

highest creep temperature, the largest-grained steel, since it has a minimum of the weaker total boundary length, should produce the maximum creep strength. This discontinuity or change in desirable grain size for maximum creep strength cannot take place without an accompanying change in structure or condition of the steel, which should in turn appear in the plotted results. No such discontinuity appears in Fig. 5. It is not the purpose of this article to suggest how the current metallurgical hypothesis mentioned above should be modified to correspond with the physical facts; instead, some simple mathematical rules are herewith suggested for the test result characteristics.

Test results show the maximum creep strength and corresponding optimum grain diameter are each a continuous function of the creep temperature. A curve of creep strength was plotted against grain diameter for each of three steels at 1022 degrees Fahr. with material and temperature held constant. The portion of each curve lying between the origin and maximum indicated that the creep strength increases approximately with the grain diameter. Different constant-temperature curves show that creep strength and grain diameter are each continuous functions of the creep temperature. With the first part of the curves and the maximum values as temperature functions, it is assumed that the bend in the curves and the complete curve are also the same unknown but continuous function of creep temperature.

In Fig. 1, curves AB and CD represent trends to the limiting or boundary conditions of the unknown temperature function. The approach to a limiting condition as AB can be a part of one complete curve and, as CD, a part of another complete curve for the limiting constant temperatures. Each intermediate constant-creep temperature would present a complete curve similar to those drawn in Fig. 1. Each curve would become a member of a family of curves derived from the same unknown temperature function but all the curves would have a mathematical similarity in form.

The common curve shape for the creep strength vs. grain diameter family of curves can be checked with creep test results by the ratio plot in Fig. 6. Curves numbered 1, 2 and 3 are drawn from test points for the three steels in curve with grain diameter plotted against stress for constant rate of creep. These three differently alloyed steels at 1022 degrees Fahr. agreed to a common form as closely as could be expected with this type of data. The curve N is a nickel-chromium-molybdenum steel, SAE 4330, tested at 840 degrees Fahr. A 750-degree curve on the same steel is not plotted in Fig. 6 but is shown in Fig. 1, duplicating the form of the 840-degree Fahr. curve while passing through five test points. The righthand (X=2) ends of the curves in Fig. 6 are influenced by a change in structural formation of the steel. Considering the range in temperatures and in the numbers of alloyed steels used, Fig. 6 may not indicate an exact common shape for the creep strength vs. grain size curve, but the test curves are in close enough agreement to a common form to indicate definite trends in creep characteristics.

TABLE III—Shape of Creep Stress vs Grain Size Curve

M = A.S.T.M. Grain-Size Number for Optimum Grain.
ϕm = Corresponding Maximum Creep Stress

Grain Size (A.S.T.M. No.)	Creep Stress-ϕm
M−2	0.77
M—1	0.91
M	1.00
M+1	0.91
M+2	0.76
M+3	0.56
M+4	0.40
M+5	0.27
M+6	0.19

Assuming a single curve shape represented by the points indicated by the circles in Fig. 6, the creep strength can be stated in terms of ASTM grain-size numbers. Let ϕm equal maximum creep strength at a given temperature and M represent the optimum structural grain size expressed as an ASTM grain-size number. Then the creep strength at the same constant temperature for another grain-size number is given by the top scale in Fig. 6 and in Table III.

With the data for the maximum creep strength and optimum grain size given in Fig. 5 and the common shape for the creep strength vs. grain size temperature characteristic for carbon-molybdenum steel can be drawn as in Fig. 7, which records the characteristics indicated in Fig. 1 in a different form.

The construction of Fig. 7 is as follows: Consecutive grain-size numbers for the optimum grain are found by interpolation along the curve in Fig. 5. These points are plotted in Fig. 7 with a cross and grain-size number. If a curve is drawn through these cross points, it would duplicate the curve in Fig. 5. Choose a cross point in Fig. 7. Let the optimum grain-size number at that point be numerically equal to M in Table III. By means

(*Please turn to Page* 92)

Industrial

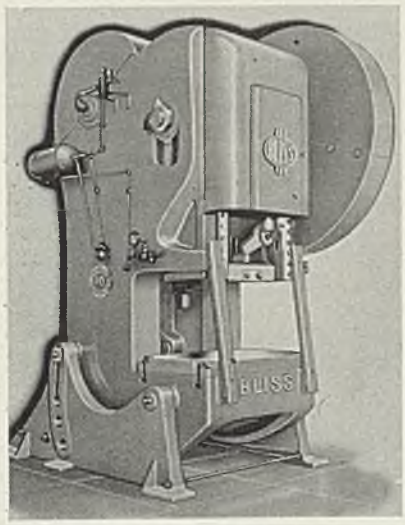
Perforating Press

■ Beckley Perforating Co., Garwood, N. J., announces a new perforating press designed so it can be used to perforate silk fabric 54 inches wide and, with slight changes,

16-gage steel sheets of the same width. Its feed mechanism is arranged so that index feeds as low as 1/64-inch can be made accurately and by a special feature adjustment a maximum index feed of 3 inches per stroke can be obtained. The press is constructed of flame cut steel sections and electric welded joints.

Inclinable Press

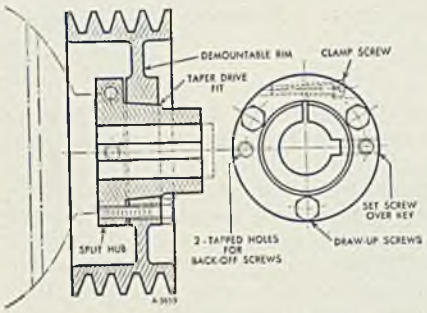
■ Consolidated Press division, E. W. Bliss Co., Fifty-third street and Second avenue, Brooklyn, N. Y., has placed on the market a new No. 10 inclinable press of greater size and capacity. It is a general



purpose machine with strokes ranging from 8 to 12 inches and a bed area of 35 inches front to back by 53 inches left to right. The gearing and other working parts of the unit are all enclosed. Press features a hammer forged crankshaft of special grade steel coupled with a large aera flanged slide.

Detachable Sheaves

■ Worthington Pump & Machinery Corp., Harrison, N. J., announces a new type Q-D detachable V-belt driver sheave for any application where quick mounting of sheaves to shaft, and dismounting from shaft, are desirable. It is especially applicable on equipment where speed ratios must be changed to meet varying conditions. Each sheave unit consists of two parts, a longitudinally-split or clamp hub and a V-grooved rim. The hub is clamped to the shaft by means of a



cap screw in its flange and is fastened securely by a standard keyway. A fit equal to a press fit, on shafts up to ten-thousandths oversize or undersize, is provided. The rim is taper-fitted to the hub and is fastened with three draw bolts. To remove the rim, the draw bolts are withdrawn and two of them are inserted in holes so tapped in the rim that the bolts act as jamb screws and bear against the hub, thus forcing the rim off the taper without disturbing the position of the hub. These type sheaves are available in the complete range of standard driver sizes.

Fluorescent Lamp

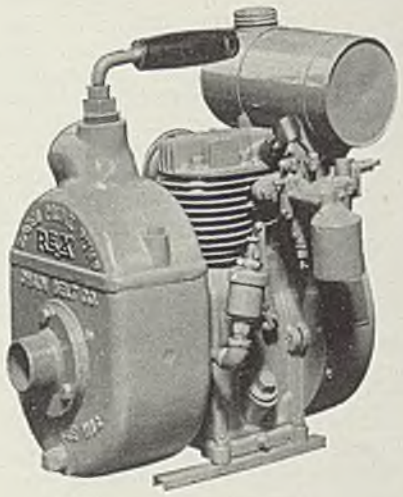
■ General Electric Co., Nela Park, Cleveland, has introduced three new F fluorescent lamps—a 100-watt 60-inch Mazda F lamp, a 6-watt 9-inch Mazda F lamp and a Mazda soft-white F lamp—all three being available in several sizes and lengths.

The 100-watt lamp employs a T-17 tubular bulb that measures 2⅛ inches in diameter. It is designed for general lighting needs. The new 6-watt 9-inch lamp employs a T-5 round bulb and miniature bipin bases. This unit of daylight and 3500 degrees white permits use of fluorescence in many places where larger lamps are not altogether as practical.

The new soft-white lamps come in 15, 20, 30, and 40-watt sizes and in 18, 24, 36 and 48-inch lengths. The 15 and 30-watt sizes have T-8 bulbs; the 20 and 40-watt sizes are equipped with T-12 bulbs.

Centrifugal Pump

■ Chain Belt Co., Milwaukee, announces a new, light weight Rex Junior, 3000 gallon-per-hour centrifugal pump for pumping water from excavations, etc. It features a large semisteel recirculating water chamber equipped with an aluminum cap, and is powered by a single-cylinder air-cooled engine of ¾ to 1 horsepower. The engine is equipped with an automatic governor that speeds up the motor when the pump catches its prime and starts to lift water. The overall dimensions of



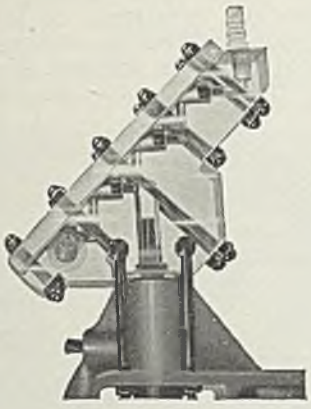
this 1½-inch pump is 15¼ x 11¾ x 15¾ inches. It weighs only 54 pounds.

Plastic Pump

■ Milton Roy, 1308 East Mermaid avenue, Philadelphia, has placed on the market a transparent plastic pump for handling dilute acids, hypochlorites and many other chemicals. Machined from a solid block of clear plastic material, known as Plexiglas, its feature is the visibility, at all times, of the flow of liquid being pumped, and the movement of the valve checks and pump piston. The pump's valve contains all the advantages of the standard

Equipment

step-type valve. Accessibility is provided by a flat-plate cover which, when removed, permits cleaning of the complete valve assembly without disturbing pipe connections to the pump. This unit has a capacity



of 18 gallons per hour against a maximum discharge pressure of 150 pounds per square inch. It is driven by a 1/6-horsepower integral-gear motor. Other pumps are available in capacities of from ½ to 20 gallons per hour.

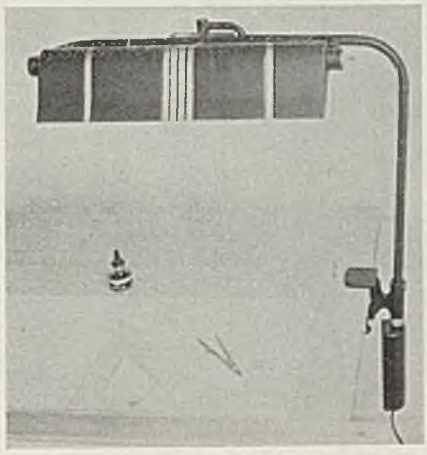
Steel Desk Tray

■ Globe-Wernicke Co., Carthage, avenue, Cincinnati, has placed on the market an attractive new Streamliner steel desk tray which features a full width opening making it easy to handle papers. It can be intermembered with others to any height desired. Metal supports of

satin chromium finish are easily attached and hold stacks absolutely rigid. Rubber feet on the bottom prevent marring of desk surface. The tray is available in letter and legal sizes, finished in seal gray and standard green finishes.

Fluorescent Reflector

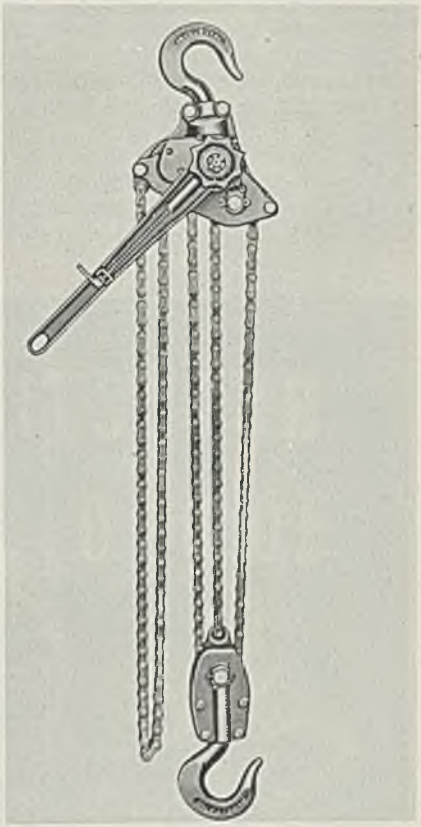
■ Frederick Post Co., Box 803, Chicago, announces an engineers fluorescent reflector which with its special pigment treatment balances the heavy blue light common to fluorescent lighting, producing a neutral colorless light. It is said to provide more light and enables the user to see better. Illumination is cool and permits working close to the light source. Finished in brown Matelasse with silver trim on the shade, the unit, by means of adjustments, can be set at any position from the table top to 24 inches. The shade is adjustable in a hori-



zontal arc 360 degrees and vertical arc 180 degrees. This light is available in two models—No. 2224A which fastens to the drawing surface by a clamp, and No. 2224B which has a screw anchor attachment for permanent installation.

Portable Hoist

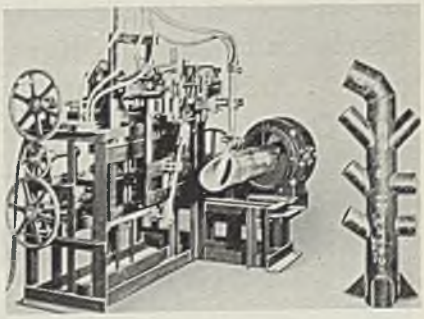
■ Philadelphia division, Yale & Towne Mfg. Co., 4530 Tacony street, Philadelphia, announces a new Pul-Lift portable hoist capable of handling 4½ tons. Having the same safety and construction features as previous models, it is light in weight yet strong enough to more than care for the jobs within its rated capacity. The roller chain it utilizes is specially designed and has an ultimate strength nearly five times the rated capacity of the hoists. The unit also will operate equally well in horizontal or vertical position. The hooks are of the type that open slowly, without fracture when



greatly overloaded. For operation in close quarters the hoist is equipped with a ratchet handle. Possibility of flying handle is decreased to a minimum by the self-actuated load brake.

Pipe Cutter

■ Spence Engineering Co. Inc., Walden, N. Y., has developed a new Fall-O-Matic universal pipe intersection cutter, which saves time required to lay out intersections for welded pipe joints, making the cut with mathematical precision and repeating the operation. Its production is rapid, and is determined by the loading time, which is controlled

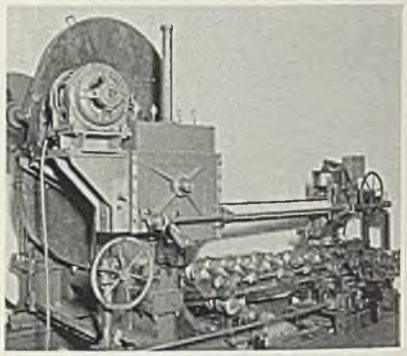


by the size of the pipe. The cutting itself is done by a standard cutting torch. The machine is equipped to cut any size pipe to fit pipe of the

same size, or larger, at any angle or offset. Sample of the work it can do is shown at the right in the illustration. Changeover from one size of pipe to another, or for different angles of intersection is accomplished in about 4 minutes by means of four adjustments on numbered scales, the settings being obtained from a chart. The illustration also shows a piece of 6-inch pipe in the machine which has been cut to fit an 8-inch pipe at an angle of 45 degrees with a 1-inch offset. The machine is hand operated because the compound motion changes the cutting speed to such an extent that the operator must gage the speed to match the torch's ability to cut. It takes less than five minutes to set up and make the cut. The chuck opens up, and is equipped with a set of adapters for each size of pipe. Also an attachment can be supplied that will cut the corresponding holes in the other pipe. If necessary the machine can be truck-mounted and carried to the job.

Hot Billet Shear

■ Lewis Foundry & Machine division, Blaw-Knox Co., P. O. Box 1586, Pittsburgh, has developed a new vertical type shear for shearing alloy steel billets. Self-contained, it is readily inserted into the production line. It cuts downward, across the diagonal, and there is less deformation of the billet stock because of this shearing action. Control from a central point permits one man operation of both shear and runout table, and the operator also retracts the table for the discharge of the crop ends. Power is provided by a 40-horsepower motor, transmitted through a double reduction gear drive, which drives a main crankshaft of 7-inch stroke. The shear is actuated by a one-revolution clutch. By stepping on the foot treadle, the operator places the shear in motion for *one cut only*. The runout table is powered by a 5-horsepower motor, which serves two functions. In the one direction, it drives the rollers of the runout table; in the reverse direction, the table motor operates the

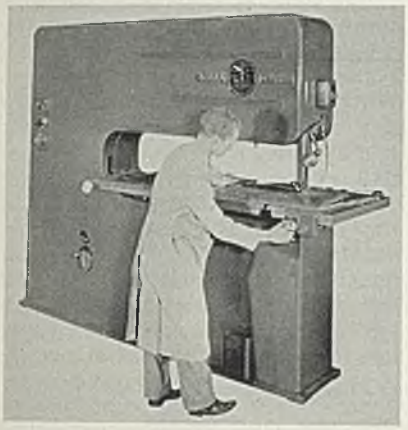


kickoff fingers. The operations in each cycle are governed by limit switches, which in turn are controlled by the operator's handling of the main and secondary stops on the table gage. The shear gage is moved horizontally by a handwheel to set the length of bars to be sheared. Another handwheel moves the entire roller table horizontally to provide space for crop end discharge. The unit is available to accommodate sizes up to and including 4½ inches square. The design, however, is adaptable to larger sizes.

Contour Machine

◘ Continental Machines Inc., 1301 Washington avenue, Minneapolis, announces a new model V-60 contour machine designed to meet demands in the defense industries. It has a 5-foot throat depth which provides unlimited capacity for handling large machining jobs. Thus, thicknesses of work up to 12 inches can be cut and the cutting can be done with considerable speed since the machine uses narrow band saw blades varying from 1/16 to 1 inch in width. The machine also has two large working tables measuring 30 inches square and a super butt welder which joins the 1-inch wide

saw blades. The continuous cutting band of the unit passes over three wheels, however, in handling smaller work only the two main



drive wheels are used, while the third wheel simply becomes an idler wheel. Also, when smaller work is being handled a hand screw feed which locks for quick adjustment is used in place of the automatic power feed. The illuminated magnifying attachment used on other models is likewise provided on this model. A hydraulic contour feed control used in connection with the power feed reduces the operator's attention to a minimum. The machine also incorporates the Speedmaster variable drive which provides every speed from 50 to 1500 feet per minute, and the Job Selector which makes accurate recommendations for cutting speeds and saws or files to be used for a wide range of materials.

Printing Machine

■ Charles Bruning Co. Inc., 100 Reade street, New York, announces a compact model 55 BW printer which operates with either cut sheets or roll stock. It prints ink tracings at from 12 to 15 feet per minute. Measuring only 32 inches wide, 62 inches long, and 48 inches high, it features a new print and

tracing return. The entire top of the machine serves as a return tray and the return is designed so that the tracing enters the tray on top of the print. No reversing of the tracing is necessary when reinserting it into the machine, and as they emerge from the printer onto the tray, exposed sheets stack themselves almost automatically. The light source of the printer is a 55-watt new-type mercury vapor quartz lamp. This furnishes uniform exposure, without flickering and is guaranteed for a life of 1000 hours. The lamp is installed in a revolving 9-inch Pyrex contact cylinder. An automatic clutch, operated by a simple, wide-range foot pedal, releases the feed roller so the tracing may be adjusted or removed when necessary. A hinged section at each end of the machine allows ready access to all electrical controls and drive mechanism. An automatic switch shuts off the light when the end housing of the tube and cylinder are removed. The printer is made for two currents—220 volts alternating current, 60 cycles, or 220 volts alternating current, 50 cycles.

Voltage Regulator

■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has introduced a new indirect-acting rheostatic generator-voltage regulator for automatic voltage control of medium and large size alternating current

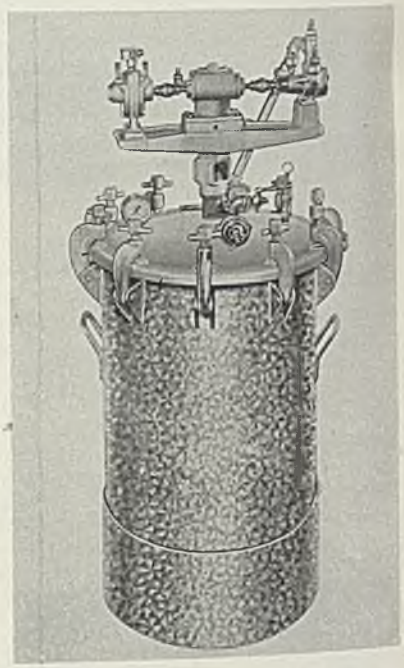
generators in central stations, or large municipal and industrial generating plants, and for synchronous motors and condensers. Its greatest distinctive operational feature is its high-speed action time of 3 cycles after a voltage change. This and its ability to quickly force the exciter field to its limit makes it suitable for quick-response systems. The regulator element responds to the average 3-phase voltage, hence will not operate falsely on an unbalanced system fault.

