STEEL

ESTABLISHED 1882

Contents

Volume 109—No. 13 September 29, 1941

PRODUCTION • PROCESSING • DISTRIBUTION • USE

Experience of Years

STORED UP

in Helpful Literature...

The pressing demands of the defense program call for the employment of every skill and facility at the disposal of the metal working industries.

Among the resources available is the experience of our technical staff in the solution of problems involving the use of Nickel and its alloys.

This experience has been distilled into helpful literature which deals with the selection, fabrication and uses of these materials. This printed matter is yours for the asking. You are also offered the assistance of our technical staff in solving problems of material arising from the temporary lack of Nickel.

Your inquiries addressed to the Company either for literature or personal consultation will receive prompt attention.

Nickel

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK, N. Y.

HIGHLIGHTING THIS ISSUE OF STEEL

■ PROGRESS is being made in the campaign to subcontract more defense work, not only to expand defense production but to provide work for plants now threatened by shortages of materials. A subcontracting "clinic" at New York and a defense "roundup" in Ohio and Western Pennsylvania **(p. 21-22)** last week benefitted this cause. OPM's Contract Distribution Service, formerly the Defense Contract Service, is to have more field offices. This OPM branch has asked 56 important defense contractors to appoint one of their "ablest executives to take charge of subcontracting . . . . and to act as liaison officer". Last week's meetings revealed that 90 per cent of prospective subcontractors require changes in tooling and equipment.

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Forecasts 1942 Auto Output

To further simplify the task of reading the ramified news out of Washington STEEL **(p. 32)** summarizes the highlights of last week's priority, price and other business news—and will render this service weekly . . . . A national survey of compliance with the priority system **(p. 32)** is under way . . . . For the benefit of parts and materials producers **(p. 37)**, A. H. Allen, STEEL'S Detroit editor forecasts the volume of automobile production over the entire 1942 model year . . . . Evidence that aviation is to be the next great mass production industry is analyzed **(p. 41)** in Wing Tips . . . . Leon Henderson **(p. 50)** goes on record as opposing a continuation of federal emergency controls after the war comes to an end.

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Stainless Steel Airplane Flown

It is hoped that steel industry problems will be solved more easily **(p. 35)** through appointment of 18 new subcommittees . . . . Copies of a pamphlet containing the new British standard steel specifications are available **(p. 31)** from the British Standards Institution . . . . In this country an OPM committee **(p. 30)** is tackling the same objective and is making a start with carbon and alloy plates and aeronautic steels . . . . Designs have been prepared **(p. 24)** for 75-ton bessemer converters and 2000-ton mixers . . . . Contracts are beginning to be placed **(p. 24)** under the government-financed steelworks expansion program . . . . The first stainless steel military airplane **(p. 23)** was flown last week . . . . Is steel labor trouble ahead **(p. 25)?**

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Assembling Optical Parts

This week Professor Macconochie describes **(p. 58)** methods of assembling optical parts for fire-control instruments such as the rangefinder. . . . The American Society for Testing Materials approves **(p. 72)** 34 new specifications; some information on steel, nonferrous, copper alloy specifications is outlined. . . . Alloy Casting Institute adopts standard system **(p. 76)** for designating nickel-chromium and straight chromium alloys. . . . Paul J. McKimm discusses **(p. 78)** the melting phase in the manufacture of high-quality low-cost steel and presents much data accumulated on this subject. . . . New equipment includes a shell marking machine **(p. 88)** and a shell case welder **(p. 76).**