Construction features of this type BJ unit include an antihunting action to correct for normal voltage deviations. Absence of continuously rotating parts, and of all moving parts reduces element wear. A built-in adjustment provides for adjusting regulator characteristics to match those of the generating equipment.

The regulator readily controls voltage by controlling a motor operated rheostat which varies the exciter field resistance. Rated sensitivity is plus or minus one-half of one per cent of normal voltage. It comes in two mounting styles.

Circulating Systems

■ De Vilbiss Co., Toledo, O., has introduced new type QBM small paint circulating systems, for finishing room use. These will supply a maximum of six production spray guns in continuous operation, handling such materials as lacquers, synthetic enamels, paints, varnishes, shellacs, etc. The heart of the new system is the tank assembly. The container is a standard type QM unit (with agitator), of 30 or 60-gallon capacity. The motor-speed reducer-pump combination, mounted on a small platform on the lid of the tank, is especially suitable for continuous work. Either air or electric motors are available. These are of sufficient capacity to circulate fluids with a maximum viscosity of 25 seconds against an average loop pressure of 50 pounds per square inch. The pump has no packing gland, incorporating instead a mechanical seal. Three types of QBM systems are available. System A, the simplest, delivers fluid over a loop no longer than 200 feet, with a minimum internal diameter of one-half inch. In this system the material is forced throughout the loop by air pressure. Material enters the loop only as it is used and is not recirculated through the tank. With system B the loop can be as



long as 450 feet, with a minimum internal diameter of ¾-inch. Included are individual fluid regulators for each gun. The material is kept more uniformly mixed by being constantly recirculated through the tank. In system C the fluid is recirculated through the head of each gun. It is recommended for materials which are difficult to keep in suspension or which otherwise alter their physical characteristics when allowed to remain stationary for relatively short periods. With it individual fluid pressure regulators for every spray station are provided.

"Player Piano" Control

(*Concluded from Page 57*)

"reverse" and "stop" operation control holes, however, is contingent upon the operator's locking to the yoke of this operating lever the supplementary lever or levers which will cause the tool templet to move along the contour diagram in the required direction and which, upon further depression of the hand lever, causes the punching of the corresponding control hole or holes to take place. Angles and curves on the diagram are closely approximated either by engaging two feeds at once or by intermittent engagement —first of one and then the other.

"Puffs" of Air Actuate Valves

Control of the lathe through the medium of the resulting perforated strip might be described as "reversed action" of the foregoing procedure. Mounted at the side of one of the headstocks of the heavy-duty dual-head car-wheel lathe is a cabinet containing a device called a "paper tower," which is driven through crank, connecting rod and ratchet from the feed works of the lathe. The cabinet is shown in Figs. 2 and 4, the "paper tower" being visible through windows. This device is not unlike the punching unit just described. Instead of a punch-carrying block and dieblock, it has an oblong nozzle block and a duct block between which the perforated strip is drawn step-by-step by a sprocket roll. Dry air at 80 pounds per square inch from the nozzle block blows through the control holes in the paper strip as these holes come in line with matching openings in the duct block. These "puffs" of relatively low pressure air pass on through ducts into a relay block where they actuate valves which in turn release corresponding impulses of high-pressure air into the identical feed control mechanisms built into the twin tool carriages depicted in Figs. 1, 2 and 4.

In these carriage-control mechanisms whose cabinets appear in Figs. 2 and 4 and whose operative details can be seen in Fig. 3, the high-pressure air impulses actuate pistons which engage and disengage constantly reciprocating "forward," "in" and "reverse" pawls with two-way ratchets on the "forward-and-reverse" lead screw, and on the splined rod, Fig. 3, which operates the "in-and-out" turret feeds. A fourth piston stops the feed by disengaging a clutch. Thus the round nose roughing tools are caused automatically to move along the two wheels in paths identical to that which was followed by the tool templet along the outline of the wheel contour diagram when the control strip was being punched.

Finishing cuts, taken by the second set of tools, are through hand feed. The light, shaving cuts thus taken serve to remove the slight ridges resulting from the automatic step-by-step action of the roughing tools. Removal of these ridges precludes subsequent development of wheel failures.

By this contouring method it is possible to machine each set of two wheels with weight equally distributed, with variation in weight between the two wheels of 8 pounds or less, tolerances being held within 1/32-inch on each surface.

For this service wheels are usually mated in sets of four with variation in the outside diameter of one-half tape size or approximately 0.02-inch.

Cutting Used Containers Subject to Explosion

■ A recommended procedure to be followed in preparing for welding or cutting of certain types of containers which have held combustibles is incorporated in a booklet recently announced by the American Welding Society, 33 West Thirty-ninth street, New York. The booklet embodies general precautions, initial treatment and several methods for treating containers that might create an explosion or flame.

Creep Strength

(*Concluded from Page 85*)

of this table the corresponding creep stresses are calculated for other grain sizes and these are plotted directly under the chosen cross point. This procedure is repeated for each numbered point. Through these calculated points creep stress vs. temperature curves for each constant grain-size number are drawn.

Results: Assuming that creep strength and structural grain size are both continuous functions of the creep temperature which would result in a family of curves possessing a mathematical common form, the form in Table III was found from an analysis of creep tests. Other creep tests on 0.5 per cent molybdenum steel in Fig. 5 gave numerical values to the common form for plotting the curves in Fig. 7.

—General creep characteristics are presented in Fig. 7 by a series of creep stress vs. temperature curves for each of the constant structural grain sizes that exists during creep in the microstructure of the low-carbon 0.5 per cent molybdenum steel.

—These creep stress curves indicate the importance of control of the final grain size, particularly in steel for service at the higher temperatures. While the characteristics are for still-air-cooled and drawn heat treatments of the steel, the data at 1022 degrees Fahr. are for annealed steels which have a slightly higher creep strength at that temperature.

—In the application of Fig. 7, a uniform grain size is important. Steel deoxidized with a strong grain-growth inhibitor and finally heat treated in the coarsening temperature range often presents a "duplex" structure with areas of different grain size. The creep strength of the steel is weakened toward that of the weaker grain size.

—Other steels, presumably heat treated just over the Ac_1 point (which is the beginning of the critical transformation temperature range), present grains with very irregular outlines, particularly between areas of ferrite and precipitated carbides. These steels have such low creep strength that acceptance could not be considered.

—With the above precautions the creep-characteristic curves for 0.5 per cent molybdenum steel in Fig. 7 present reliable predictions of the approximate creep strength based upon the microstructure and chemical analysis of the steel.

—Undoubtedly, similar curves can be prepared for other alloys by the same method.

♦

High-Explosive Shell

(*Concluded from Page 62*)

of the dies is effected, particularly when we remember that some automatic relief must be provided in case the operator should happen to misplace the stock in the groove so that the gripping dies cannot complete their full closing movement, or lest the dies be considerably overpacked due to carelessness in die setting. The obvious answer to this particular problem is the toggle, coupled with suitable arrangements for snapping it open in case of overload. Two cams are used on the National machine, one to close the jaws and the other to open. For the relief, a double toggle arrangement is employed, with the result that a relatively small spring presure suffices to retain the driving member of the main toggle mechanism in the operating position. Should, however, the pressure on the jaws exceed a certain predetermined level, the double toggle mechanism on the driving bar acts, relieving the pressure immediately and causing the movable die to recede to the wide open position before the advance of the heading tool. This relief device is automatic, resetting itself on the next return stroke.

By way of summarizing the situation concerning the best methods of forging high-explosive shell, as it appears to exist at the present moment, the vertical hydraulic press, operated with the horizontal draw bench using solid dies is still preferred for shell of very large caliber. The Canadians appear to prefer this plan, with the substitution of a roller-type draw bench for shell of medium caliber—75, 90-millimeter, and the like. For shell in this latter range, however, very interesting experimental work is in progress in Canada on a single-operation or "single-shot" technique, in which the entire operation is completed in one stroke on a vertical-type press, using a split die of variable volume.

In this country the Witter cross roll, following a pierce on the hydraulic or preferably on a mechanical press, seems to be well out in front on account of its high production rate and the claim that a large proportion of any eccentricity developed on the cupping operation is rolled out. The Baldwin-Omes machine, successor to the old bulldozer should do a steady and reliable job for its owner, but without the speed of the cross roll mill.

From a production standpoint, the upsetter appears to be at the tail end of the procession. Despite reports of high scrap percentages, it seems able to forge a highly acceptable carcass when proper attention is given to tool design and maintenance. All of these methods are known to produce shell of acceptable quality, especially from the standpoint of fragmentation.

Steel "Penthouses" for Expanding Production

■ In the current industrial expansion program, Steelox Co., Middletown, O., offers a solution in the form of paneled steel "penthouses" whereby a company now can expand upward if it cannot expand outward. Stress limits on many roofs prohibit the addition of another story. And the average weight of brick per square foot of wall surface is 90 pounds. For concrete, it is 108 pounds—both calculations being based fully on the standard 9-inch wall. By using steel panels fully insulated and with the interior plaster-finished, the weight rarely exceeds 18 pounds per square foot of wall surface. The saving in weight is due to the 4-inch wall thickness which, although less than half that of concrete and brick, has better insulating possibilities. Installations also can be further lightened by paneling the steel walls with plywood and other prefabricated materials, bringing the weight down to 7 pounds per square foot of wall surface. Two types of panels—plain or acoustical—are available for the roof decking. These are formed from 16 to 22-gage Armco Paintgrip steel sheets.

< < HELPFUL LITERATURE > >

1. Aluminum Bronze Alloys

Ampco Metal, Inc.—Illustrated data sheet No. 85 shows, with schematic drawing, applications and uses of aluminum bronze alloys in aircraft industry. Six grades of metal with graduated physical properties are used in airplane propeller, landing gear, door, engine, and tail wheel fittings.

2. Electric Motors

Century Electric Co.—4-page illustrated bulletin No. 0421A describes totally enclosed fan cooled squirrel cage induction motors. Complete construction details of fan cover, deflector, end bracket, stator, fan and rotor are given together with photographs of each part. Types of mountings are enumerated also.

3. Electric Pot Furnaces

A. F. Holden Co.—2-page bulletin, "Holden Electric Pot Furnaces", presents specifications and construction details of three-phase electrode furnaces. Subjects of auxiliary equipment, power factor, pot life, electrodes, and temperature control are discussed. Attached to bulletin is diagram showing general construction and assembly features.

4. Spot Welders

Acme Electric Welder Co.—4-page illustrated bulletin No. 53 describes two direct action air operated press type spot and projection welders, the first built in 30, 40, 50 and 75-kilovolt amperes capacities, the second in 100, 125, 150-kilovolt amperes. General capacity information, specifications and distinctive features of welders are listed.

5. Friction Clutches

W. A. Jones & Machine Co.—16-page illustrated catalog No. 60 lists prices, features, parts and dimensions of line of friction clutches and pulleys. Cutaway views give details of construction and operation.

6. Trolley Duct

Bulldog Electric Products Co.—24-page illustrated bulletin No. 407 is descriptive of industrial type "Trol-E-Duct" for feeding portable electric tools, cranes, hoists and similar moving electrical loads. Typical applications in various industries are shown.

7. Brick and Tile

Harbison-Walker Refractories Co.—6-page broadside, "Duro Acid-Proof Brick and Tile", illustrates shapes and sizes of acidproof brick and tile for use in floors subject to acid, pickling tanks, stack linings and acid towers. Discusses manufacture and laying of brick and lists recommended uses.

8. Heavy Chemicals

Cowles Detergent Co.—Folder describes properties of commercial anhydrous sodium metasilicate, pentahydrate sodium metasilicate, and technically anhydrous sodium orthosilicate for the manufacture of detergents, textile kier boiling, laundering and bottle washing operations, and washing and cleaning sheet and strip steel, heavy ferrous parts and castings.

9. Insulation

Illinois Clay Products Co.—Five illustrated data sheets cover "Therm-O-Flake" coating, granules, concrete, brick and block. Description, characteristics, advantages, principal uses and shipment information is given on each type. Photographs show insulation being applied to oven walls and to open hearth checkers.

10. High Nickel Alloys

International Nickel Co.—12-page illustrated technical bulletin No. T-19 gives data on deep drawing, shearing and perforation of monel, nickel and inconel. Die materials, lubricants, and drawing practice is covered, along with general information on annealing and pickling of alloys. Information on mechanical characteristics of high nickel alloys as compared to other deep drawing materials is given.

11. Machining Problems

Gisholt Machine Co.—Four illustrated data sheets Nos. 66-69, outline practical solutions to various machining problems. In sheets is explained how production of diesel engine fuel injector bodies, garage equipment parts, collets, and tractor steering-clutch-drums was speeded up on turret and automatic lathes. Tool layout diagrams are included.

12. Carburizing Furnace

General Electric Co.—4-page illustrated bulletin No. GEA-3523 describes gas-carburizing electric furnace. Cutaway view shows design and construction together with photographs of typical installations. Costs and theory of gas-carburizing are discussed. Dimensions and ratings of standard sizes are also enumerated.

13. Industrial Locomotives

Whitcomb Locomotive Co.—8-page bulletin, "Series Rg," presents complete construction details and performance data, with speed tractive effort curves, of line of diesel electric locomotives in sizes from 35 to 50 tons. Views show power plant, underframe and axle assembly.

14. Steel Strapping

Acme Steel Co.—8-page illustrated bulletin, "Acme Process News", is pictorial presentation of strapping practices used by shippers of trucks, sugar, airplanes, nut meats, boats, sucker rods, salmon and mining equipment. Tools available for steel-banding of all types shipping loads are illustrated and described.

15. Construction Welding

Air Reduction—16-page illustrated folder lists advantages of arc welding for building construction. Advantages are illustrated specifically in magazine article reprint featuring construction of New York Airlines Terminals Building. Information on fundamentals of design for welded construction together with descriptions of recommended types of electrodes and welding machines are included.

16. Milling Machine

Sundstrand Machine Tool Co.—8-page illustrated bulletin, "No. 00 Hydraulic Rigidmil", describes small hydraulic milling machine capable of automatic cycling for high production. Discusses speeds, automatic table control, lubrication, stepless feed range and hydraulic equipment. Completed specifications and detailed line drawing are included.

17. Metal Cleaning

Oakite Products, Inc.—32-page booklet, "Cleaning of Metals Before Electro-Plating," describes new and improved methods for cleaning polished steel without presoaking, cleaning iron and steel castings, removing smut and insoluble matter from cold rolled steel, and precleaning in mechanical washing machines. Outlines methods of cleaning aluminum, magnesium, buffed brass, bronze, zinc and tin alloys.

18. Open Steel Flooring

Dravo Corp.—20-page illustrated catalog shows open steel flooring, concrete armoring, safety steps, and heavy duty steel flooring. Engineering data, specifications, features, and typical applications are given. Equipment is applicable to power plants, bridges, towboats, industrial plants, and in road construction.

19. Prefinished Metals

American Nickeloid Co.—4-page illustrated folder, "Speed Up", discusses value of prefinished metals, which require no plating or polishing, for increased efficiency, productivity, and economy in defense work. Types, sizes and shapes of metal available are listed. Small sample of prefinished metal is included.

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(Continued)

20. Welding Positioners

Cullen-Friestedt Co.—12-page illustrated bulletin No. W-P20 tells how welding assemblies may be positioned for down-hand welding on top, bottom and sides of weldment with single set-up. Considers factors involved in handling of assemblies of all sizes and shapes, and illustrates positioners in modern industrial use.

21. Sheeting Drivers

Worthington Pump and Machinery Corp.—4-page bulletin No. H-1200-B12A describes and illustrates pneumatic pavement breaker that may be converted to sheet driving machine by interchanging breaker head with driver head. Specifications and auxiliary equipment are also listed.

22. Hydraulic Cylinders

Tomkins-Johnson Co.—24-page catalog No. H-40 contains engineering data, and shows constructional features, models and styles of hydraulic cylinders. Cutaway views and dimensional diagrams of all types of cylinders are given. Hydraulic shock accumulators and rotating cylinders are also described.

23. Pyrometers

Instrument Division, Tamms Silica Co. —4-page bulletin No. 401 lists models of high resistance indicating pyrometers, thermocouples for diesel engines, ribbon thermocouples and portable lance type pyrometers, recording thermometers, and other temperature indicating instruments. Scale ranges and construction features are listed.

24. Wire Calculator

General Cable Corp.—Wire calculator gives information based on new National Electrical Code on conduit size, allowable current carrying capacity and temperature correction for any given size and type of wire for both new work and rewiring. Data is rapidly and conveniently obtained on slide-type direct reading scales.

25. Ball Bearing Units

Stephens-Adamson Manufacturing Co. —32-page illustrated catalog describes line of pre-lubricated, self-aligning bearing units. Engineering data, dimension and load rating tables are given for pillow blocks, cartridge units, hangar, countershaft hangar, carrier bearings and take-up units. Photographs of typical installations are shown.

26. Swaging Machines

Etna Machine Co.—4-page bulletin, "Series 100", shows machines for tapering, sizing and reducing round solids and tubing of any reasonable ductile material. Lists specifications of seven 2-die machines capable of handling tubing from ⅜ to 4 inches in diameter, and four 4-die machines capable of handling 1½ to 4-inch diameter tubing.

27. Apron Feeder

Robins Conveying Belt Co.—4-page bulletin illustrates features of heavy duty manganese steel apron feeder for carrying large tonnages of mineral bearing rock and ore at mines, smelter and reduction plants, and slag formations at steel plants. Tables and line drawings give complete engineering data.

28. Gun Barrel Rifling

Pratt & Whitney—4-page bulletin No. 455 illustrates and describes line of gun barrel rifling machines. Features, operation, specifications, and instructions for use are included together with closeup views of individual parts.

29. Fluorescent Lamp Starter

Lamp Division, Hygrade Sylvania Corp. —4-page folder No. FM-181 enumerates features and advantages of fluorescent lamp starter which comes in three sizes for all wattages. Diagram and text explain operation and construction of device.

30. Blast Cleaning Equipment

Ruemelin Manufacturing Co.—8-page illustrated bulletin No. 35A lists line of sand blast rooms and cabinets, mechanical abrasive elevators, dust filters and blast cleaning generators. Line drawings, pictures and text cover construction and operation details of units. Included is partial list of users.

31. Capacitors

Westinghouse Electric & Manufacturing Co.—28-page technical manual, "Application Data on Capacitors", is reference text for use by electrical engineers on capacitor problems. Index listings include amount and location of capacitors, application and selection, star versus delta banks, calculated released system capacity and effect of capacitor on telephone interferences. Curves and graphs amplify text.

32. Pressure Instruments

Republic Flow Meters Co.—12-page illustrated bulletin No. 801 contains specifications covering construction, principle of operation and application of draft and pressure gages and recorders. Sectional views show construction features, and tables and diagrams give mounting dimensions and installation data.

33. Die Steels

Crucible Steel Co. of America—4-page folder discusses high carbon, high chromium die steels. Outstanding advantages, list of applications, forging, annealing, hardening and tempering practices are given on four grades of steel of varying carbon and molybdenum content.

34. Machine Tools

Weber Tool Co.—4-page bulletin, "Weber Precision Machine Tools", is descriptive of high speed vertical milling machine and jig borer. Distinctive features, specifications, capacity, and assembly details are enumerated.

35. Hand Tools

Stanley Tools, division of Stanley Works—56-page illustrated catalog No. 50. Listed are miter boxes, spoke shaves, breast drills, cold and wood chisels, dolly blocks and other industrial hand tools most in demand by production men. Items particularly suited for aircraft work are marked with illustration of airplane.

36. Dewatering Screens

Koppers-Rheolaveur Co. — Illustrated data sheet No. E-1 describes wedge-wire screens used for removing free moisture from fine material. Construction details and dewatering theory of two types of screen, flat surface and tudor drop, are presented together with closeup views of screens in action.

37. Phosphor Bronze

Phosphor Bronze Smelting Co.—8-page illustrated catalog, "Elephant Brand Phosphor Bronze," gives technical data on four standard alloys. Lists chemical and physical properties of rods, castings, sheet and strip, bars, spring and welding wire, and wire rope.

38. Broaching Machines

Cincinnati Milling Machine Co.—16-page illustrated catalog No. M-886 outlines features and gives construction data on single ram vertical and duplex vertical surface broaching machines. Drawings and tables give specifications.

39. Fire Brick

Ironton Fire Brick Co.—Illustrated bulletin on "Ironton Cavalier" outlines properties of this brick which is said to offer maximum resistance to abrasion, slag action and mechanical shock. Product is used in such installations as blast furnace stoves, ladles, coke ovens, and chimney linings.

40. Chemical Flakers

Buffalo Foundry & Machine Co.—12-page illustrated bulletin No. 326 discusses features of "Buflovak" flakers for cooling and flaking chemicals. Equipment is used to convert continuously various liquid and molten materials directly into flaked or granular form.

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Use of Substitutes Gains In Metals Industries

Shifting of analysis applies particularly to alloy steels. Fresh orders are still on the increase. Sell by quarters, no longer months.

MARKET IN TABLOID ★

Demand
Increasing.

Prices
Firm.

Production
Off 2 points at 94½.

■ MAJORITY of steel makers report February order totals will be larger than January despite the shorter month. However, more companies report a leveling off in demand. This is due partly to knowledge on the part of consumers that steel is difficult to buy unless very good reasons for the purchase are shown. Many companies on new contracts merely promise quarters of delivery rather than months.

Steel ingot production last week dropped 2 points to 94½ per cent, the severest set-back in many weeks, due largely to wearing out of furnace linings.

Substitutes are beginning to be employed: A certain analysis of carbon steel in place of the usual; a different combination of alloying elements in the alloy field; substitutes for certain scarce nonferrous metals; in some cases nonmetallic commodities in place of metals. There is considerable worry in some cases lest carefully built-up markets will be lost permanently.

Leading steel companies have begun urging their customers to specify, wherever possible, substitutes for nickel steels. This move results from the fact that supplies of nickel at steel plants are equivalent to 2 to 14 days' requirements, with deliveries considerably below the level to maintain inventories. By agreeing to accept suitable substitutes, consumers will be assured of a continuing supply of steel.

The matter of substituting specifications is not expected to prove to be too complicated since the whole question of providing substitutes has been studied by the steel industry over a long period. It is expected the majority of the proposed changes will have become effective within a few weeks.

The tight situation in zinc last week caused certain producers to cut down their output of galvanized sheets and they are prepared to take similar steps in regard to galvanized wire. They are even prepared to reduce output of galvanized pipe if it should seem necessary.

There also is a tight situation in the supply of low-carbon ferromanganese and of ferrochromium, particularly low-carbon ferrochromium.

The supply of aluminum is sufficiently tight to cause concern among steel producers. They are ready, if necessary, to substitute open for killed steel on a substantial scale.

There is no concern over the immediate supply of tin and of manganese ore as shipments continue to come in from abroad. There also is no reason for immediate concern as to the supply of tungsten.

The government is taking short cuts in buying steel. Thus in the case of a mid-western ordnance plant piecemeal competitive bids have been done away with on the remaining 15,000 tons of a total of 20,000 tons of fabricated structurals required, the low bidder on the first 5000 tons having been awarded the remainder.

A growing number of steel foundries which customarily work five or six days a week are now working seven. There is greater pooling of efforts. Thus steel plants are often turning over some surplus product, such as pig iron, in return for some other product, such as coke, to rival steelmakers in the same district. Or they are sharing jointly in the cost of rehabilitating some furnace. A number of iron and steel warehouses have pooled their purchases in an effort to obtain better mill service.

A steel works has sold some pig iron in northern Ohio based on $23, Cleveland furnace, for No. 2 foundry. One large merchant pig iron interest with six widely scattered stacks is producing at 105 per cent of rated capacity.

Steel inquiries carrying priority certificates issued at Washington are fewer than was expected for this stage of defense.

Scheduled automobile production for the week ended Feb. 22 is 129,240 units, a gain of 1740 for the week, comparing with 102,570 a year ago.

Operating declines took place in the following districts as follows: Pittsburgh down 2 points to 94½ per cent, Chicago 4 points to 95½, Wheeling 12 points to 88, New England 8 points to 92 and eastern Pennsylvania 1 point to 95. Gains were Cleveland by ½ point to 84½ and Detroit by 3 points to 95. Unchanged were Buffalo at 90½, Birmingham at 100, Cincinnati at 95, St. Louis at 93 and Youngstown at 90.

All three of STEEL'S price composites are unchanged for last week, iron and steel at $38.23, finished steel at $56.60 and steelworks scrap at $19.91.

COMPOSITE MARKET AVERAGES

	Feb. 22	Feb. 15	Feb. 8	One Month Ago Jan., 1941	Three Months Ago Nov., 1940	One Year Ago Feb., 1940	Five Years Ago Feb., 1936
Iron and Steel	$38.23	$38.23	$38.20	$38.38	$38.08	$37.21	$33.48
Finished Steel	56.60	56.60	56.60	56.60	56.60	56.50	53.70
Steelworks Scrap..	19.91	19.91	19.91	20.88	20.72	16.98	13.83

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

COMPARISON OF PRICES

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

Finished Material

	Feb. 22, 1941	Jan. 1941	Nov. 1940	Feb. 1940
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.47	2.47	2.47
Iron bars, Chicago	2.25	2.25	2.25	2.15
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.17	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
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	2.55

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 ⅜-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron

	Feb. 22, 1941	Jan. 1941	Nov. 1940	Feb. 1940
Bessemer, del. Pittsburgh	$25.34	$25.34	$24.34	$24.34
Basic, Valley	23.50	23.50	22.50	22.50
Basic, eastern, del. Philadelphia	25.34	25.34	24.34	24.34
No. 2 foundry, Pittsburgh	25.21	25.21	24.21	24.21
No. 2 foundry, Chicago	24.00	24.00	23.00	23.00
Southern No. 2, Birmingham	19.38	19.38	19.38	19.38
Southern No. 2, del. Cincinnati	24.06	23.06	23.06	23.06
No. 2X, del. Phila. (differ. av.)	26.215	26.215	25.215	25.215
Malleable, Valley	24.00	24.00	23.00	23.00
Malleable, Chicago	24.00	24.00	23.00	23.00
Lake Sup., charcoal, del. Chicago	30.34	30.34	30.34	30.34
Gray forge, del. Pittsburgh	24.17	24.17	23.17	23.17
Ferromanganese, del. Pittsburgh	125.33	125.33	125.33	105.33

Scrap

Heavy melt. steel, Pitts.	$20.75	$22.15	$21.50	$17.75
Heavy melt, steel, No. 2, E. Pa.	18.50	19.30	19.75	16.30
Heavy melting steel, Chicago	19.25	20.25	20.25	15.75
Rails for rolling, Chicago	24.25	24.70	24.55	18.25
Railroad steel specialties, Chicago	23.25	24.05	23.25	18.50

Coke

Connellsville, furnace, ovens	$5.50	$5.50	$4.75	$4.75
Connellsville, foundry, ovens	6.00	6.00	5.75	5.75
Chicago, by-product fdry., del.	11.75	11.75	11.75	11.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

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

Sheet Steel

Hot Rolled

Pittsburgh	2.10c
Chicago, Gary	2.10c
Cleveland	2.10c
Detroit, del.	2.20c
Buffalo	2.10c
Sparrows Point, Md.	2.10c
New York, del.	2.34c
Philadelphia, del.	2.27c
Granite City, Ill.	2.20c
Middletown, O.	2.10c
Youngstown, O.	2.10c
Birmingham	2.10c
Pacific Coast ports	2.65c

Cold Rolled

Pittsburgh	3.05c
Chicago, Gary	3.05c
Buffalo	3.05c
Cleveland	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.37c
New York, del.	3.39c
Granite City, Ill.	3.15c
Middletown, O.	3.05c
Youngstown, O.	3.05c
Pacific Coast ports	3.70c

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
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast ports	4.05c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.80c
Pacific Coast	4.55c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.40c	4.00c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 303	No 304
Bars	24.00	26.00	25.00
Plates	27.00	29.00	29.00
Sheets	34.00	36.00	36.00
Hot strip	21.50	27.00	23.50
Cold strip	28.00	33.00	30.00

Straight Chromes

	No. 410	No. 416	No. 430	No. 442
Bars	18.50	19.00	19.00	22.50
Plates	21.50	22.00	22.00	25.50
Sheets	26.50	27.00	29.00	32.50
Hot strip	17.00	18.25	17.50	24.00
Cold stp.	22.00	23.50	22.50	32.00

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c-2.44c
Philadelphia, del.	2.15c-2.30c
Boston, delivered	2.43c-2.57c
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-2.25c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast ports	2.65c

Steel Floor Plates

Pittsburgh	3.35c
Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	4.00c

Structural Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast ports	2.75c

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

Roofing Ternes

Pittsburgh base, package 112 sheets 20 x 28 in., coating I.C.

8-lb.	$12.00	25-lb.	$16.00
15-lb.	14.00	30-lb.	17.25
20-lb.	15.00	40-lb.	19.50

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	2.25c
Detroit, delivered	2.47c
Philadelphia, del.	2.52c
Boston, delivered	2.49c
New York, del.	2.50c
Gulf ports	2.80c
Pacific Coast ports	

Rail Steel

(Base, 5 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Detroit, delivered	2.25c
Cleveland	2.15c

Buffalo	2.15c
Birmingham	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.80c

Iron

Chicago	2.25c
Philadelphia, del.	2.37c
Pittsburgh, refined	3.50-8.00c
Terre Haute, Ind.	2.15c

Reinforcing

New Billet Bars, Base

Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt., Pitts.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

Rail Steel Bars, Base

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birm.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard and cement coated wire nails	$2.55
(Per Pound)	
Polished fence staples	2.55c
Annealed fence wire	3.05c
Galv. fence wire	3.40c
Woven wire fencing (base C. L. column)	67
Single loop bale ties, (base C.L. column)	56
Galv. barbed wire, 80-rod spools, base column	70
Twisted barbless wire, column	70

To Manufacturing 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

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

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.70	3300	3.80
2500	2.55	3400	3.20
4100	0.15 to 0.25 Mo.		0.55
4600	0.20 to 0.30 Mo. 1.50-2.00 Ni.		1.20
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.

Alloy Plates (Hot)

Pittsburgh, Chicago, Coatesville, Pa. 3.50c

Strip and Hoops

(Base, hot strip, 1 ton or over; cold, 3 tons or over)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.10c
Detroit, del.	2.20c
Philadelphia, del.	2.42c
New York, del.	2.46c
Pacific Coast ports	2.75c
Cooperage hoop, Young., Pitts.; Chicago, Birm.	2.20c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.80c
Chicago	2.90c
Detroit, del.	2.90c
Worcester, Mass.	3.00c

Carbon	Cleve., Pitts.
0.26—0.50	2.80c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass. $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.35c

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

Cents per pound

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%.

Carriage and Machine

½ x 6 and smaller	68 off
Do., ⅝ and ⅝ x 6-in. and shorter	66 off
Do., ¾ to 1 x 6-in. and shorter	64 off
1⅛ and larger, all lengths	62 off
All diameters, over 6-in. long	62 off
Tire bolts	52.5 off

Stove Bolts

In packages with nuts separate 73-10 off; with nuts attached 73 off; bulk 81 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	60 off
Plow bolts	68.5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
½-inch and less	66	70
⅝-1-inch	63	65
1⅛-1½-inch	61	62
1⅝ and larger	60	

Hexagon Cap Screws

Upset 1-in., smaller 68 off

Square Head Set Screws

Upset, 1-in., smaller	74.0 off
Headless set screws	64.0 off

Piling

Pitts., Chgo., Buffalo 2.40c

Rivets, Washers

F.o.b. Pitts., Cleve., Chgo., Bham.

Structural	3.40c
⅞-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 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
½	63½	54
¾	66½	58
1—3	68½	60½

Iron

¾	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	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.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½"O.D.	13	$ 9.72	$23.71
1¾"O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2¼"O.D.	13	13.79	21.68
2¼"O.D.	12	15.16	
2½"O.D.	12	16.58	26.57
2¾"O.D.	12	17.54	29.00
3" O.D.	12	18.35	31.36
3½"O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O.D.	13	$ 7.82	$ 9.01
1¼"O.D.	13	9.26	10.67
1½"O.D.	13	10.23	11.79
1¾"O.D.	13	11.64	13.42
2" O.D.	13	13.04	15.03
2¼"O.D.	13	14.54	16.76
2¼"O.D.	12	16.01	18.45
2½"O.D.	12	17.54	20.21
2¾"O.D.	12	18.59	21.42
3" O.D.	12	19.50	22.48
3½"O.D.	11	24.62	28.37
4" O.D.	10	30.54	35.20
4½"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

Class B Pipe—Per Net Ton

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 Stnd. fitgs., Birm., base $100.00.

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Youngs., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young, Buffalo, Birm.	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point Buffalo, Canton, Chicago.	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅜-inch incl. (per 100 lbs.) $2.00
Do., over ⅜ to 41/64-in. incl. 2.15
Worcester up $0.10; Galveston up $0.25; Pacific Coast up $0.50.

Skelp

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt. 1.90c

Shell Steel

Pittsburgh, Chicago, base, 1000 tons of one size, open hearth

3-12-inch	$52.00
12-18-inch	54.00
18-inch and over	56.00

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$5.00- 5.75
Connellsville, fdry.	5.25- 6.00
Connell. prem. fdry.	6.00- 6.60
New River fdry.	6.50- 7.00
Wise county fdry.	5.50- 6.50
Wise county fur.	5.00- 5.25

By-Product Foundry

Newark, N. J., del.	11.85-12.30
Chicago, outside del.	11.00
Chicago, delivered	11.75
Terre Haute, del.	11.25
Milwaukee, ovens	11.75
New England, del.	13.00
St. Louis, del.	11.75
Birmingham, ovens	7.50
Indianapolis, del.	11.25
Cincinnati, del.	11.00
Cleveland, del.	11.55
Buffalo, del.	11.75
Detroit, del.	11.50
Philadelphia, del.	11.63

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	14.00c
Toluol, two degree	27.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (less than 1000 lbs.)	13.75c
Do. (1000 lbs. or over)	12.75c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	7.00c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$30.00

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 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$25.00	$25.50	$24.50	$26.00
Birmingham, Ala.§	20.38	. . .	19.38	25.00
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.00	25.50	24.50	26.00
Granite City, Ill.	24.00	24.00	23.50	24.50
Hamilton, O.	24.00	24.00	23.50	....
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	....	....	....
Sharpsville, Pa.	24.00	24.00	23.50	24.50
Sparrow's Point, Md.	25.00	....	24.50	....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	24.00	24.00	23.50	24.50

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

Delivered from Basing Points:				
Akron, O., from Cleveland	25.39	25.39	24.89	25.89
Baltimore from Birmingham	25.78	....	24.66	....
Boston from Birmingham	25.12	....	....	....
Boston from Everett, Mass.	25.50	26.00	25.00	26.50
Boston from Buffalo	25.50	26.00	25.00	26.50
Brooklyn, N. Y., from Bethlehem	26.50	27.00	...	....
Canton, O. from Cleveland	25.39	25.39	24.89	25.89
Chicago from Birmingham	†24.22	....	...	....
Cincinnati from Hamilton, O.	24.44	25.11	24.61	....
Cincinnati from Birmingham	24.06	....	23.06	....
Cleveland from Birmingham	24.32	....	23.82	....
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	25.44
Milwaukee from Chicago	25.10	25.10	24.60	25.60
Muskegon, Mich., from Chicago, Toledo or Detroit	27.19	27.19	26.69	27.69
Newark, N. J., from Birmingham	26.15	....	....	....
Newark, N. J., from Bethlehem	25.53	26.03	....	....
Philadelphia from Birmingham	25.46	....	24.96	....
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	....
Pittsburgh district from Neville Island	} Neville base, plus 69c, 84c and $1.24 freight.			
Saginaw, Mich., from Detroit	26.31	26.31	25.81	26.81
St. Louis, northern	24.50	24.50	24.00	....
St. Louis from Birmingham	†24.12	....	23.62	....
St. Paul from Duluth	26.63	26.63	....	27.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50, base; $30.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$23.50	Lake Superior fur.	$27.00
Pitts. dist. fur.	23.50	do., del. Chicago	30.34
		Lyles, Tenn.	26.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $29.50; 6.51-7—$30.00; 7-7.50—$30.50; 7.51-8—$31.00; 8-8.50—$31.50; 8.51-9—$32.00; 9-9.50—$32.50; 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

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	55.10
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	26.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$50.00
Chem. bonded chrome	50.00
Magnesite brick	72.00
Chem. bonded magnesite	61.00

Fluorspar

Washed gravel, duty pd., tide, net ton	$25.00-$26.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	20.00-21.00
Do. barge	20.00
No. 2 lump	20.00-21.00

Ferroalloy Prices

Ferromanganese, 78-82%,
carlots, duty pd. $120.00
Ton lots 130.00
Less ton lots 133.50
Less 200 lb. lots 138.00
Do., carlots del. Pitts. 125.33

Spiegeleisen, 19-21% dom.
Palmerton, Pa., spot 36.00

Ferrosilicon, 50%, freight allowed, c.l. 74.50
Do., ton lot 87.00
Do., 75 per cent 135.00
Do., ton lots 151.00
Spot, $5 a ton higher.

Silicomanganese, c.l., 3 per cent carbon 113.00
2½% carbon 118.00
2% carbon, 123.00; 1%, 133.00
Contract ton price $12.50 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.90-2.00

Ferrovanadium, 35 to 40%, lb. 2.70-2.80-2.90

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

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 11.00c
Do., ton lots 11.75c
Do., less-ton lots 12.00c
less than 200 lb. lots 12.25c

67-72% low carbon:

	Carloads	Ton lots	Less ton
2% carb.	17.50c	18.25c	18.75c
1% carb.	18.50c	19.25c	19.75c
0.10% carb.	20.50c	21.25c	21.75c
0.20% carb.	19.50c	20.25c	20.75c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do., less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-60% contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do., less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50
Do., spot 145.00
Do., contract, ton lots 145.00
Do., spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do., spot 160.00
Do., contract, ton lots. 160.00
Do., spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do., ton lots 8.00c
Do., less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract, freight allowed, lb. carlots, bulk 7.00c
Do., ton lots 7.50c
Do., less-ton lots 7.75c
Do., less 200 lbs. 8.00c
Spot ¼c lb. higher

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.50
Do., smaller lots 2.60

Vanadium Pentoxide, contract, lb. contained $1.10
Do., spot 1.15

Chromium Metal, 98% cr., contract, lb. con. chrome, ton lots 80.00c
Do., spot 85.00c
88% chrome, cont. tons. 79.00c
Do., spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.50c
Do., 2% 13.00c
Spot ¼c higher

Silicon Briquets, contract carloads, bulk, freight allowed, ton $74.50
Ton lots 84.50
Less-ton lots, lb. 4.00c
Less 200 lb. lots, lb. 4.25c
Spot ¼-cent higher

Manganese Briquets, contract carloads, bulk freight allowed, lb. 5.50c
Ton lots 6.00c
Less-ton lots 6.25c
Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, bulk, gross ton 102.50
Do., ton 108.00

35-40%, contract, carloads, lb., alloy 14.00c
Do., ton lots 15.00c
Do., less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. $2.60
200-lb. kegs, lb. 2.75
Do., 100-200 lb. lots 3.00
Do., under 100-lb. lots

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

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: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars: Carbon	Cold Drawn Bars: S.A.E. 2300	Cold Drawn Bars: S.A.E. 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.48	5.11	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.95	4.45	3.55	3.55	5.25	3.55	4.05	4.65	3.31	4.06	8.56	7.16
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	....	5.05	....	4.05	....	....
Norfolk, Va.	4.00	4.10	....	4.05	4.05	5.45	3.85	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.25	4.30	4.75	3.22	3.75	8.40	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.65	....	3.65	8.40	6.75
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.62	3.20	3.75	8.40	6.75
Detroit	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.30	4.84	3.20	3.80	8.70	7.05
Omaha	3.90	4.00	4.00	3.95	3.95	5.55	3.65	....	5.50	....	4.42	....	....
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.00	4.92	3.47	4.00	8.75	7.10
Chicago	3.50	3.40	3.40	3.55	3.55	5.15	3.25	4.10	4.60	3.30	3.75	8.40	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.50	4.35	5.00	3.83	4.34	9.09	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	3.64	3.74	3.74	3.69	3.69	5.29	3.39	4.12	4.87	3.61	4.02	8.77	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	....
Indianapolis	3.60	3.75	3.75	3.70	3.70	5.30	3.45	....	5.01	....	3.97	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	....
Chattanooga	3.80	4.00	4.00	3 85	3.85	5.68	3.70	....	4.40	....	4.39	....	....
Tulsa, Okla.	4.44	4.34	4.34	4.49	4.49	6.09	4.19	....	5.54	....	4.69	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.88	3.45	....	4.75	....	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	4.80	5.00	4.60	....	....
Houston, Tex.	3.75	5.95	5.95	3.85	3.85	5.50	4.20	....	5.25	....	6.60	....	....
Seattle	4.00	4.00	5.20	4.00	4.00	5.75	4.00	6.50	5.00	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	4.75	....	5.75	....	....
Los Angeles	4.15	4.60	6.45	4.15	4.15	6.40	4.20	6.50	5.25	....	6.60	10.55	9.80
San Francisco	3.75	4.25	6.00	3.75	3.75	5.60	3.75	6.40	5.40	....	6.80	10.65	9.80

	S.A.E. Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	....
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	6.02	5.77	7.87
Seattle	5.85	....	8.00	7.85	8.65
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.55	8.55	8.40	9.05
San Francisco	5.25	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; 300-9999 Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in B'ham., Memphis.