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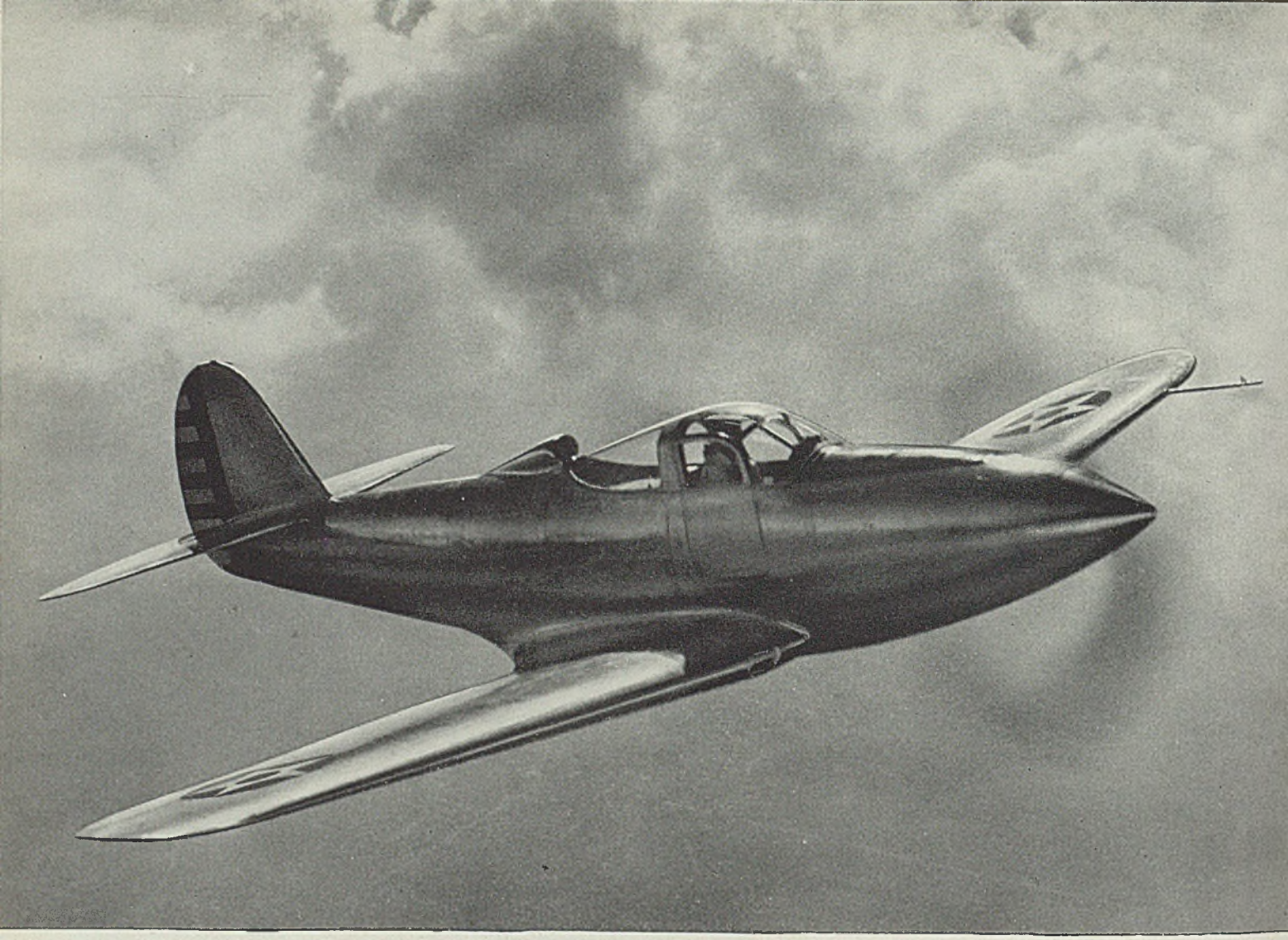
Those Hidden Possibilities

Guy Hubbard, STEEL'S machine tool editor, shows **(p. 56)** some of the hidden possibilities of ordinary machine tools and how they can be utilized to handle unusual operations. . . . Much information of arc welding electrodes and their performance on various types of work is given **(p. 62)** by E. W. P. Smith in Section V on his series devoted to getting more from arc welding. . . . Electric salt-bath furnaces are now provided **(p. 75)** with fully mechanized handling facilities, assuring more accurate control of work. . . . Projectile heat-treating equipment and procedures are presented **(p. 84)** by W. M. Hepburn in the second of his series on ordnance work.



Ryerson Certified Steels Help Build Airacobras

When stepped-up production schedules for these speedy fighter-planes demand quick shipment of uniform, high quality steel, Bell Aircraft Corp. calls Ryerson. Special sheets . . . alloys . . . hot and cold rolled bars . . . strip steel . . . tool steel . . . stainless steel and many other Ryerson products vital to America's Emergency are used by Bell in building the Airacobras.

Stocks at the 10 Ryerson plants are reasonably complete, and service in general is prompt. In times like these, naturally many sizes of certain products are low, some are out. But for the most part, you can depend on Ryerson for good service on thousands of different kinds, shapes and sizes of steel and allied products. Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Cleveland, Detroit, Buffalo, Philadelphia, Boston, Jersey City.