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; 750-4999 in San Francisco; 300-4999 in Portland, Seattle; any quantity in Twin Cities; 300-1999 Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-4999 in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 1500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; 25 to 49 bundles in Philadelphia; 750-4999 in San Francisco.

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 $4.02½ per Pound Sterling

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	BRITISH Gross Tons f.o.b. U.K. Ports	£ s d
Merchant bars, 3-inch and over	$66.50	16 10 0
Merchant bars, small, under 3-inch, re-rolled	3.60c	20 0 0
Structural shapes	2.79c	15 10 0
Ship plates	2.90c	16 2 6
Boiler plates	3.17c	17 12 6
Sheets, black, 24 gage	4.00c	22 5 0
Sheets, galvanized, corrugated, 24 gage	4.61c	25 12 6
Tin plate, base box, 20 x 14, 108 pounds	$ 6.29	1 11 4

British ferromanganese $120.00 delivered Atlantic seaboard duty-paid.

Domestic Prices Delivered at Works or Furnace—

		£ s d
Foundry No. 3 Pig Iron, Silicon 2 50—3.00	$25.79	6 8 0(a)
Basic pig iron	24.28	6 0 6(a)
Furnace coke, f.o.t. ovens	7.15	1 15 6
Billets, basic soft, 100-ton lots and over	49.37	12 5 0
Standard rails, 60 lbs. per yard, 500 ton lots & over	2.61c	14 10 6
Merchant bars, rounds and squares, under 3-inch	3.17c	17 12 0††
Shapes	2.77c	15 8 0††
Ship plates	2.91c	16 3 0††
Boiler plates	3.06c	17 0 6††
Sheets, black, 24 gage, 4-ton lots and over	4.10c	22 15 0
Sheets, galvanized 24 gage, corrugated, 4-ton lots & over	4.70c	26 2 6
Plain wire, mild drawn, catch weight coils, 2 ton lots and over	4.28c	23 15 0
Bands and strips, hot-rolled	3.30c	18 7 0††

(a) del. Middlesbrough 5s rebate to approved customers. ††Rebate of 15s on certain conditions.

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.	18.00
Bos. dock No. 1 exp.	17.00
New Eng. del. No. 1	17.00-17.25
Buffalo, No. 1.....	20.50-21.00
Buffalo, No. 2.....	18.50-19.00
Chicago, No. 1	19.00-19.50
Chicago, auto, no alloy	18.00-18.50
Cincinnati, dealers.	18.25-18.75
Cleveland, No. 1....	20.00-20.50
Cleveland, No. 2....	19.00-19.50
Detroit, No. 1.....	†16.50-17.00
Detroit, No. 2.....	†15.50-16.00
Eastern Pa., No. 1..	20.00
Eastern Pa., No. 2..	18.50
Federal, Ill., No. 2..	16.50-17.00
Granite City, R. R. No. 1	17.50-18.00
Granite City, No. 2..	16.50-17.00
Los Ang., No. 1 net	14.50-15.00
Los Ang., No. 2 net	13.50-14.00
N. Y. dock No. 1 exp.	†16.50
Pitts., No. 1 (R. R.)	21.00-21.50
Pittsburgh, No. 1...	20.50-21.00
Pittsburgh, No. 2...	19.50-20.00
St. Louis, No. 1....	17.50-18.00
St. Louis, No. 2....	16.50-17.00
San Fran., No. 1 net	15.00-15.50
San Fran., No. 2 net	14.00-14.50
Seattle, No. 1.....	15.00
Toronto, dlrs., No. 1	12.25-12.50
Valleys, No. 1	21.00-21.50

COMPRESSED SHEETS

Buffalo	18.50-19.00
Chicago, factory ...	18.50-19.00
Chicago, dealers ...	17.00-17.50
Cincinnati, dealers.	17.00-17.50
Cleveland	20.00-20.50
Detroit	†17.25-17.75
E. Pa., new mat....	20.00
E. Pa., old mat....	17.00
Los Angeles, net...	12.50-13.00
Pittsburgh	20.50-21.00
St. Louis	13.50-14.00
San Francisco, net..	13.00-13.50
Valleys	20.50-21.00

BUNDLED SHEETS

Buffalo, No. 1.....	18.50-19.00
Buffalo, No. 2.....	17.00-17.50
Cleveland	15.00-15.50
Pittsburgh	19.50-20.00
St. Louis	12.50-13.00
Toronto, dealers ...	10.00-10.50

SHEET CLIPPINGS, LOOSE

Chicago	13.50-14.00
Cincinnati, dealers..	12.50-13.00
Detroit	†13.50-14.00
St. Louis	12.00-12.50
Toronto, dealers....	9.00

BUSHELING

Birmingham, No. 1.	16.00
Buffalo, No. 1.....	18.50-19.00
Chicago, No. 1.....	18.00-18.50
Cincin., No. 1 deal..	14.25-14.75
Cincin., No. 2 deal..	7.75- 8.25
Cleveland, No. 2....	14.00-14.50
Detroit, No. 1 new.	†16.50-17.00
Valleys, new, No. 1.	20.50-21.00
Toronto, dealers....	7.00- 7.50

MACHINE TURNINGS (Long)

Birmingham	9.50
Buffalo	14.00-14.50
Chicago	13.50-14.00
Cincinnati, dealers..	10.00-10.50
Cleveland, no alloy.	13.50-14.00
Detroit	†11.00-11.50
Eastern Pa.	14.50
Los Angeles	4.00- 5.00
New York	†10.50-11.00
Pittsburgh	15.50-16.00
St. Louis	10.75-11.25
San Francisco	5.00
Toronto, dealers....	†8.75- 9.00
Valleys	15.50-16.00

SHOVELING TURNINGS

Buffalo	15.00-15.50
Cleveland	14.50-15.00
Chicago	14.25-14.75
Chicago, spcl, anal..	15.50-16.00
Detroit	†12.00-12.50
Pitts., alloy-free....	17.00-17.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	†8.50- 9.50
Buffalo	14.50-15.00
Cincinnati, dealers..	9.25- 9.75
Cleveland	16.00-16.50
Eastern Pa.	14.00
Detroit	†12.00-12.50
New York	†10.50-11.00
Pittsburgh	16.00-16.50
Toronto, dealers....	†8.75- 9.00

AXLE TURNINGS

Buffalo	16.50-17.00
Boston district.....	†12.50-13.00
Chicago, elec. fur...	20.00-20.50
East. Pa. elec. fur..	19.50-20.00
St. Louis	13.50-14.00
Toronto	†7.75- 8.00

CAST IRON BORINGS

Birmingham	8.50
Boston dist. chem...	†10.75-11.25
Buffalo	14.50-15.00
Chicago	13.75-14.25
Cincinnati, dealers..	9.25- 9.75
Cleveland	16.00-16.50
Detroit	†12.00-12.50
E. Pa., chemical....	15.50-16.00
New York	†11.50-12.00
St. Louis	11.00-11.50
Toronto, dealers....	†8.75- 9.00

RAILROAD SPECIALTIES

Chicago	23.00-23.50

ANGLE BARS—STEEL

Chicago	23.00-23.50
St. Louis	21.25-21.75

SPRINGS

Buffalo	25.00-25.50
Chicago, coil	24.00-24.50
Chicago, leaf	23.50-24.00
Eastern Pa.	26.00-26.50
Pittsburgh	27.00-27.50
St. Louis	21.50-22.00

STEEL, RAILS, SHORT

Birmingham	20.00
Buffalo	27.00-27.50
Chicago (3 ft.)....	23.25-23.75
Chicago (2 ft.)	24.25-24.75
Cincinnati, dealers..	25.25-25.75
Detroit	†22.50-23.00
Pitts., 2 ft. and less	26.00-26.50
St. L. 2 ft. & less..	23.50-24.00

STEEL RAILS, SCRAP

Birmingham	18.00
Boston district.....	†15.75-16.00
Buffalo	22.00-22.50
Chicago	19.00-19.50
Cleveland	24.00
Pittsburgh	24.00-24.50
St. Louis	19.50-20.00
Seattle	18.00-18.50

PIPE AND FLUES

Chicago, net	14.00-14.50
Cincinnati, dealers..	13.25-13.75

RAILROAD GRATE BARS

Buffalo	14.50-15.00
Chicago, net	13.75-14.25
Cincinnati, dealers.	12.75-13.25
Eastern Pa.	19.00-19.50
New York	†13.00-13.50
St. Louis	14.00-14.50

RAILROAD WROUGHT

Birmingham	16.00
Boston district.....	†11.75-12.25
Eastern Pa., No. 1..	20.50-21.00
St. Louis, No. 1....	14.00-14.50
St. Louis, No. 2....	16.25-16.75

FORGE FLASHINGS

Boston district	†13.25-13.50
Buffalo	18.50-19.00
Cleveland	18.50-19.00
Detroit	†16.50-7.00
Pittsburgh	20.00-20.50

FORGE SCRAP

Boston district	†12.75-13.00
Chicago, heavy	23.50-24.00

LOW PHOSPHORUS

Buffalo, plates	26.00-26.50
Cleveland, crops....	26.00-26.50
Eastern Pa., crops..	25.50-26.00
Pitts., billet, bloom, slab crops	27.00-27.50
Toronto, dealers ...	13.50-14.00

LOW PHOS. PUNCHINGS

Buffalo	25.00-25.50
Chicago	23.50-24.00
Cleveland	22.00-22.50
Detroit	†18.75-19.25
Eastern Pa.	25.50-26.00
Pittsburgh	26.50-27.00
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	19.00
Boston	†18.50-19.00
Chicago	24.00-24.50
New York	†19.50-20.00
Eastern Pa.	26.00-26.50
St. Louis.....	22.00-22.50

STEEL CAR AXLES

Birmingham	18.00
Boston district	†20.00-20.50
Chicago, net	24.75-25.25
Eastern Pa.	27.50-28.00
St. Louis	25.75-26.25

LOCOMOTIVE TIRES

Chicago (cut)	23.50-24.00
St. Louis, No. 1....	19.50-20.00

SHAFTING

Boston district	†19.50-19.75
New York	†21.00-21.50
Eastern Pa.	25.00-25.50
St. Louis, 1¼-3¾"..	19.50-20.00

CAR WHEELS

Birmingham iron...	18.00
Boston dist., iron...	†16.50-17.00
Buffalo, steel	24.50-25.00
Buffalo iron	20.50-21.00
Chicago, iron	20.00-20.50
Chicago, rolled steel	22.75-23.25
Cincin., iron deal...	19.50-20.00
Eastern Pa., iron...	23.00-23.50
Eastern Pa., steel...	26.00-26.50
Pittsburgh, iron ...	22.00-22.50
Pittsburgh, steel...	27.00-27.50
St. Louis, iron	21.00-21.50
St. Louis, steel	21.50-22.00

NO. 1 CAST SCRAP

Birmingham	18.50
Boston, No. 1 mach.	†18.00-19.00
N. Eng., del. No. 2..	19.00-19.25
N. Eng. del. textile	22.00-23.00
Buffalo, cupola	20.50-21.00
Buffalo, mach.....	22.00-22.50
Chicago, agri. net..	16.00-16.50
Chicago, auto net..	18.50-19.00
Chicago, railr'd net.	17.50-18.00
Chicago, mach. net.	20.00-20.50
Cincin., mach. deal..	21.50-22.00
Cleveland, mach....	24.00-24.50
Detroit, cupola, net.	†17.50-18.00
Eastern Pa., cupola.	24.00-24.50
E. Pa., No. 2.....	20.50
E. Pa., yard fdry...	20.50-21.00
Los Angeles	16.50-17.00
Pittsburgh, cupola..	22.50-23.00
San Francisco	14.50-15.00
Seattle	14.00-15.00
St. L., agri. mach...	19.50-20.00
St. L., No. 1 mach...	20.50-21.00
Toronto No. 1 mach., net dealers	†21.50-22.00

HEAVY CAST

Boston dist. break..	†16.50-16.75
New England, del...	20.00-20.50
Buffalo, break.....	18.00-18.50
Cleveland, break, net	18.50-19.00
Detroit, auto net...	†18.00-18.50
Detroit, break.	†16.00-16.50
Eastern Pa.	22.50
Los Ang., auto, net.	13.00-14.00
New York break...	†17.00

STOVE PLATE

Birmingham	13.50
Boston district	†14.50-15.00
Buffalo	17.50-18.00
Chicago, net	14.00-14.50
Cincinnati, dealers.	13.00-13.50
Detroit, net	†11.00-11.50
Eastern Pa.	19.00-19.50
New York fdry.	†14.00-14.50
St. Louis.....	15.00-15.50
Toronto dealers, net.	†17.50-18.00

MALLEABLE

New England, del...	22.00-23.00
Buffalo	24.00-24.50
Chicago, R. R.	23.50-24.00
Cincin. agri., deal...	18.00-18.50
Cleveland, rail	25.00-25.50
Eastern Pa., R. R....	23.00-23.50
Los Angeles	12.50
Pittsburgh, rail	25.50-26.00
St. Louis, R. R.....	21.50-22.00

Ores

Lake Superior Iron Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer..	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract..	10.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Chinese wolframite, net ton, duty pd..	$23.50-24.00
Brazil iron ore, 68-69%, ord.....	7.50c
Low phos. (.02 max.)	8.00c

F.O.B. Rio Janeiro.

Scheelite, imp.	23.50-24.00
Chrome ore, Indian, 48% gross ton, cif.	$36.00-37.00

Manganese Ore

Including war risk but not duty, cents per unit cargo lots.

Caucasian, 50-52% ..	.....
So. African, 48%...	57.00-60.00
Indian, 49-50%	60.00-63.00
Brazilian, 46%	53.00-54.00
Cuban, 50-51%, duty free	67.50

Molybdenum

Sulphide conc., lb., Mo. cont., mines..	$0.75

Sheets, Strip

Sheet & Strip Prices, Pages 96, 97

Pittsburgh—In spite of increasing demand for galvanized products, operations last week dropped three points to 78 per cent of capacity. Sheet mill output is around 90 per cent of capacity, still running behind incoming specifications. Deliveries have been falling behind promised dates in some cases over the past two weeks.

Cleveland—Sales are being made into late second quarter and early third, with no slowing of new orders. Many companies find February sales better than in January, marking several months of unbroken gains. Alloy sheets are increasingly difficult to buy for any delivery because of scarcity of alloying materials. A company which a week ago was holding back orders from branch offices to allow main office to catch up, is again receiving them. A few companies report some easing in demand.

Chicago—Orders for sheets and strip are still exceeding expectations due partly to abnormally high requirements of the automobile industry which is setting new assembly records for February. Galvanized, hot-rolled and cold-rolled sheets have advanced from 14 to 15 weeks to 18 to 20 weeks; strip mill sheets from 10 to 12 weeks to 12 to 15 weeks; strip, 2½ inches and under, from 15 to 17 weeks to 4 to 5 months; and wide strip, 2½ to 8 inches, from 10 to 12 weeks to 13 to 15 weeks.

Boston—Continued heavy buying of narrow cold strip maintains backlogs and rerolling operations with deliveries extended into third quarter on some finishes. Hot strip deliveries, notably alloys, are more uncertain, which is reflected in cold processing operations. Sheet buying is active with consumers and distributors short on some finishes, especially galvanized.

New York—Many sheet buyers are anticipating requirements through third quarter and in some cases into fourth quarter. This is said to be particularly true of jobbers, who have been particularly alert in anticipating needs. Some mills, however, are not quoting as far ahead as fourth quarter at this time.

Substitution of chromium-molybdenum for some narrow cold strip products is being undertaken co-operatively by some producers and consumers to ease the tight situation in nickel supplies for stainless and other alloys. Cold strip bookings continue heavy and well above capacity.

Philadelphia — Mills still encounter difficulty in maintaining shipments on schedule, partly from

precedence for defense orders. Buyers are pressing for delivery, although minor delays so far have not proved serious. Orders for future requirements continue to accumulate, such business being largely for third quarter shipment. Some fourth quarter tonnage is being entered.

Cincinnati — Sheet orders continue unabated, with more interest in third quarter tonnage. Books of one mill, closed temporarily for second quarter, have been reopened. Priority orders are increasing. Even with apportionment of tonnage mill schedules for first half are nearly filled.

St. Louis—Despite capacity operations and unusually heavy shipments, backlogs of sheet and strip continue to expand. Orders show no sign of receding, as all classes of users endeavor to protect themselves. Second quarter books are being gradually filled.

Birmingham, Ala.—Sheet bookings have increased within the past two weeks, and production continues at virtual capacity in all lines, especially manufacturers' sheets. The strip mill is busy, and orders are heavy.

Toronto, Ont.—Sheet sales show a further upward movement, with buying almost exclusively for war uses. Sheet metal companies with large war orders on hand are more prominent buyers and in addition further heavy contracts are coming out from the automotive industry and electrical equipment makers. Mills report steadily piling up of orders for long term delivery, most new booking being for third quarter.

Youngstown, O.—Makers or hot and cold-rolled strip are fairly solidly booked with specifications for two months, in some widths through second quarter. Makers of stainless strip are handicapped in instances by lack of necessary component materials, especially some electric furnace alloymakers.

Plates

Plate Prices, Page 96

Pittsburgh—Plate mills report increased activity from shipbuilders. Releases have been more general and in larger volume than previously, although in many cases delivery dates are well into second half. Backlogs are gaining as incoming tonnage is considerably ahead of current shipments. Deliveries remain tightest on alloy plates.

Cleveland — Some makers have withdrawn from the market on universal plates, having withdrawn a few weeks previously on sheared plates. Only floor plates are still in free supply and deliverable promptly. Inquiry is still brisk and it is difficult to get delivery on current orders before third quarter.

Chicago—Outlook for new plate work is not bright with deliveries becoming more extended. Fabricators of boilers, tanks, and heavy construction are operating at capacity. Sheared plates are now offered in 15 to 17 weeks, wider plates 5 to 6 months, and universal plates 15 to 17 weeks.

Boston—While shipbuilding accounts for most plate specifications, miscellaneous requirements are heavier with deliveries extended, notably on wider widths and alloys. Boiler shops are placing more volume for fabrication of allied products and demand for lighter plates for small tanks is maintained. Structural shops are buying sparingly and railroads in the main are specifying for maintenance only.

New York — Plate mill backlogs continue to accumulate, with deliveries on sheared plates running well into third quarter and on some heavier and wider sizes beyond that. Railroad specifications are again taking a spurt and oil company demand is being stepped up sharply, along with increasing amount of ship specifications.

Philadelphia — Plates continue tight as a consequence of growing needs for defense. Deliveries on wider sizes extend into July and August, and on some extreme dimensions mills find it difficult to make a definite shipping promise. Additional ship plate orders are being received, a portion being for fall delivery.

Birmingham, Ala.—Current plate orders are close to shipments with considerable insistence on deliveries. Large backlogs have been almost untouched in some instances.

Seattle—The shipbuilding industry is the heaviest plate purchaser, large tonnages having been placed and others soon to be awarded. Smaller fabricating shops have subcontracts from shipyards and many jobs involving small tonnages are being placed.

San Francisco—While awards of plates were not heavy some favorable tonnages are expected to be released for figures soon. No award has been made on 3500 tons for penstocks for the Pacific Gas & Electric Co., San Francisco.

Toronto, Ont—Plate orders are being placed at a rapid rate, most buying being done outside Canada. Canadian producers are fully booked to the end of the year. Large tonnages are being placed for new type war tank construction, most of which is in armor plate.

Youngstown, O.—Plate mills are being loaded with ship plate overflow from eastern mills by yards building government cargo ships. Miscellaneous plate orders also are being taken care of, being second only to steel bars.

Plate Contracts Placed

27,318 tons, also 460 tons, steel bolts and washers, fabricated steel plates, including large quantities of three-inch, Panama, schedule 4762, additional lock construction, to Bethlehem Steel Export Corp., New York, $3,592,967; deliveries starting April 1 and extending to Jan. 15, 1942; bids Feb. 10, Washington.

165 tons, black structural steel plates, Panama, schedule 4763, to Bethlehem Steel Export Corp., New York; bids Feb. 10, Washington.

Bars

Bar Prices, Page 96

Pittsburgh — No bar capacity is open for second quarter here, with the possible exception of small tonnages which may fit into rolling schedules and material which might be shipped out of warehouse stocks. Standard carbon bars cannot now be delivered much before the end of June, cold-finished carbon steel bars run well into third quarter, and delivery on alloy products is virtually out of sight unless extreme need in connection with the defense program is a condition of the order.

Cleveland — Inquiries have not abated. Whereas usually large sales are made up from many small individual orders, numerous large tonnage orders are now received. Sales volume increases rather than otherwise and February shipments also promise to be large. Priority orders are only moderate.

Chicago—Bar orders continue to increase and further tighten deliveries. Local mills for the most part name July and August for delivery on most grades and sizes, although some sizes in alloy bars can be had in eight to ten weeks. Priority requests still are so infrequent as to cause no trouble.

Boston—With heavy forward orders placed and deliveries extending into third quarter, buying of carbon and alloy steel bars is somewhat more orderly. Specifications are substantial, with more volume developing for defense contracts, notably small arms. Alloy material for forgings is active, shops producing for the aircraft industry covering well ahead. Tool steel demand is maintained by machinery builders.

New York—Few sellers of carbon bars have much to offer before Aug. 1 and buyers are anticipating needs in some cases into fourth quarter, particularly jobbers. Alloy bar schedules are even more extended and where bars are to be given special heat treatment, deliveries run beyond the end of the year. One feature of current demand is the increasing number of small manufacturers in the market, indicating that defense work is now

being felt by the smaller interests as well as the larger.

Philadelphia — June delivery is available on some sizes of carbon bars, but most second quarter capacity already has been absorbed, and July or later usually is named on both carbon and alloy material. Heavy tonnages are moving through warehouses as a consequence of increased requirements of smaller consumers. Extension of forward buying partially reflects the projection of manufacturing schedules which gives consumers a more accurate idea of future needs.

Birmingham, Ala.—With concrete reinforcing bars the most active item, bar business is holding exceptionally close to the high mark of the early days of the quarter. Merchant bars are in consistent demand, and backlogs are large. Production approximates capacity.

Buffalo—A growing volume of bar orders on priority rating is reducing tonnage to nondefense consumers. As a result, mills are turning down an increased volume of forward inquiry.

Toronto, Ont.—Following a minor recession in merchant bar sales orders in large volume again are appearing. Demand is widely diversified. Mill orders now run to the end of the first half, although on some lines delivery dates are available late in May.

Youngstown, O.—Hot rolled carbon steel bar mills continue under increasing pressure for deliveries, bessemer auxiliaries being brought into service to increase output. Specifications are being received for deliveries as far ahead as July and August.

Pipe

Pipe Prices, Page 97

Pittsburgh—Buying in oil country tubular goods continues to increase. Standard pipe production continues at virtual capacity. Shipments to consigned stocks are being made as rapidly as possible, although most jobbers, particularly in eastern section, report orders are running ahead of receipts from mills.

Cleveland — Despite heavy drain on merchant pipe stocks are well rounded, though producers are turning away more business constantly, confining it to regular customers and standard patterns. There is tendency to avoid contracts which involve elaborate accessories, which are not strictly standard. Line pipe demand is especially brisk for this season as consumers wish to anticipate shortages. Casings are one of the few slow departments.

Boston—Resale merchant steel pipe prices, while tending to improve, are still shaded at some

points, despite generally firm mill quotations. Buying is seasonally slack, but better than normal for this period with prospects for improvement next month. Considerable tonnage of steel pipe remains to be bought for construction.

New York—The outlook in line pipe is more promising, with a 100,000-ton project in Tennessee said to be under contemplation. Meanwhile, merchant pipe business is showing improvement, with sellers generally looking for steady increase well into spring. Deliveries are still fairly good, except in the case of mechanical tubing, where shipments extend many weeks.

Birmingham, Ala. — Pipe buying has proved surprisingly consistent. Mills are well booked on smaller sizes from miscellaneous sources, and inquiries are numerous.

San Francisco—No cast iron pipe awards of size were reported but small lots or carloads and less than carload lots continue in heavy demand. Cast iron pipe awards, so far this year, aggregate 4913 tons, compared with 3813 tons for the same period last year.

Cast Pipe Placed

500 tons, 4 to 8-inch, La Mesa, Lemon Grove and Spring Valley irrigation district, La Mesa, Calif., to United States Pipe & Foundry Co., Burlington, N. J. 119 tons, 6 and 12-inch, Ventura, Calif to American Cast Iron Pipe Co., Birmingham, Ala.

Cast Pipe Pending

950 tons, 2 to 10-inch, River Road district, Eugene, Oreg.; bids to E. E. Martin, secretary, Feb. 27.

425 tons, 2 to 8-inch, Menlo Park district, Portland, Oreg.; bids to George E. Birnie, 1012 Spalding building, March 3.

103 tons, 8 to 12-inch, Anaheim, Calif.; United States Pipe & Foundry Co., Burlington, N. J., low.

100 tons plus, 4 to 10-inch, for Ampere; bids to Bonneville Project, Portland, Feb. 24.

Unstated, 2000 feet of 14 and 16-inch, supply line, Hoquiam, Wash.; bids soon; Walter L. Lovejoy, superintendent.

Steel Pipe Pending

730 tons, 1-inch pipe or tubing, Bureau of Reclamation, for delivery at Coram, Calif.; Laclede Steel Co., St. Louis, low.

Rails, Cars

Track Material Prices, Page 97

Active car and locomotive buying continues as carriers prepare for heavy demands on equipment. In a number of cases cars are being let to the roads' own shops, although carbuilders still have capacity. Rail buying is light, only an occasional tonnage being placed. Rail mills are making deliveries as rapidly as material is needed, although demand for steel for other purposes may cause some delay later.

Car Orders Placed

Army and Navy, 53 box cars, to Greenville Steel Car Co., Greenville, Pa.

Canadian National Railways, 825 freight cars, distributed as follows: 150 fifty-ton ballast cars and 125 eighty-ton ore cars, to National Steel Car Corp., Hamilton, Ont.; 200 fifty-ton flat cars, to Canadian Car & Foundry Co. Ltd., Montreal; 250 seventy-ton hopper cars, to Eastern Car Co. Ltd. New Glasgow, N. S.; and 100 forty-ton refrigerator cars, to its own shops in Winnipeg, Man.

Central Railroad of New Jersey, 500 hopper cars and 25 caboose cars to the Reading, Pa., shops of the Reading Co., its affiliated line, subject to court approval.

Chesapeake & Ohio, 25 seventy-ton all-steel flat cars, to Ralston Steel Car Co., Columbus, O.; ten 125-ton all-steel flat and ten 125-ton allsteel well cars, to Greenville Steel Car Co., Greenville, Pa.

Chicago, Milwaukee, St. Paul & Pacific, 500 box, 25 caboose and six well flat cars, to own shops.

Lake Superior & Ishpeming, 100 fifty-ton ore cars, to Bethlehem Steel Co., Bethlehem, Pa.

St. Louis Refrigerator Car Co., 35 lightweight refrigerator cars, to own shops.

Utah Copper Co., 75 ore cars, to Pressed Steel Car Co., Pittsburgh.

Car Orders Pending

Baltimore & Ohio, 1400 freight cars, including 1000 fifty-ton hopper cars 250

fifty-ton auto cars, and 150 seventy-ton covered cement cars; bids asked.

Chicago, Burlington & Quincy, 1500 fifty-ton box cars; 225 fifty-ton automobile cars; 200 fifty-ton hopper cars; bids March 8.

National Tube Co., 44 to 100 seventy-ton gondolas; inquiry issued.

United States Navy, 15 fifty-ton flat cars, American Car & Foundry Co., New York, low bidder; the cars are for the Brooklyn navy yard.

Wabash, 150 automobile cars, 50 gondolas, 16 cabooses; court permission granted.

Locomotives Placed

Maine Central, two diesel-electric switch engines, one of 600-horsepower going to American Locomotive Co., New York, and one of 380-horsepower to General Electric Co., Schenectady, N. Y.

New York, New Haven & Hartford, five electric freight locomotives, to Westinghouse Electric & Mfg. Co., Pittsburgh.

Locomotives Pending

Baltimore & Ohio, four diesel-electric passenger locomotives; purchase authorized.

Grand Trunk Western, 25 locomotives; bids asked.

Minnesota Transfer, three diesel-electric switchers; bids asked.

Rail Orders Placed

Bangor & Aroostook, 1633 tons, to Bethlehem Steel Co., Bethlehem, Pa.

Buses Booked

A.c.f. Motors Co., New York: Fourteen for Eastern Massachusetts Street Railway Co., Boston; sixteen for Florida Motor Lines Corp., Jacksonville, Fla.; eight for Oahu Railway & Land Co., Honolulu, T. H.; six for Union Bus Co., Jacksonville, Fla.

J. G. Brill Co., New York: Twelve 44 passenger single-motor trackless trolley coaches for Akron Transportation Co., Akron, O.

Twin Coach Co., Kent, O.: Twenty-three 31-passenger for Rochester Transit Corp., Rochester, N. Y.; ten 31-passenger for Winnipeg Electric Co., Winnipeg, Man.; seven 31-passenger and three 35-passenger for Columbus & Southern Ohio Co., Columbus, O.; seven 27-passenger for Arkansas Power & Light Co., Pine Bluff, Ark.; six 31-passenger for Northern Indiana Transit, Inc., South Bend, Ind.; six 31-passenger for Tri-City Railway Co. of Illinois, Rock Island, Ill.; five 27-passenger for Mill Power Supply Co., Charlotte, N. C.; three 42-passenger for Co-Operative Transit Co., Wheeling, W. Va.; two 31-passenger for South Bend Motor Bus Co., South Bend, Ind.

Wire

Wire Prices, Page 97

Pittsburgh—Principal new activity is in merchant wire products, arising from jobber buying for the agricultural market. Manufacturers' wire buying still strong, releases being active from automotive industries and farm equipment manufacturers.

Chicago — Principal specifications are for manufacturers' wire of all types. Demand is expected to increase with spring and accelerated construction in connection with national defense projects.

Boston—Volume of incoming wire tonnage to New England mills continues heavy and in the aggregate ahead of production and shipments. Deliveries are further expanded, notably on specialties, orders for which are brisk. Rod supplies continue tight, notably alloys, while in a few instances lack of zinc handicaps efforts to meet galvanizing specifications.

New York — Mills in some instances are turning down business with orders in unabated volume. Others are not quoting on galvanized and some orders have been canceled by one producer. Wire rod supply is limited, notably on alloys, with more priorities appearing.

Birmingham, Ala. — The Ensley wire mill is on a full schedule, with production at capacity. Manufacturers' wire, fencing, nails and other items are being turned out in volume, most of it moving immediately, although some restocking is being done.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 97

Cleveland — February sales and shipments are running ahead of

January. Sales are being increasingly limited to regular customers. Some makers complain of a shortage of alloy steel.

Shapes

Structural Shape Prices, Page 96

Pittsburgh—Virtually all inquiry for shape tonnage over the past month has been for defense work. There is no improvement in delivery. There has been considerable difficulty in getting projects through the engineering stage, but currently more business is available than can be shipped.

Cleveland—Though inquiry and orders are comparatively light much work still is being planned. Largest order was for 3500 tons for an airparts manufacturer at Cleveland. It is reported that the government is no longer inviting open bids on some 15,000 tons of structurals out of 20,000 tons for Ravenna, O., having awarded all to a fabricator who had been consistently low bidder on the first buildings constructed.

Chicago—Awards for structural steel are at the lowest point in recent weeks. Numerous large jobs are pending, most being for national defense plans. Fabricators are delayed in obtaining material as mills have long backlogs and can offer only 13 to 15 weeks delivery, an extension of a week.

Boston—Structural steel inquiry and contracts are temporarily lower, private industrial expansion in connection with defense being lighter. Most of 30,000 tons or more for the Fore river shipyards, Quincy, Mass., has been placed. Plain material deliveries range from eight to 10 weeks.

New York—Indications are structural steel bookings in February will approximate 275,000 tons and shipments will be relatively as large. Pressure for fabricated material for defense plants during the next two months will be unusually heavy, but there are indications of some letdown in second quarter, although probably late in that period.

Philadelphia—While deliveries on plain shapes have not improved, shipments are about holding their own. Reduced volume of fabricated material inquiries points to eventual improvement in structural shipments, but this may be slow in view of urgent need for steel in rolling other products. Most recent inquiries and awards have been for small lots.

San Francisco — The structural steel shape market was the most active one of the week and 1462 tons were booked. This brought the aggregate for the year to 119,679 tons, compared with 39,975 tons for the same period a year ago. The outlook on the Pacific Coast from the fabricators' standpoint is most encouraging and much new work is being subdivided between several shops.

Shape Contracts Placed

3500 tons, plant, Thompson Aircraft Products Corp., Cleveland, to Burger Iron Works, Akron, O.

2700 tons, finished ammunition buildings, ordnance plant, war department, Dayman, Iowa, to Illinois Steel Bridge Co., Jacksonville, Ill.

2250 tons, two bridges, Delaware & Hudson railroad, Fort Edward, N. Y., to American Bridge Co., Pittsburgh.

1800 tons, powerhouse extension and al-

Shape Awards Compared

	Tons
Week ended Feb. 22	23,782
Week ended Feb. 15	21,129
Week ended Feb. 8	31,960
This week, 1940	14,121
Weekly average, 1941	41,618
Weekly average, 1940	28,414
Weekly average, Jan.	51,215
Total to date, 1940	145,685
Total to date, 1941	332,941

Includes awards of 100 tons or more.

terations, Public Service Electric & Gas Co., Burlington, N. J., to B. Katchen Iron Works, Newark, N. J.

750 tons, addition, International Graphite Co., Niagara Falls, N. Y., to the Bethlehem Steel Co., Buffalo.

655 tons, plate shop, California Shipbuilding Co., Los Angeles, to Consolidated Steel Corp., Los Angeles.

600 tons, unit 6, Philadelphia Electric Co. power station, Chester, Pa., to Lehigh Structural Steel Co., Allentown, Pa.

585 tons, building, Singer Manufacturing Co., Elizabethport, N. J., to American Bridge Co., Pittsburgh.

425 tons, Mokelumne River bridge, San Joaquin county, Calif., for state, to Minneapolis-Moline Power Implement Co., Minneapolis.

400 tons, live poultry market buildings, Queens, N. Y., to Schact Steel Construction Co., New York, through Lieb Construction Co., New York.

350 tons, municipal airport, Little Rock, Ark., to Arkansas Foundry Co., Little Rock, Ark.

325 tons, building, Bell Telephone Co., Youngstown, O., to American Bridge Co.

300 tons, bridge, A-122.5, Erie, Kans., Missouri, Kansas & Texas railroad, to American Bridge Co., Pittsburgh.

285 tons, state highway bridge, Medford, Okla., to Capital Iron Works Co., Topeka, Kans.; bids Dec. 17.

260 tons, storage building, Iona Island, New York, to Deleson Steel Co., Englewood, N. Y.; Jonwall Construction Co., New York, contractor.

225 tons, warehouses, navy yard, Portsmouth, N. H., to Waghorne-Brown Co., Boston; Bethlehem Fabricators, Bethlehem, Pa., to fabricate.

204 tons, Pepsi Cola bottling plant, General Bottlers Inc., Chicago, to Wendnagel & Co., Chicago.

190 tons, alterations, Philadelphia Art Museum, to Frank M. Weaver & Co. Inc., Lansdale, Pa.

165 tons, bridge, Monroe county, Pennsylvania, to Anthracite Bridge Co., Scranton, Pa.

165 tons, axle shop addition and heat treating alterations, American Locomotive Co., Schenectady, N. Y., to American Bridge Co., Pittsburgh.

150 tons, building, American Cyanamid & Chemical Corp., Bound Brook, N. J., to American Bridge Co., Pittsburgh.

120 tons, post office, Jackson Park, Chicago, to Harrison Iron Works, Chicago; William R. Gross Co., Chicago, contractor; bids Oct. 25.

120 tons, Panama, schedule 4763, omitting item 65, to Bethlehem Steel Export Corp., New York.

108 tons, state bridge, Columbia county, Wisconsin, Roger Van Vechten Co., contractor, to Lakeside Bridge & Steel Co., Milwaukee.

100 tons or more, barracks and quarters, Corozal, Panama, to Decatur Iron & Steel Co., Decatur, Ala.; MacDonald Bros. Construction Co., St. Louis, contractor; Bethlehem Steel Co., Bethlehem, Pa., awarded reinforcing steel.

Shape Contracts Pending

6200 tons, bomber assembly plant, to be operated by Glen L. Martin Co. for war department, Omaha, Neb.; Peter Kiewit Sons Co. and George W. Condon Co., Omaha, Neb., and Woods Bros. Construction Co., Lincoln, Neb.; contractors, bids March 6.

6000 tons, 460,000 feet of curbing, Brooklyn and Manhattan, New York.

3500 tons, manufacturing building, etc., for Defense Plant Corp., Euclid, O.

3000 tons, ordnance plant, Milan, Tenn.; bids Feb. 19.

3000 tons, construction trestle, Norfolk dam, Norfolk, Ark., for government.

1300 tons, three buildings, fleet base, Long Beach, Calif., for navy.

1000 tons, public school No. 25, Brooklyn, N. Y.

900 tons, state bridge No. 5950, St. Paul, Minn.

800 tons, sheet steel piling, turning basin, Cuyahoga river straightening, Great Lakes Dredge & Dock Co., Cleveland, contractor.

730 tons, sheet steel piling, flood control, Massillon, O.; bids March 27, U. S. engineers.

600 tons, addition, Sterling Engine Co., Buffalo.

600 tons, addition to sheet metal plant No. 10, Chevrolet Motor division, General Motors Corp., Flint, Mich.

600 tons, diversion dam and cofferdam, Neversink, N. Y., to George M. Brewster & Son Inc., Bogota, N. J., low.

550 tons, bridges and repairs, various locations, Chicago, Milwaukee, St. Paul & Pacific railroad.

500 tons, Chrysler building, San Leandro, Calif.; Engineers, Ltd., San Francisco, contractor.

500 tons, curb angles, New York City Department of Purchase; Phoenix Bridge Co., Phoenixville, Pa., low.

395 tons, Government dam project, Paducah, Ky.; C. E. Carson Co., Chicago, contractor.

350 tons, bridge No. 2.55, New Haven, Conn., New York, New Haven & Hartford railroad.

350 tons, Mariners Harbor yard, Staten Island Shipbuilding division, Bethlehem Steel Co., Bethlehem, Pa.

350 tons, cyclotron building, University

Behind the Scenes with STEEL

People You Should Know

Bobbing in and out of metalworking plants these days, trying to get a minute with the boss, who is supposed to be the big guns, most of us are apt to brush right past some of the real personalities of this whole defense program. Here, for instance, are a few of the characters we ran into last week just scouting around town for a couple of days:

■ Bottle-Neck Van—who runs the little shack at the North truck entrance. He knows his job of minutely examining identification cards and passes is an important one, and he lives and looks the part. Van likes nothing better than to see a half-dozen or so big trucks lined up waiting to get in and deliver rush "priority" material. The traffic manager recently traced a rush steel shipment right out to Van's little shack. The trucker overheard the conversation outside, grabbed the phone and delightedly explained to the peeved t.m. that he had been waiting to get in exactly five minutes longer than he had been enroute from the warehouse.

■ Sloppy Joe—the slightly stuttering Dutchman, who dishes out bum hamburgers from his rickety old lunch wagon just outside the south gate. Inevitably tagged with the adjective, Joe's real name is not Joe at all, but Roderick. In all the hustle of concocting "burgers" for the boys, Joe dispenses cheerfulness worth much more than a dime and lets the noontime jabber drift in one ear and out the other, and wouldn't even admit to knowing what CIO stood for.