RYERSON *Certified* **STEELS**

RYERSON CERTIFIED STEELS

Defense Clinic Reveals 90% Potential

Subcontractors Need New Equipment

Negotiations started on 35 per cent of 2670 contracts offered . . . Find metal stamping shop capacity more than adequate. Forging plants, however, are heavily engaged . . . Odlum announces division will open new field offices

NEW YORK

■ NEGOTIATIONS for subcontracting were started on 35 per cent of 2670 contracts, between holders of the prime defense awards and smaller manufacturers, at a nationwide "clinic" sponsored by OPM's Division of Contract Distribution here three days last week. Defense items to be sublet were exhibited.

Subcontractors to the number of 4800 registered, and probably close to 5500 attended, mainly from New York, New England and New Jersey.

Of those present, 3500 had been "analyzed" previously as to their manufacturing facilities and machine tool equipment.

Prime contractors numbering 130 were represented with requirements and items offered for subcontracting.

Few Prospects Prepared

Prospects previously surveyed had been advised promptly by card what firms to interview for subcontracts.

Fully 90 per cent of prospective subcontractors were found to require changes in tooling or equipment. The number in position to take on work for immediate production without some readjustments in equipment is relatively few.

Metal stamping shops are in the forefront of those seeking defense work. While subcontracting of stamped parts is heavy and steadily mounting, the shops engaged in this type of work represent an excess of potential capacity, despite heavy demands from prime contractors. The outlook for a considerable number of stampers for obtaining many subcontracts was reported to be "none too bright."

On the other hand, forging shops are heavily engaged with large defense orders. Lack of idle equipment in this branch makes it difficult to place subcontracts.

On Tuesday 402 negotiations were started between primes and 1147 promising subs, this ratio holding throughout the three days.

Prospective subcontractors were classified in three groups: First, a small class ready to go into production on parts and products at once; a second, including most of those requiring some revisions in plant equipment; and third, a group not likely to fit into the defense program, these to be turned over to the Civilian Supply Branch of the OPM.

Where possible, changes will be made at plants to fit them into the defense picture. In some instances, it was declared, holders of prime contracts are attempting to do the easiest part of the work and trying to farm out the most difficult.

However, subcontracting by private negotiation by the majority of prime contractors is well regulated and expanding successfully. Aircraft engine builders, makers of aircraft parts, and builders of tanks and combat vehicles were cited in this latter class. In many of such instances production had been originally planned with subcontracting in view and special staffs had charge of farming out the work.

The increasing number of defense "clinics" is taking much time and effort on the part of both primes and subs, and more care will be needed in future.

Attendance everywhere is large, but a surprising number of prospective subcontractors have only a vague idea of procedure, a lack of understanding shared even by some prime contractors.

Odlum Asks Defense Manufacturers To Appoint Subcontracting Officers

■ FIFTY-SIX companies holding large prime defense contracts were requested to appoint one of their "ablest executives to take charge of subcontracting to small enterprises and to act as liaison officer" with the OPM Division of Contract Distribution by Floyd B. Odlum, director of the division.

In a letter to the companies last week Mr. Odlum said: "Orders for defense goods have piled up in a comparatively few of the larger more efficient plants of the country. At the same time many smaller plants able to work, but lesser known to procurement officers or less efficient, have been without work.

"Because of the tremendous all-out defense effort, thousands of small businesses which have been busy up to now face a shutdown due to lack of materials for civilian production. . .

"You can well imagine the social catastrophe and economic dislocation which might follow if these small enterprises are put out of business.

Such a tragedy must not happen and with your help it will not happen. . . . We must have practical action at once. As a first step in this practical action, I request you . . . to appoint one of your ablest executives to take charge of subcontracting to small enterprises and organize it intensively within your ranks. I want this man also to be appointed to act as liaison officer between my division and your company. He will bring your problems to us and our problems to you," he wrote.

Mr. Odlum announced Friday that field offices of his department will be organized with at least one office in each state, and some states having several officers, reporting to a central executive pertaining to industrial facilities in each area.

In addition to 39 offices absorbed from the former OPM Defense Contract Service, offices are being opened immediately in Hartford, Conn., Providence, R. I., Columbus, O., and Indianapolis, with others to be opened shortly in many other cities as fast as personnel can be assigned.