■ One Ten Thousandths Mac—the Navy inspector, whose stentorian voice is known to scores of defense-industries plants. That, in fact, is his real badge of authority, and they say you can hear him sometimes above the roar of an acre of metalworking machinery at full tilt. His favorite trick is trying to scoot past the receptionist girls without getting out his pass; and then bawling them out if they don't catch him, or bawling them out if they catch him too quick.

■ Ikey, the Rooshian—whose only misfortune is having a name ending in "ski" and a thick accent. He operates a sand-sifting machine in a brass foundry. Likeable and sincere, his knowledge of the English language is pretty bad, and one day in the cafeteria he said, "De Nazis delighted me," when he really meant he disliked them plenty. For a long while he suffered in silence, shunned and hurt, until an understanding foreman cleared up the mystery. The boys in the foundry all know now that Ikey is about as fine an American as any of them, and he's the pet of the whole department.

■ Eddie, the G-Man—who has flashing eyes and wears a huge, tweed cap, is a floor-sweeper and the story got around that he was a government man planted to ferret out any fifth-column work in the shop. He thoroughly enjoys his new role, and commands respect and admiration that border on worship. The boys go to work double quick to show for sure they're not slow down artists, as he moves quietly down the long aisles with his push-broom, glancing up meaningfully from the rim of his giant cap.

■ There are dozens of others, too, like big, black "Wash" Adams who is floor man for the crane in the core room, and who talks a good brand of communism in the shower room; "J. T.", the bull-of-the-woods foreman of the assembly line, who wakes up every morning with a sour stomach and doesn't like any part of this whole blamed defense program; and "Porky" in the pickling room; or the young engineer from state college; or Tom, the office boy, who knows more about Spitfires than the R. A. F.

■ We'll be sorry, in a way, when this war is over and England wins because it's made so many of us aware of being an American. But maybe it will all be carried over in a continuing spirit of co-operation that we'll surely need.

Shrdlu.

of California, Berkeley, Calif.; Moore Drydock Co., Oakland, Calif., low.

310 tons, machine shop additions, Atlantic Basin Iron Works, Brooklyn, N. Y.

275 tons, widening bridge, New York Central railroad, Bronx, New York.

225 tons, office building, for Remington-Rand Co., Ilion, N. Y.

200 tons, sheet steel piling, river improvement, Sherwin Williams Co., Cleveland; bids in.

200 tons,, asphalt plant, Manhattan N. Y.; Lane Engineering Co., New York, low.

175 tons, exchange additions, Bell Telephone Co., New Kensington, Pa.

170 tons, building, Galion Metallic Vault Co., Galion, O.; bids Feb. 22.

150 tons, torpedo storage building, ammunition depot, Hawthorne, Nev., for navy.

125 tons, state bridge, contract No. 2124, Montezuma, Ind.

120 tons, bridge, Springfield, Mass., for army.

115 tons, bridge repairs, Illinois and Indiana, Chicago & Eastern Illinois railway.

110 tons, warehouse, Thatcher Mfg. Co., Elmira, N. Y.

100 tons, building, Euclid Road Machinery Co., Euclid, O.

100 tons, boiler house, Fort Lewis, Wash.; bids in.

Reinforcing

Reinforcing Bar Prices, Page 97

Pittsburgh — Pending tonnage in connection with the defense program is heavy. A large part of the projected work has not reached the stage in which steel would be ordered as there is considerable delay on the drafting boards. Prices are strong in all sections, both on new billet and rail bars.

Chicago—Activity in reinforcing materials has eased, with fewer awards, for smaller tonnages. Most current activity is in connection with government construction for national defense.

Seattle—No large tonnages are pending but numerous small projects are bringing out a large aggregate of orders. Rolling mills are working to capacity as lettings of the last 60 days have been exceptionally heavy.

San Francisco—Few inquiries of size have developed in the reinforc-

Concrete Bars Compared

	Tons
Week ended Feb. 22	10,325
Week ended Feb. 15	6,238
Week ended Feb. 8	13,771
This week, 1940	2,155
Weekly average, 1941	10,212
Weekly average, 1940	9,661
Weekly average, Jan.	10,272
Total to date, 1940	61,317
Total to date, 1941	81,693

Includes awards of 100 tons or more.

ing steel bar market. Movement of small lots predominates and constitutes the majority of awards. These totaled 266 tons, bringing the aggregate to date to 9281 tons, compared with 14,762 tons for the corresponding period in 1940.

Reinforcing Steel Awards

2000 tons, naval powder storage plant, Burns City, Ind., Maxon Construction Co., Dayton, O., to Inland Steel Co., Chicago.

1200 tons, Capitol street armory, Washington, to Bethlehem Steel Co., Bethlehem, Pa.; Charles H. Tompkins, contractor.

1000 tons, Gilmore Homes housing, Baltimore, to Republic Steel Corp., Cleveland, through Capitol Steel Corp., of New York; Woodcrest & Rosoff, contractors.

900 tons, defense housing units, Borinquen Field, Aguidilla, R. R., and housing units, Fort Buchanan, San Juan, P. R., to Virginia Steel Co., Richmond, Va.; Hillyer & Lovan, Jacksonville, Fla., contractors.

700 tons, receiving barracks, navy yard, Brooklyn, N. Y., to Truscon Steel Co., Youngstown, O.; White Construction Co., contractor.

700 tons, Chester housing project, Philadelphia, to American Steel Engineering Co., Philadelphia; Stoffiet & Tillotson, Philadelphia, contractors.

512 tons, airplane engine parts plant, Studebaker Corp., Chicago, S. N. Nielsen Co., Chicago, contractor, to Bethlehem Steel Co., Bethlehem, Pa.; bids Jan. 31.

500 tons, parts plant, Studebaker Corp., Chicago, to Inland Steel Co., Chicago; S. N. Nielson, contractor.

500 tons, Scott Circle underpass, Washington, to Republic Steel Corp., Cleveland, through Capitol Steel Corp. of New York; Cayuga Construction Co., contractor.

429 tons, specification 6818, county of Los Angeles, to Trojan Steel Co., Los Angeles.

400 tons, 5-story addition, Frank T. Stagg Co., Frankford, Ky., to Pollak Steel Co., Cincinnati; Frank Messer & Sons Inc., Cincinnati, contractor.

300 tons, Kingsley dam, Ogallala, Nebr., U. S. engineer, to Sheffield Steel Corp.

290 tons, bridge, route 8-1224, Giles county, Virginia, to Virginia Steel Co.; T. A. Loving Co., contractor.

217 tons, addition to Harrison homes, Illinois project 3-2A, Peoria, Ill., Patrick Warren Construction Co., Chicago, contractor, to Laclede Steel Co., St. Louis; bids Nov. 4.

200 tons, grain elevator, Hales & Hunter, Wilmington, Del., to Bethlehem Steel Co., Bethlehem, Pa.; McKenzie & Hague Inc., contractor.

177 tons, Bureau of Reclamation, invitation A-33,109-A-2, Coram, Calif., to Columbia Steel Co., San Francisco.

100 tons, administration building and school, Willowbrook, N. Y., to Joseph T. Ryerson & Son Inc., Chicago; Mutual Construction Co., contractor.

100 tons or more, bars and shapes, ammunition storage, Norfolk, Va., to Truscon Steel Co., Youngstown, O.; Virginia Engineering Co., Newport News, Va., contractor; Bowker & Roder, Richmond, Va., awarded structural steel.

100 tons or more, bars and shapes, housing and ammunition, Yorktown and Newport News, Va., to Rosslyn Steel & Cement Co., Washington; Virginia Engineering Co., Newport News, Va.; contractor; Liphart Steel Co., Richmond, Va. awarded structural steel.

Reinforcing Steel Pending

4000 tons, ammunition plant, Remington Arms Co., Denver.

1600 tons, Triboro Bridge Authority, Cont. B-19, Brooklyn, N. Y.

1500 tons, powder bagging plant, Goodyear Engineering Corp., Clark county, Indiana; Winston Brothers, contractor.

1200 tons, flood wall, Unit 2, Portsmouth-New Boston, O.

938 tons, Bureau of Reclamation, invitation 32,992-A, Tucumari, N. Mex.; bids Feb. 17.

850 tons, dry dock, Curtis Bay; Centaur Construction Co., New York, low.

694 tons, Bureau of Reclamation, Invitation A-33,162-A, Coram, Calif.; bids opened.

500 tons, housing project, New Haven, Conn.; bids Feb. 26.

475 tons, plant, Louisville Gas & Electric Co., Louisville, Ky.

450 tons, plant, DuPont-National Carbon Co., Louisville, Ky.

400 tons, government dam project, Paducah, Ky.; C. E. Carson Co., Chicago, contractor.

400 tons, inspection shed, board of transportation, Brooklyn, N. Y.; Thomas Waters Co., New York, low; also 815 tons shapes.

368 tons, flood control, Massillon, O.; bids March 27, U. S. engineers.

300 tons, plant, Plankington Packing Co., Milwaukee.

300 tons, plant, Cudahy Packing Co., Milwaukee.

275 tons, conversion tunnel, Neversink, N. Y.; George M. Brewster & Son Inc., Bogota, N. J., low.

260 tons, concrete runways, Ft. Wayne,

Ind., U. S. engineer.

225 tons, under-pass, Cochise county, Arizona, for state; bids opened.

200 tons, sewage disposal plant, Ft. Benjamin Harrison, Ind.

133 tons, dried sludge building and miscellaneous construction, West-Southwest sewage treatment works, division G, Sanitary District of Chicago; bids Feb. 27.

129 tons, building for Pabst Brewing Co., Milwaukee; bids Feb. 14.

124 tons, Bureau of Reclamation, invitation 32,997-A, Tucumari, New Mex.; bids in.

100 tons, reservoirs at Fort Barry and Fort Kronkhite, Calif.; bids Feb. 25.

100 tons, stadium addition, State College, Fresno, Calif.; bids opened.

Unstated, 6-story addition, Sacred Heart hospital, Eugene, Oreg.; Ross B. Hammond, Portland, contractor.

Unstated, water reservoir, Camas, Wash.; bids March 11.

Unstated, bakery, Fort Lewis, Wash.; Sam Bergesen, Tacoma, low.

Unstated, two state spans, Gilliam and Yamhill counties, Oregon; bids at Portland, Feb. 27-28.

Semifinished Steel

Semifinished Prices, Page 97

Youngstown, O.—While billets and sheet bars have been in fairly regular supply to nonintegrated mills dependent stripmakers and sheet mills are beginning to look ahead apprehensively to future sources of supply, which are being put under continually heavier pressure for diversion to heavier finished products.

Pig Iron

Pig Iron Prices, Page 98

Pittsburgh—There is little change in the pig iron situation, with production at capacity. The coke situation has pretty well cleared up, with more than 8100 beehive ovens now active and about 1000 more available, many of which are being conditioned for operation. Shipments continue to run ahead of production and stocks are dwindling. The squeeze is expected to come in foundry iron, rather than in furnace iron, although it is entirely possible that production will be balanced in time to avert shortage of any grade.

Cleveland — Shipments for some producers are running ahead of January and for others on the same level. One large merchant producer is crowding production, now working at 105 per cent rated capacity as against 103 a week ago. Jackson county producers of silveries and bessemer ferrosilicon report an unusually heavy demand from foundries to sweeten mixtures in view of the fact that melters have been compelled to buy so much scrap and pig iron varying from their accustomed analyses.

Chicago—Shipments of pig iron are well on schedule, although perhaps slightly behind last week. Practically all furnaces are sold for first quarter and are unable to accept new business. Foundry melts, particularly gray iron and malleable, are increasing. Youngstown Sheet & Tube Co. will blow in its last idle blast furnace here, No. 4 at South Chicago, not later than March 1.

Boston—Pig iron customers are specifying steadily against contracts and shipments would probably be substantially heavier but for the fact some producers are barely covering regular customers while others are practically rationing tonnage. Foundry melt continues heavy, notably by those supplying the machine tool trade.

New York — Pig iron specifications are larger than last month. Orders continue light as sellers generally are refusing to book domestic tonnage for second quarter on any basis and are taking little business for export.

Philadelphia—Buying is light as pig iron sellers are discouraging forward coverage. Regular customers have been assured they will be accommodated on the basis of past requirements, but some consumers are attempting to enter orders for delivery beyond midyear. Foundry operations have been expanding gradually but still are limited generally to five days weekly.

Buffalo—Pig iron producers are giving regular customers prompt shipments, but reserve stockpiles are dwindling. Extensive forward buying and speculative purchasing are rejected. In an effort to get maximum production leading producers are co-ordinating facilities.

Cincinnati — The foundry melt tends steadily heavier, though not reflected in February pig iron shipments. The market is tight, little tonnage being available for any but established customers. Inventories built on specifications in December and January help supply the current melt.

St. Louis—There has been no change in the pig iron situation. Consumption continues at record levels, and February shipments bid fair to establish a new record for that month. Blast furnaces have failed to bring out a definite quotation for second quarter, even on a basis of prices prevailing at delivery. There is a disposition to ration and allot reasonable amounts, but all efforts to build inventories and speculate are being discouraged.

Toronto, Ont.—Sharp advance in scrap prices is having a stimulating effect on merchant pig iron sales. Cast scrap, which is decidedly scarce, now is selling in the local

market at 25 cents per ton above pig iron, and melters are dropping cast and swinging exclusively to iron in their melt. Pig iron prices show no change.

Scrap

Scrap Prices, Page 100

Pittsburgh — Prices remain partially nominal and quotations are unchanged. Brokers find it virtually impossible to obtain supplies, some being unable to finish coverage of higher priced orders taken before the edict of lower scrap prices was issued in Washington. The meeting here last week emphasized need for some situation which will provide a flow of material into Pittsburgh. Although no mills in the district have reported they are short of scrap, it is known that stocks are considerably lower than a month ago and scrap moving into the district has dropped off considerably.

Cleveland—Receipts of iron and steel scrap are growing scarcer from outside sources. Local producers of scrap are selling to their usual outlets. The feature of the week here was the purchase of 10,000 tons of blast furnace material by an important steelmaker at about $16.50, delivered, somewhat higher than the last local purchase.

Chicago—Little change has taken place in the iron and steel scrap situation, with no new mill buying and brokers experiencing some trouble in acquiring sufficient material to meet contracts. Foundry operations are increasing and demand for scrap from this field is strong.

Boston—Cast grades, notably No. 1 machinery and textile, are now being offered sparingly. Both for district and domestic delivery, prices are firmer and the downward trend on other grades, including heavy melting steel, appears to have been halted. For export current buying has been slightly heavier with heavy melting steel grades at $17.25 to $16, respectively.

New York — With prices apparently more stabilized, except for a few minor adjustments, mostly upward slightly, steelmaking grades are coming out more freely and shipments are maintained against active demand, mainly against contracts. Foundry buying is more active, with available grades moving in good volume. Loading for export is heavier.

Philadelphia — Scrap prices are steady, with principal grades unchanged. Material is coming out in fair volume although not at a rate which permits mills to build stocks to desired level. In some grades dealers are unable to cover orders at less than the present market, and prospects for an early reduction in prices are poor. However, there are expectations of a further scaling down in bids on subsequent railroad offerings of heavy melting steel.

Buffalo—Talk of differentials on a Pittsburgh base system is not favored by local scrap dealers. In the past local prices were generally considered $1 to $2 a ton below the Pittsburgh market. Recent sales, however, of No. 1 heavy melting were made at the price prevailing in the Pittsburgh market. Adjustments in various sections of the list have raised the price on short steel rails and stove plate.

Detroit—No changes are reported in scrap prices, the market apparently marking time. Fisher Body Co.'s mid-month scrap tonnage involved better than 20,000 tons, from four plants. This tonnage was about on a par with months immediately preceding, indicating a high level of car output in March.

Cincinnati—Iron and scrap prices are unchanged and activity is near recent levels. Most grades are none too plentiful although tonnage is moving in fairly adequate volume on contracts. Blast furnace grades are stronger but quotations are held within arbitrary limits. District brokers obtained a normal proportion of railroad offerings in recent bidding.

St. Louis—Except for a few minor adjustments, prices of iron and steel scrap are unchanged, and apparently the market has reached a balance. An east side mill purchased a round tonnage of heavy melting steel on a basis of current quotations. Delivery over the next 60 days is specified, and the order was split among three or four

dealers. In addition there has been a fair volume of sales in small lots. Cast and malleable grades are scarce and firm.

Birmingham, Ala.—Scrap is moving well and is not abundant in some grades. Prices are unchanged.

Toronto, Ont. — Soaring prices, heavy demand and limited offerings feature the scrap market. Practically all grades have moved upward, advances ranging from 50 cents on some steel grades to $2 on machinery cast. The unsettlement overspread the market at the beginning of the week when the Canadian Steel Controller came forward with an announcement that consumers' buying prices, delivered Hamilton, had been pegged. Under the new ruling No. 1 heavy melting steel is pegged at $18, gross ton; low phos steel at $19 and No. 2 heavy melting at $16.50 This does not mean that dealers are obtaining these prices, but that they are the limit to be paid. Dealers did not advance buying prices to levels that would correspond with the top price, although further action may be taken later in this direction.

Seattle—Rolling mills operating at capacity are the principal scrap buyers. Prices are steady at $14 and $15 for No. 2 and No. 1 respectively. Foundry activity is general and some scrap is being consumed in that industry. Steel scrap stocks are ample but demand for cast grades exceeds present supplies. Increased shipments are expected soon from the interior, as weather conditions improve.

San Francisco—The scrap market is firm and movement is strong. No. 1 heavy melting steel in the San Francisco metropolitan area holds at $15 to $15.50 a net ton f.o.b. cars, No. 2 at $14 to $14.50. Those in the Los Angeles district hold at $14.50 to $15 a net ton for No. 1 heavy melting steel and $13 to $13.50 a ton for No. 2.

Warehouse

Warehouse Prices, Page 99

Chicago—Deferred mill deliveries are leaving their imprint on warehouse sales. Chief difficulty is in alloy steels, principally bars, for which consumer requirements are substantial and increasing. Heavy products, such as plates and structurals, also are in a tight position.

Boston—Demand for steel out of warehouse continues heavy, volume this month running ahead of last with most jobbers. Turnover is high with buying well diversified. Jobbers in some instances are operating with six to eight weeks supplies against five to six months normally.

Philadelphia — Sales this month are on a par with January or slightly ahead. Maintaining adequate stocks is a major concern of warehouses, particularly in odd sizes of certain products which are difficult to replenish.

Buffalo—Distributors report buying at a record pace. February turnover is expected to exceed January.

Cincinnati — Warehouses are receiving increased demand for sheets, directly due to the mill situation. This tonnage is the heaviest in many months. Jobbers' stocks are fairly complete. Prices are unchanged.

St. Louis—With mill deliveries becoming more remote, demand for flat rolled materials at warehouses continues to expand. Plate supplies have diminished in recent weeks and difficulties are experienced in replenishment.

Tin Plate

Tin Plate Prices, Page 96

Pittsburgh—Situation remains unchanged, with buying at the highest point of the season thus far. Operations are estimated at 67 per cent of capacity, up 2 points from last week, and are being expanded in line with delivery demand. Stocks held by producers are in fair shape and no shortage exists either in finished plate or in black plate.

Chicago—New tin plate business is improving as it has for the past several weeks and producers are now comfortably booked ahead. One maker is sold out and is accepting no further orders. Other mills are assured of full operations well into second quarter.

Steel in Europe

Foreign Steel Prices, Page 99

London—(*By Cable*)—Steelmaking and basic pig iron production in Great Britain are attaining a record volume but current supply of hematite iron requires some rationing. Shipbuilding is taking increasing steel tonnage and large quantities of steel sheets are needed for air raid shelters.

Demand for special steels is heavier but the supply at present is adequate. Tin plate export demand is good but shipments are restricted by limitation of steel supplies.

Iron Ore

Iron Ore Prices, Page 100

Cleveland—Consumption of Lake Superior iron ore in January was an all-time record at 6,331,018 gross tons, compared with 6,173,038 tons in December and with 5,289,308 tons

in January, 1940. Stocks of ore at furnaces and on Lake Erie docks Feb. 1 totaled 29,794,047 tons, comparable figures being 36,072,833 tons a month ago and 30,189,247 tons a year ago. The Feb. 1 total comprised 26,166,584 tons at furnaces and 3,627,463 tons at docks. Number of furnaces in blast Jan. 31 was 167, compared with 166 a month before and 142 a year ago, these being stacks which depend principally on Lake Superior iron ore. The above statistics are issued by the Lake Superior Iron Ore Association, Cleveland.

Equipment

Seattle—Machinery and equipment required in ship construction are in strong demand and form a large volume. Road-working equipment and electrical items are also moving well and the opening of the Alaska mining season has added to the total. United States engineer, Portland, has called bids March 4 for four 60,000-kva generators and auxiliaries. Denver will receive bids March 5 for actuators, indicators, receivers, etc. for Coulee dam, Spec. 1479-D. King county, Washington, will open bids Feb. 24 for crushing, screening, tank, boiler unit and asphalt mixing plant. Wahkaikum county, Washington, has called bids at Cathlamet March 3 for tractor and bulldozer. Spokane and Grant counties, Washington, have received figures for diesel graders and bulldozers.

Ferroalloys

Ferroalloy Prices, Page 98

New York—With ferroalloy shipments about as heavy as capacity will allow, and having been this way for some time, sellers look for the movement this month to fall behind January by virtue of the fact that February is the shorter month. Producers' excess stocks have been cleaned up in most cases, and while expansion is going forward it has not begun to make itself greatly felt to date.

Price announcements for second quarter are expected shortly, although there is still question as to whether there will be any change in most leading products, especially insofar as contracts are concerned. However, there will be no certainty until definite action is taken. Meanwhile, ferromanganese is holding at $120, duty paid, Atlantic and Gulf ports and 19 to 21 per cent spiegeleisen, at $36, Palmerton, Pa.

Nonferrous Metals

New York—Government action to conserve metal supplies for defense

Nonferrous Metal Prices

Feb.	Copper, Electro, del. Conn.	Copper, Lake, del. Midwest	Copper, Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
15	12.00	12.00	12.25	51.00	50.87½	5.65	5.50	7.25	17.00	14.00	35.00
17	12.00	12.00	12.25	51.50	51.00	5.65	5.50	7.25	17.00	14.00	35.00
18	12.00	12.00	12.25	51.75	51.12½	5.65	5.50	7.25	17.00	14.00	35.00
19	12.00	12.00	12.25	52.62½	52.00	5.65	5.50	7.25	17.00	14.00	35.00
20	12.00	12.00	12.25	54.25	54.25	5.65	5.50	7.25	17.00	14.00	35.00
21	12.00	12.00	12.25	53.87½	53.12½	5.65	5.50	7.25	17.00	14.00	25.00

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 12.00c Conn. copper

Sheets

Yellow brass (high)	19.48
Copper, hot rolled	20.87
Lead, cut to jobbers	8.90
Zinc, 100 lb. base	12.50

Tubes

High yellow brass	22.23
Seamless copper	21.37

Rods

High yellow brass	15.01
Copper, hot rolled	17.37

Anodes

Copper, untrimmed	18.12

Wire

Yellow brass (high)	19.73

OLD METALS

Nom. Dealers' Buying Prices

No. 1 Composition Red Brass

New York	8.00-8.25
Cleveland	9.25-9.50
Chicago	8.87½-9.12½
St. Louis	8.37½-8.50

Heavy Copper and Wire

New York, No. 1	9.62½-9.87½
Cleveland, No. 1	10.00-10.50
Chicago, No. 1	10.00-10.25
St. Louis	9.62½-9.75

Composition Brass Turnings

New York	7.62½-7.87½

Light Copper

New York	7.62½-7.87½
Cleveland	8.00-8.25
Chicago	8.00-8.25
St. Louis	7.62½-7.75

Light Brass

Cleveland	5.00-5.50
Chicago	5.87½-6.12½
St. Louis	5.00-5.25

Lead

New York	4.75-4.90
Cleveland	4.50
Chicago	4.50-5.00
St. Louis	4.25-4.50

Zinc

New York	6.50
Cleveland	5.00-5.50
St. Louis	4.50-4.75

Aluminum

Mis., cast, Cleveland	14.00
Borings, Cleveland	8.50
Clips, soft, Cleveland	16.50
Misc. cast, St. Louis	13.25

SECONDARY METALS

Brass ingot, 85-5-5-5, l.c.l	13.25
Standard No. 12 aluminum (nom.)	17.50

needs and to stabilize the markets were more determined last week. An OPM official warned against continuance of the unstable condition in tin and declared that "in event our supplies of tin from the Far East should be interrupted—all stocks, whether in government or private hands, would become subject to allocation on basis of the requirements of national defense." Other defense officials predicted that a strict rationing system would be invoked soon on the use of nickel-steels, aluminum and zinc in non-defense production. The Metals Reserve Co. is contemplating an additional purchase of 100,000 Latin American copper.

Copper — Consumption for 1941 is estimated at about 1,300,000 tons of which about 300,000 tons must be imported. Sales of domestic copper for the full week, estimated at 15,000 tons, were allocated chiefly by the leading mine producer at 12.00c since custom smelters booked only limited tonnages at their 15.50-cent level. Operations at copper and brass mills continue active, although curtailed in some quarters due to lack of adequate zinc supplies.

Zinc—Supplies continued extremely tight, although galvanizing operations eased to 78 per cent. Sales of the common grade were rather light last week at the firm 7.25-cent East St. Louis level for prime western.

Tin—Prices soared to a high of 54.25c from 51.00c at the close of the previous week before the government's warning checked the advance. The market closed firm at 53.87½c.

DIED:

PAUL E. McKINNEY, 56, metallurgical engineer on the central staff of the operating vice president, Bethlehem Steel Co., Bethlehem, Pa., Feb. 18. Mr. McKinney was widely recognized as an authority on the metallurgy and production of steel for ordnance. Before his affiliation with Bethlehem in 1929, he was superintendent of the forge and foundry divisions of the United States naval gun factory in Washington. He was a member of many professional societies, including American Iron and Steel Institute, American Institute of Mining and Metallurgical Engineers, American Society for Testing Materials, Steel Founders' Society of America, American Society for Metals and others.

♦

Richard Peters Jr., for many years identified with pig iron and coke sales in eastern Pennsylvania, in Philadelphia, Feb. 15. A graduate of Swarthmore college, he joined Rogers, Brown & Co. as salesman, and later became sales representative for Pennsylvania Steel Co., now part of Bethlehem Steel Co. In recent years he had been a partner in the building materials firm of Lea, Peters & Co.

♦

William B. Updegraff, 62, vice president, Watson-Stillman Co., Roselle, N. J., manufacturer of hydraulic machinery, Feb. 13, in New York.

♦

Guernsey A. Palmer, 55, district manager for Baldwin De La Vergne Sales Corp. and Baldwin Southwark division of Baldwin Locomotive Works in Houston, Tex., Feb. 8 at his home in that city.

♦

William W. Crawford, 59, chairman and president, Edward Valve & Mfg. Co. Inc., East Chicago, Ind., Feb. 19, in Miami Beach, Fla.

♦

Samuel R. Hoover, 63, assistant general sales manager, former Carnegie Steel Co., Pittsburgh, until his retirement in 1935, Feb. 20 at his home in Cleveland.

♦

John T. Ryan, 57, president, Mine Safety Appliances Co., Pittsburgh, Feb. 20, in Miami Springs, Fla., while on vacation. Mr. Ryan was a member, American Institute of Mining and Metallurgical Engineers, Engineers Society of Western Pennsylvania, and a number of mining organizations.

♦

George Klenk, 76, associated with Allis-Chalmers Mfg. Co., Milwaukee, and its predecessor companies over 50 years, in Milwaukee, Feb. 14. He had been superintendent of the brass foundry many years. He was a member, American Foundrymen's Association.

Hardware Men Satisfied With Steel Contacts

Only a few price advances in hardware products have occurred to date, it was stated by leading merchants at the forty-seventh annual convention and exhibition of the Ohio Hardware Association, Cleveland, Feb. 18-21.

Products made of metals have advanced less than others, it was said. Moreover, manufacturers of hardware items exhibited at the public auditorium stated they had no difficulty in obtaining steel on schedule from mills. A record number of exhibitors and record number of sales as a result of exhibits was reported. Nearly 3000 were in attendance.

Lebanon Steel & Iron Co. Will Liquidate

Stockholders of Lebanon Steel & Iron Co., Lebanon, Pa., last week voted to liquidate and close its plant. Company employs approximately 650 men.

Officials said the liquidation was due to company's inability to obtain raw materials and failure to realize a profit on sale of finished products at present prices.

Company will continue to operate until liquidation is completed, possibly in six weeks. Offers have been received from prospective purchasers and it is expected the plant may be sold as an operating unit.

Canadian War Orders Come to United States

TORONTO, ONT.

■ Department of Munitions and Supply, for the week ended Feb. 7, placed 2134 orders with total value of $5,092,566, including orders placed with United States companies valued at $362,437. Under capital expenditure outlay totaled $657,741, and included Bata Shoe Co. Ltd., Frankford, $28,050; DeHavilland Aircraft of Canada Ltd., Toronto, $199,000; Boeing Aircraft of Canada Ltd., Vancouver, B. C., $430,691. The orders:

Instruments: War Office, England, $11,000; Dominion Electric Protection Co., Montreal, $59,589; Canadian Government Motion Picture Bureau, Ottawa, $6594; Ontario Hughes-Owens Co. Ltd., Ottawa, $14,529; Harley-Kay Ltd., Georgetown, Ont., $14,490.

Electrical equipment: Canada Wire & Cable Co. Ltd., Montreal, $6948; Canadian Marconi Co., Montreal, $22,562; Canadian Telephone & Supplies Ltd., Toronto, $11,284; Cnadwick-Carroll Brass & Fixtures Ltd., Hamilton, $25,461.

Machinery: Air Ministry, England, $14,940; John Bertram & Sons Co. Ltd., Dundas, Ont., $9489; P. Fayette Co., Penetanguishene, Ont., $16,812.

Tools: Builders Sales Ltd., Ottawa, $10,145.

Aircraft: Air Ministry, England, $72,110; Aviation Electric Ltd., Montreal, $18,752; Canadian Car & Foundry Co. Ltd., Montreal, $13,221; Canadian Vickers Ltd., Montreal, $121,328; Canadian Wright Ltd., Montreal, $124,564; Transport Supply Co., Toronto, $13,964; Ottawa Car & Aircraft Ltd., Ottawa, $8164; S. & S. Aircraft Ltd., Ottawa, $47,385; Standard Tube Co. Ltd., Ottawa, $120,450; Steel Co. of Canada Ltd., Hamilton, $34,184; Fleet Aircraft Ltd., Ft. Erie, Ont., $23,699; McDonald Brothers Aircraft Ltd., Winnipeg, Man., $140,400; Precision Machine & Foundry Ltd., Calgary, Alta., $9990.

Shipbuilding: Morris Boat Works, Hamilton, $11,601.

Drydock supplies: Canada Firebrick Co. Ltd., Montreal, $8178; Gourock Ropes & Canvas Ltd., Montreal, $7427; Canadian Fairbanks-Morse Co. Ltd., Ottawa, $27,164.

Land transport: Canadian Trade Corp. Ltd., Montreal, $17,276; General Motors of Canada Ltd., Oshawa, Ont., $22,748; Dominion Truck Equipment Co. Ltd., Kitchener, $13,700; Ford Motor Co. of Canada Ltd., Windsor, $53,249; Richardson Road Machinery Co. Ltd., Saskatoon, Sask., $12,958.

Ordnance: Air Ministry, England, $15,000.

Munitions: Hull Iron & Steel Foundries Ltd., Hull, Que., $107,406; Anaconda American Brass Ltd., New Toronto, $42,145; Galt Art Metal Co. Ltd., Galt, Ont., $21,433.

Metals: Consolidated Mining & Smelting Co. of Canada Ltd., Montreal, $227,707.

Defense Contracts Reported Last Week

(*Concluded from Page* 45)

machines, $153,427.31.
Plume & Atwood Mfg. Co., Waterbury, Conn., spur grommets, $5543.02.
Reid Avery Co., Dundalk, Baltimore, welding electrodes, $270,727.67.
Republic Steel Corp., Massillon, O., alloy bar steel, $68,980.20.
Reynolds Wire Co., Dixon, Ill., steel wire cloth, $7380.55.
Risdon Mfg. Co., Naugatuck, Conn., spur grommets, $67,296.20.
Ritchie, E. S., & Sons Inc., Brookline, Mass., flinders bars, $11,392.50.
Rockbestos Products Corp., New Haven, Conn., electric cable, $252,824.10.
Russell, John M., Mfg. Co., Naugatuck, Conn., weldless chain, $6714.88.
Ryerson, Joseph T., & Son Inc., Chicago, plate bending roll, $8461.
Scherr, George, Co. Inc., New York, milling machines, $8840.
Scrimgeour, William, Washington, table forks, can openers, $91,340.
Sidney Machine Co., Sidney, O., engine lathes, $52,533.
Slaymaker Lock Co., Lancaster, Pa., barrel bolts, coat and hat hooks, $15,048.31.
Spetnagel Hardware Co., Chillicothe, O., cotter pins, $13,274.64.
Standard Steel Specialty Co., Beaver Falls, Pa., tapered steel pins, $8408.52.
Star Electric Motor Co., Bloomfield, N. J., motor generator sets, $119,263.
Steel Products Engineering Co., Springfield, O., propeller hubs, $18,730.
Swind Machinery Co., Philadelphia, trimming presses, $7350.
U. S. Axle Co. Inc., Pottstown, Pa., dummy car trucks, $41,150.
Underwood, H. B., Corp., Philadelphia, milling machines, $9018.
United States Rubber Co., New York, electric cable, $111,712.50.
Vacuum Can Co., Chicago, food carriers, $7262.06.
Wallace, R., & Sons Mfg. Co., Wallingford, Conn., silver-plated ware, $110,368.55.
Warren Steam Pump Co. Inc., New York, main condenser pumps, $708,328.
West Bend Aluminum Co., West Bend, Wis., aluminum water pitchers, $13,200.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., unit substations, $66,354.
Wilcox, Crittenden & Co. Inc., Middletown, Conn., eyelet grommets, $7461.80.
Williams & Wells Co., New York, cuspidors, $7554.75.
Williams, White & Co., Moline, Ill., rotary shear, plate bending roll, $22 400.
Wright, G. F., Steel & Wire Co., Worcester, Mass., steel wire cloth, $11,693.60.
Youngstown Sheet & Tube Co., Youngstown, O., bar and sheet steel, $73,897.34.

Bureau of Yards and Docks Awards

Clyde Iron Works Inc., Duluth, two jib cranes at Navy yard, Puget sound, Washington, $216,000.
Harnischfeger Corp., Milwaukee, two 20-ton bridge cranes for subassembly shop building No. 2; one 10-ton bridge crane for extension to steel storage runway; and two 10-ton bridge cranes for shop building No. 63 at Navy yard, Brooklyn, N. Y., $102,590.
Pittsburgh-Des Moines Steel Co., Pittsburgh, pontoon gear at Navy yard, Charleston, S. C., $56,100.
Shaw-Box Crane & Hoist Co., Muskegon, Mich., two 20-ton bridge cranes for subassembly shop building No. 1 at Navy yard, Brooklyn, N. Y., $39,994.
Standard Construction Co. Inc., Minneapolis, students' barracks building at Naval Reserve aviation base, Minneapolis, $90,363.
Welso Construction Co., Chicago, students' barracks building at Naval Reserve aviation base, Glenview, Ill., $94,845.

A. M. Castle Co., Chicago, iron and steel merchandiser, reports net income in 1940 was $509,662 after depreciation, federal income and excess profits taxes and other charges. Equal to $2.12 per share on the company's capital stock, net profit last year compared with $349,185 or $1.45 per share in 1939.

Construction and Enterprise

Ohio

AKRON, O.—Hamlin Metal Products Co., West Exchange and Water streets, will build an addition 36 x 54 feet, on plans by George Bali, Metropolitan building.

AKRON, O.—Freitag Machine Co., 1006 Grant avenue, has let general contract for a one-story 150 x 290-foot manufacturing plant to J. L. Hunting Co., Ninth-Chester building, Cleveland. Wallace Hatch, Hippodrome building, Cleveland, is engineer.

BUCYRUS, O.—General Electric Co. lamp department, Nela Park, Cleveland, has bought 20 acres and will build a one-story plant with about 150,000 square feet floor space for manufacture of glass and electric lamps.

■ Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 107 and Reinforcing Bars Pending on page 109 in this issue.

CANTON, O.—Union Metal Mfg. Co., 1432 Maple avenue N. E., will take bids soon on a foundry addition to cost over $40,000.

CLEVELAND—Warner & Swasey Co., 5701 Carnegie avenue, will build one-story personnel building 20 x 150 feet. Adrian Foose is company architect.

CLEVELAND—John Harsch Bronze & Foundry Co., 12502 Berea road, has let general contract for a 42 x 140-foot plant addition to H. L. Vokes Co., 5300 Chester avenue, at cost of about $40,000. Simon & Simon, 5300 Chester avenue, are engineers. (Noted Feb. 10.)

CLEVELAND—Harshaw Chemical Co., 1945 East Ninety-seventh street, will build tunnel under street at its Harvard avenue plant to carry high-pressure water line, steam line, pneumatic conveyor line and primary electric service line. H. E. Cowser is company engineer.

CLEVELAND — Thompson Aircraft Products Co. will take bids through Albert Kahn, engineer, New Center building, Detroit, for an $11,000,000 plant on 101-acre site at Euclid avenue and Lakeland boulevard.

CLEVELAND — Browning Crane & Shovel Co., 16226 Waterloo road, Sheldon Cary, president, will build a one-story plant addition 60 x 150 feet, for assembly operations. General contract has been given to Gillmore Carmichael Olson Co., 1873 East Fifty-fifth street.

CLEVELAND — Midwest Forge Co., 17301 St. Clair avenue, Robert I. Gale, president, will extend a 40-foot crane runway in a new plant addition 55 x 75 x 95 feet, contract to H. L. Vokes Co., 5300 Chester avenue.

CLEVELAND—U. S. Foundry Inc., a new corporation, has taken over the plant of the U. S. Brass Corp., 1276 East Fifty-fifth street, and has started production. Peter E. Klein, Union Commerce building, is in charge pending election of officers.

CLEVELAND—Euclid Road Machinery Co., 1361 Chardon road, will build plant addition costing $35,000, one story, 28 x 52 x 160 feet, with six overdoors. Contract will be let through H. M. Morse Co., engineer, 1500 Superior avenue. E. H. Parkhurst is company president.

CLEVELAND—Murray Ohio Mfg. Co., 1067 East 152nd street, will build two storage buildings, 48 x 113 feet and 57 x 112 feet, costing about $12,000.

NEW PHILADELPHIA, O.—Ladel Conveyor Mfg. Co., 339 South Broadway, A. L. Schwab, secretary-treasurer, will build foundry 70 x 160 feet. General contract to James C. F. Shafer Co., Caxton building, Cleveland.

SANDUSKY, O.—Lake Erie Boat Works, organized by John B. Clarke and George H. Tutt, Rocky River, O., will occupy plant at foot of Franklin street and will build custom-built and small stock craft.

Connecticut

EAST HARTFORD, CONN. — Pratt & Whitney division United Aircraft Corp., 400 Main street, will let a contract soon for a one-story monitor type addition and two three-story additions, each 65 x 80 feet. Plans are by Albert Kahn, New Center building, Detroit.

STAMFORD, CONN. — American Cyanamid Co., 30 Rockefeller Plaza, New York, has plans for a five-story 75 x 100-foot laboratory addition, to cost about $170,000. Lockwood Greene Engineers, 10 Rockefeller Plaza, New York, are engineers.

Massachusetts

HOLYOKE, MASS.—Worthington Pump & Machinery Co., 37 Appleton street, has given general contract for a one-story 98 x 250-foot plant to Daniel O'Connell's Sons Inc., 480 Hampden street, to cost about $65,000.

NEW BEDFORD, MASS.—Revere Copper & Brass Co., 24 North Front street, will let contract soon for a one-story 130 x 250-foot plate mill. Johnck & Ehmann, 104 South Michigan avenue, Chicago, are engineers.

WORCESTER, MASS. — Reed-Prentice Corp., 697 Cambridge street, has let general contract for a one-story 80 x 130-foot monitor roof machine shop to E. J. Cross, 150 Prescott street, to cost about $40,000.

New York

GENEVA, N. Y.—Geneva Foundry Co., W. J. Brennan, general manager, suffered complete loss of its plant by fire, about $300,000, partly insured. Plans for rebuilding are being considered.

WELLSVILLE, N. Y.—Bradley Producing Corp. will develop an oil and gas area, including wells, pipe lines, steel tank storage, etc., in Allegany county, at cost of about $45,000.

New Jersey

ELIZABETH, N. J.—Singer Mfg. Co., 149 Broadway, New York, has given general contract to Austin Co., 19 Rector street, New York, for a one-story 200 x 600-foot manufacturing building, to cost about $600,000.

NEW BRUNSWICK, N. J.—New Brunswick Nickel Plating Works, 128 Church street, has plans by E. Levine, 67 Paterson street, for a one-story 40 x 150-foot addition to its plating works.