Existing small branch offices at Harrisburg, Wilkes-Barre and Allentown, Pa., are to be enlarged. In the meantime, "action is being taken among holders of prime contracts to stimulate division of future contracts on defense work to available smaller industries."

OPM's Steel Expansion Recommendations Due This Week

■ OPM's steel expansion recommendation is scheduled to be presented to the Supply Priorities and Allocations Board at its meeting Tuesday, Sept. 30. After it has been approved by SPAB, the report will be forwarded to the President, at which time it is expected to be made public. Unconfirmed reports have variously placed the amount of expansion to be recommended at 10,000 000 to 13,000,000 tons of ingot capacity.

Pig iron capacity will be increased nearly 1,750,000 tons annually by an expansion program to be started immediately by Republic Steel Corp., Cleveland, under an agreement with the Defense Plant Corp.

Included in the program are four blast furnaces, 276 by-product coke ovens, increased sintering, concentrating and by-product capacity and expansion of both iron ore and coal mining operations and installation of a large amount of auxiliary equipment.

Facilities will be paid for and owned by the Defense Plant Corp. and operated by Republic.

Defense Plant Corp. also is reported to have virtually completed negotiations with Inland Steel Co., Chicago, for a $35,000,000 expansion program.

The Republic program will affect scattered areas. Facilities to be built and their locations:

CLEVELAND: Two 1275-ton blast furnaces (annual capacity approximately 900,000 tons), duplicates of the corporation's Warren blast furnace; two batteries of coke ovens of 75 ovens each, with a by-product recovery plant; additional dock facilities for iron ore handling.

YOUNGSTOWN: A 1120-ton blast furnace (annual capacity approximately 392,000 tons).

GADSDEN, ALA: An 800-ton blast furnace (annual capacity approximately 280,000 tons); battery of 65 coke ovens, with by-product recovery and benzol plants; enlarged coke wharf.

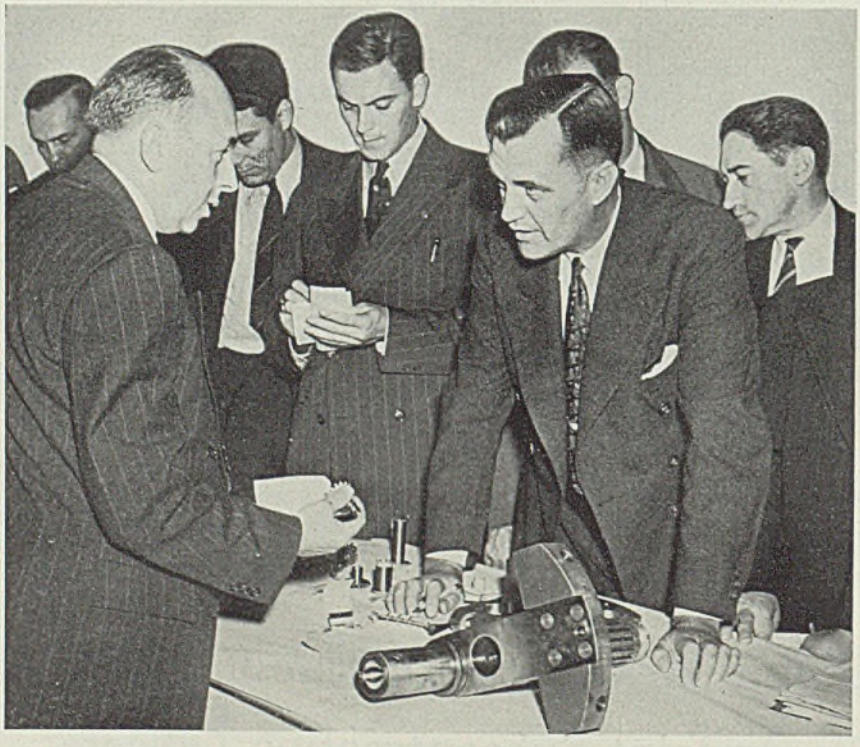
These four furnaces will produce approximately 1,572,000 tons annually. The balance of the increase will come from use of high iron content Port Henry sinter in existing furnaces in the Mahoning Valley.

BIRMINGHAM, ALA: Enlarged concentrating plant and a sintering plant at Spaulding ore mine, and reopening of Sayre coal mine.