SPRING LAKE, N. J.—City has retained Runyon & Carey, engineers, 31 Clinton street, New York, to plan conversion of municipal waterworks plant from steam to electric power. Cost estimated at $92,000.

Pennsylvania

McCHESNEYTOWN, PA.—Acme Die & Machine Co. Inc., R. R. McKenzie, president, Latrobe, Pa., will build a munitions plant, including a one-story building 60 x 140 feet and 14 smaller buildings. J. Ridilla is in charge.

Michigan

DETROIT—Midland Steel Products Co., 6660 Mt. Elliott avenue, will take bids soon on a one-story craneway 75 x 344 feet and a press shop addition, costing about $150,000. Giffels & Vallet, 1000 Marquette building, are architects.

DETROIT—Advance Machine & Engineering Co., 8770 Kimberley street, has been incorporated with $10,000 capital to deal in dies, by Joseph Pacy, 17411 Greeley avenue, Detroit.

DETROIT—Knott & Garllus Co. has been incorporated with $21,000 capital

to conduct a tool and die business, by Frank W. Knott, 3941 A street, Detroit.

DETROIT—National Machine & Tool Co., 2024 Dime Bank building, has been incorporated with $200,000 capital to manufacture metal castings, by Carl H. Taylor, Birmingham, Mich.

HILLSDALE, MICH.—Richards Bros. division of Allied Products Co., manufacturer of dies and punches, is preparing to build a plant addition 28 x 100 feet, costing $300,000, including equipment.

JACKSON, MICH.—Jackson Machine & Tool Co. will build one-story plant 64 x 150 feet on site recently purchased.

MARQUETTE, MICH.—City, M. A. Hogan, clerk, will take bids about March 1 on construction of sewage disposal plant costing about $300,000. Shoecraft, Drury & McNamee, Ann Arbor, Mich., are consulting engineers.

ST. JOSEPH, MICH. — Dachel-Carter Boat Co. has reorganized as Dachel-Carter Shipbuilding Corp. and has undertaken extensive improvements to plant and addition of much equipment.

Illinois

CHICAGO—Woodrow Corp., 4701 West Grand avenue, is asking bids on plans by Fox & Fox, architects, 549 West Randolph street, for a one-story 75 x 175-foot pipe fittings manufacturing plant to cost over $40,000.

CHICAGO—Wisconsin Steel Co., 2701 East 106th street, is building a boiler-house 35 x 50 feet, to cost about $65,000, with boilers. W. J. Hammer, 3141 South Hoyne avenue, is engineer.

GRANITE CITY, ILL.—General Steel Castings Corp. will build an addition to house its heat treating department at the Commonwealth plant here. Company has contract for one-piece armored tank bodies for the Canadian government.

ROCKFORD, ILL.—Barnes Drill Co., 814 Chestnut street, Albert M. Johnson, president, is building plant addition, irregular shape, four sides 190, 188, 119 and 83 feet.

Indiana

EVANSVILLE, IND.—Shell Oil Co. Inc., 50 West Fiftieth street, New York, is building a marine terminal, with loading facilities, on the Ohio river near here.

Missouri

BRENTWOOD, MO.—Wright Specialty Mfg. Co., 633 Del Monte way, manufacturer of leather specialties, has let contract for a two-story factory building with 15,000 square feet floor space on Manchester road, costing $60,000, to Charles J. Grady, 716 Chestnut street, St. Louis. (Noted Feb. 10.)

ST. LOUIS—Marlo Coil Co., 6135 Manchester avenue, manufacturer of refrigerating coils, will build a one-story manufacturing and office building 40 x 140 feet as a plant addition. Brussel & Viterbo, Arcade building, are engineers.

Arkansas

PINE BLUFF, ARK.—National Lead Co., New York, plans expenditure of $225,000 for a barite plant in the Magnet Cove section of Hot Springs county. Arkansas Power & Light Co. will construct 13,000-volt line to serve the plant.

Wisconsin

GILMAN, WIS.—Village, John F. Zeborowski, clerk, is having plans made for sewage disposal plant and sewer system and will apply for PWA funds. Frank J. Davy & Son, 802 Main street, La Crosse, Wis., is consulting engineer.

KOHLER, WIS.—Kohler Co., manufacturer of plumbing and heating fixtures, is taking bids on a five-story plant addition 80 x 200 feet. Richard Philipp, 756 North Milwaukee street, Milwaukee, is architect.

Minnesota

ALBERT LEA, MINN. — Interstate Power Co., Dubuque, Iowa, plans additions to generating capacity here and improvements to interconnected transmission lines, at cost of about $1,950,000.

BENSON, MINN.—City, S. A. Berg, clerk, is taking bids on a motor-driven deep well pump at waterworks plant.

MINNEAPOLIS — Lewis Bolt & Nut Co., manufacturer of bolts and nuts, plans one-story plant addition. Johnson & Johnson, 1511 Randolph street, St. Paul, are architects.

RED WING, MINN.—City, S. T. Irvine, clerk, plans to issue bonds for sewage disposal plant and intercepting sewer to cost about $200,000. M. E. Chamberlain, Montevideo, Minn., is consulting engineer.

Kansas

EMPORIA, KANS.—City, Robert W. Cunningham, clerk, awaits state legislature's approval of $75,000 bond issue to finance sewage disposal plant, plans for which have been approved by state board of health.

Nebraska

COOK, NEBR.—Village, L. H. Trank, clerk, will take bids until March 3 for materials and equipment for electric distribution system, including transformers, regulators and materials. H. H. Henningson, Service Life building, Omaha, Nebr., is consulting engineer.

FORT CROOK, NEBR.—Airplane manufacturing plant costing about $10,000,000 will be built here on plans by Albert Kahn & Associates, New Center building, Detroit, to be operated by Glen L. Martin Co. Site is about 200 acres. Buildings will include two-story manufacturing building 600 x 900 feet; one-story die-casting shop 100 x 260 feet; one-story oil storage building 100 x 100 feet; boiler house 50 x 100 feet; three-story engineering building and laboratory annex 60 x 300 feet; large warehouse and two hangars 150 x 400 feet each.

NAPER, NEBR.—Village, F. A. Putman, clerk, will take bids until Feb. 28 for a municipal electric lighting plant, including diesel engine generating plant and distribution system. H. H. Henningson, Service Life building, Omaha, Nebr., is consulting engineer.

OMAHA, NEBR.—Omaha Steel Works plans one-story machine shop 55 x 300 feet and one-story addition to steel fabricating plant 40 x 75 feet.

RULO, NEBR.—City, G. S. Lyon, mayor, will take bids Feb. 25 on a water softening plant costing about $19,000.

Iowa

DES MOINES, IOWA — Des Moines Electric Light Co. plans improvements to its power plant and distribution system, to cost about $700,000.

GARNER, IOWA—City, H. V. Reed, clerk, will take bids about March 10 for a sewage disposal plant and storm sewers. Currie Engineering Co., Webster City, Iowa, is consulting engineer.

GRAETTINGER, IOWA—City, C. E. Norris, clerk, will vote March 7 on construction of municipal electric light plant to cost about $100,000.

MALLARD, IOWA—Village, A. H. Stell, clerk, will take bids about April 10 for construction of a municipal electric light plant. K. R. Brown, 802 Valley Bank building, Des Moines, Iowa, is consulting engineer.

MAQUOKETA, IOWA—City, J. G. Thorne, clerk, takes bids to March 11 on a heavy-duty diesel engine of 1500 to 2500 horsepower, connected to alternating current generator and exciter, piping valves and connections. (Noted Feb. 17.)

SILVER CITY, IOWA—Village, Shirley Hendrix, clerk, plans special election on proposal to build municipal waterworks plant.

TRAER, IOWA — Village, Glenn H. Schwertley, clerk, is taking bids to Feb. 27 for construction of a sewage disposal plant, complete with accessories. E. E. Schenk, 214 Waterloo building, Waterloo, Iowa, is consulting engineer.

WAUKON, IOWA—City, Iver Thorsen, clerk, plans purchase of turbine-type

pump for its waterworks system, with 25-horsepower motor, capacity 150 gallons per minute.

Montana

GLASGOW, MONT.—Valley county, H. R. Bjorklund, county clerk, plans one-story maintenance garage and machine shop 79 x 120 feet.

California

FRESNO, CALIF.—Gipson Bearing Co. has been organized by N. O. Gipson to conduct business at 4190 Belmont avenue.

LOS ANGELES—Ajax Forge Co. has been incorporated with $25,000 capital by R. E. Jewell, Frank Miller and W. D. Stadler. David C. Moore Jr., 604 Merritt building, Los Angeles, is representative.

LOS ANGELES—Cadmium-Nickel Plating Co., 805 Hooper avenue, will build a new plant 119 x 119 feet, costing $20,000, at 1400 Long Beach avenue.

LOS ANGELES — Paulsen & Nardin, manufacturers of automobile and airplane parts, will build a plant at Laonis and Seville boulevards, containing 78,000 square feet floor space.

LOS ANGELES—Union Hardware & Metal Co. will build one story steel storage warehouse at First and Jackson streets, covering 37,000 square feet and costing about $125,000.

SAN DIEGO, CALIF. — Martinolich Shipbuilding Co. will build a welding shop 32 x 40 feet at the foot of Twenty-eighth street.

SAN DIEGO, CALIF.—Ryan Aeronautical Co. will build an assembly plant 75 x 225 feet, costing $100,000, at Lindbergh field.

SAN PEDRO, CALIF.—Thomas Machine Works has applied to Los Angeles harbor commission for a lease on the harbor frontage for a shipyard on Terminal island.

Oregon

PORTLAND, OREG. — Steel Tank & Pipe Co. will rebuild immediately three two-story plant buildings destroyed by fire, at cost of about $150,000, to continue production of defense materials under contract.

THE DALLES, OREG.—Special election will be held Feb. 26 on proposition to build municipal bridge across the Columbia river.

Canada

BURNABY, B. C. — Department of munitions and supply, Ottawa, Ont., will let contract soon for an addition to plant of Dominion Bridge Co. Ltd. for production of heavy guns and other armament, at cost of about $5,000,000. T. K. Sheils, Ottawa, Ont., is deputy minister.

NEW HAMBURG, ONT.—Hahn Brass Works Ltd. is taking bids until Feb. 26 for a plant addition to cost about $10,000. B. A. Jones, Kitchener, Ont., is architect.

SMITH FALLS, ONT.—Frost & Wood Co. Ltd., Chamber street East, agricultural implements, has let general contract to F. D. Scott, 8 Orchard street, for a two-story plant 75 x 100 feet.

ST. CATHARINES, ONT.—McKinnon Industries Ltd., Ontario street, will build a plant addition costing $200,000, general contract to Newman Bros., 127 St. Paul street.

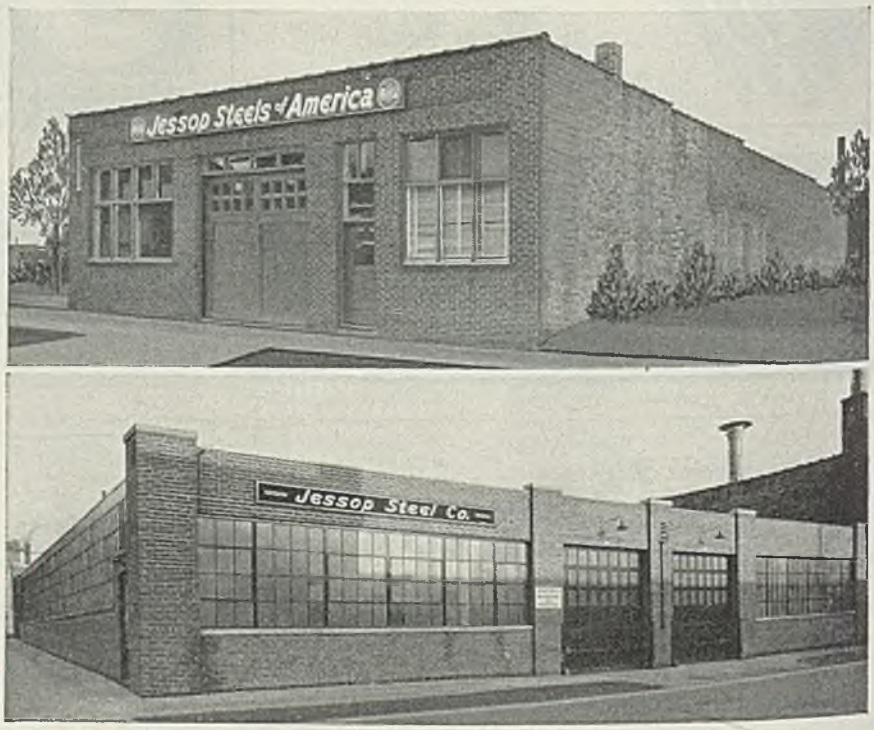
TORONTO, ONT.—Shell Oil Co. of Canada Ltd., Metropolitan building, has let general contract to Wells & Gray Ltd., Confederation Life building, for a technical products building, to cost about $100,000. R. G. Blackburn is engineer.

WELLAND, ONT.—Atlas Steels Ltd., Main street, has let general contract for buildings in $5,500,000 plant addition to J. Earle Smith Construction Co. Ltd., 28 James street South, Hamilton, Ont.; for $40,000 pump house to Redfern Construction Co., 36 Toronto street, Toronto.

DARTMOUTH, N. S.—Department of Munitions and Supply, Ottawa, Ont., has given contract to Foundation Maritime Ltd., 135 Lower Water street, Halifax, N. S., for seaplane and aircraft repair and overhaul base, costing about $500,000. Ross & McDonald, 1010 St. Catharine street, Montreal, Que., are architects.

MONTREAL, QUE.—Canadian Vickers Ltd., 5136 Notre Dame street, has let general contract to Atlas Construction Co. Ltd., 679 Belmont street, for a plant addition costing about $50,000.

Jessop Steel Co. Opens New Warehouses



Jessop Steel Co., Washington, Pa., has opened a new branch office and warehouse at Woodbridge and Walker streets, Detroit. David Hanna, district manager, is in charge. Jessop recently established a new warehouse at 1433 Hamilton avenue, Cleveland, and moved its branch office to that address. F. P. McGahan is Cleveland district manager.

USED and REBUILT EQUIPMENT
MATERIALS

USED MACHINERY FOR SALE

E-97	Crawford Sectional Oven	(H 35" W 48" D 35")	
	Oven Equip. & Mfg. Co.	(Gas Fired)	1919
E-188	Pawtucket Header	¾" No. 258	1903
E-185	Acme Upsetter	1½"	1907
E-326	Williams Cut Off	6" CD No. C-4900-25	
	Williams Tool Corp.		1925
E-327	Duplex Boring Mach.	Chas. Stecher Co.	1927
E-322	Tilted Offset Miller 48"	H—3 Oesterline Machine Co.	1927
E-195	Pin Roller	Waterbury-Farrel	1904
E-196	Acme Pin Pointer	M-9391	1914
E-192	Bulldozer	22 Williams White	1916
D-1654	Embossing Mach.	⅝" Link-Belt	
D-1792	Disc Drill Grinder	3 Besley	
D-1448	Vert. Shaper	Stevenson	1928
D-1639	Vert. Shaper	Stevenson	1930
D-1640	Vert. Shaper	Stevenson	1930
D-1380	Acme 4 Spd.	4" Stripped National Acme	1927
D-1902	Medart Straightening Mach.	Size 00 No. 807	1937
Howe 71	Geared Punch Press No. 38	No. 6867 Niagara Mch. & Tool Co.	1920

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40 KVA 220
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POST MILL, 6-1/2" bar Niles, R.P.T. M.D.
DIE SINKERS, E-3 and E-4 Keller, M.D.
GEAR PLANERS, 54" Gleason, bevel, M.D. (2)
GEAR CUTTER, 84" Newark, M.D.
LEVELLER, Plate, 84" Bertsch, 7 Rolls, M. D.
PRESS, Stoll 79-D, Bed 72"x26", M.D.
PLATE SHEAR, 10' x 3/8" United, M.D.

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1000 KW Westgh. Syn. Converter 250 v. 600 RPM 2 ped brg. with transformers and switchboard.
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2—400 KW Same as above except 80% P.F. Motors.
1—150 KW G.E. M-G Set 250 v. DC 2300 v. 3 ph. 60 cy. 1200 RPM 80% P.F. with panels.
1—150 KW West. M-G sets 550 v. cpd interpoled Generators 2300 v. 3 ph. 60 cy. Syn. Motors with panels.
2—100 KW Westgh. 3 wire M-G Sets 125/25 v. cpd interpole generator 80% P.F. Motors with panels.
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Press, Forging 150 ton United Steam Hyd.
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Shears, Gull. 2" Sq. & 4" Sq. B.D.
Shear, Plate 48"x¾" Ironton M.D.
Sheet Levellers, 48"-60"-84" McKay, 17 roll, M.D.
Slitters Gang, 36" Yoder M.D.

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G. E., Type MPC, form A Comp. wound, interpole, pedestal brgs., with magnetic reversing control panel, master controller and spare armature, condition equals new.

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ADVERTISING INDEX

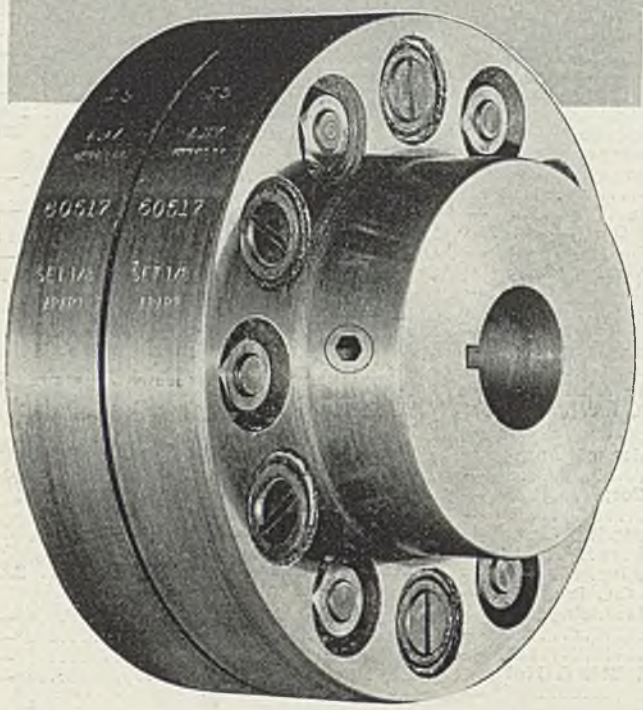
Where-to-Buy Products Index carried in first issue of month.

ADVERTISING INDEX

Where-to-Buy Products Index carried in first issue of month.

This AJAX CHECK CHART

gives you the Answers to your Questions about FLEXIBLE COUPLING DESIGN



	AJAX
DOES IT REQUIRE LUBRICATION? Ajax graphite-bronze bushings eliminate lubrication problems regardless of centrifugal force, angle of installation, or presence of dust or abrasive laden air.	NO
IS THERE A METAL FLEXING MEMBER SUBJECT TO FATIGUE? Constant compensation for misalignment sets up countless high speed flexing movements which result in fatigue and failure of metals. Ajax rubber bushings have inherent resiliency and recuperative powers to "take it."	NO
ARE THE RUBBER BUSHINGS SUBJECT TO FRICTION? In a flexible coupling, the rubber bushings should perform only ONE function . . . that of compensating for misalignment. Ajax rubber bushings are cold vulcanized to flanges . . . no friction . . . no scuffing . . . no wear.	NO
ARE THE RUBBER BUSHINGS SUBJECT TO SHEARING ACTION? In Ajax Flexible Couplings, hardened and ground steel studs in bronze bearings transmit all torque from driving to driven flange. Rubber bushings are not subject to shearing action between flanges.	NO
IS FREE END-FLOAT PROVIDED? Ajax design eliminates thrust between driving and driven machines. Electric generators or motors find their magnetic center.	YES
DOES IT PROVIDE DI-ELECTRIC INSULATION? Ajax rubber bushed design provides di-electric insulation between motors, generators, converters and driven machines at normal working voltages.	YES
DOES IT ELIMINATE BACKLASH? Ample bearing area . . . interlocking multiple drive studs . . . elimination of lubrication problems . . . precision machined to close tolerances . . . positive resilient drive—all combine to eliminate backlash.	YES
IS IT QUIET IN OPERATION? Elimination of backlash . . . reduction of wear . . . rubber cushioning—Ajax Flexible Couplings provide "rubber heels" for direct-connected machines. When it is quiet, it is efficient!	YES
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