WARREN, O: Sixty-one coke ovens; a new coke wharf, coke handling equipment, coke screening system, and a new by-product building; and a sintering plant to

(*Please turn to Page* 106)

"Primes" and "Subs" in Ohio, Pennsylvania Roundup



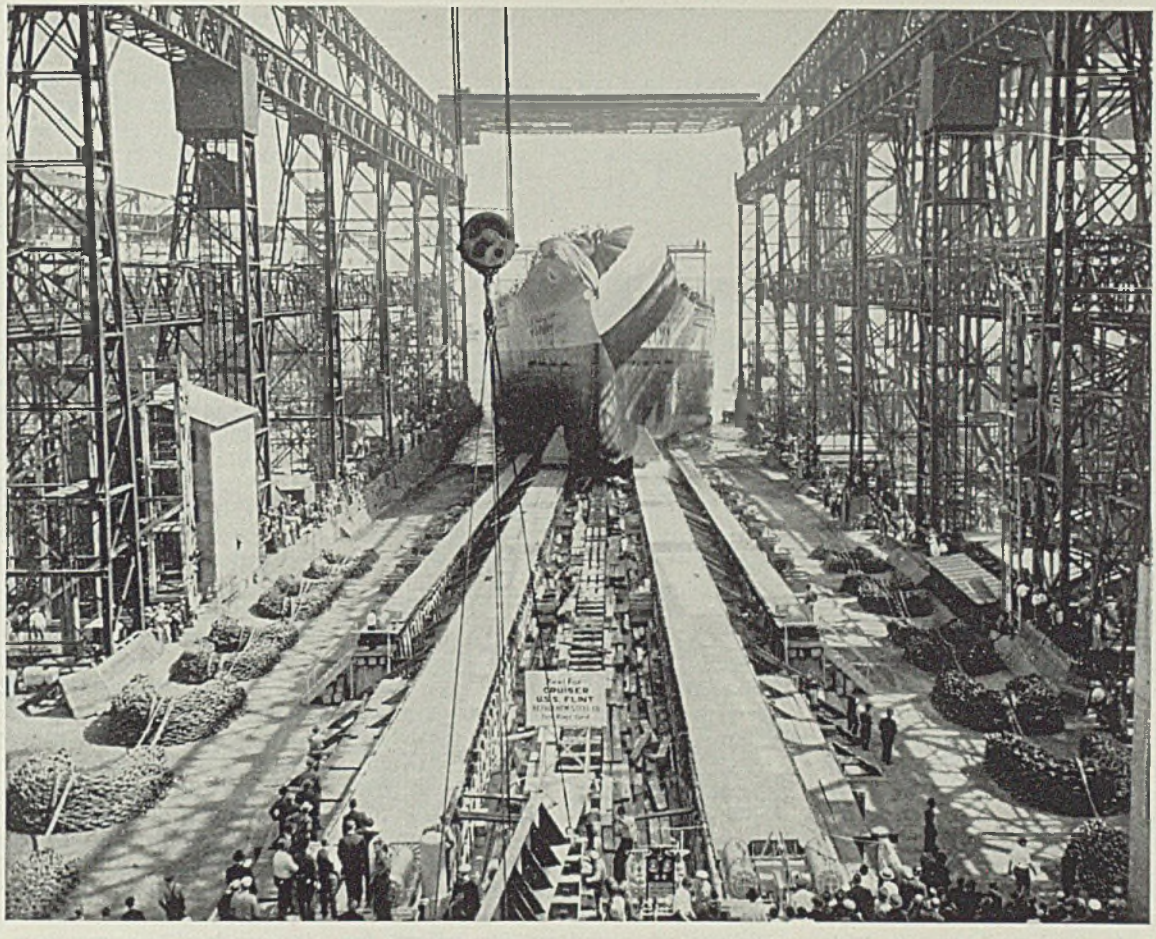
■ The staff of the Cleveland branch of OPM's Defense Contract Service is tabulating results of the "round-up" which carried them into seven Ohio cities and Erie, Pa.

Representatives of more than 4000 small manufacturers attended the sessions, examined blue prints, specifications, samples, photographs and models. Several contracts were negotiated "on the spot." At Cleveland last Wednesday one official witnessed the signing of a $150,000 contract, and another for $70,000.

It is estimated that 1000 negotiations are in progress between prime and subcontractors.

An average of 30 contractors with perhaps $5,000,000,000 in defense contracts displayed specifications and samples.

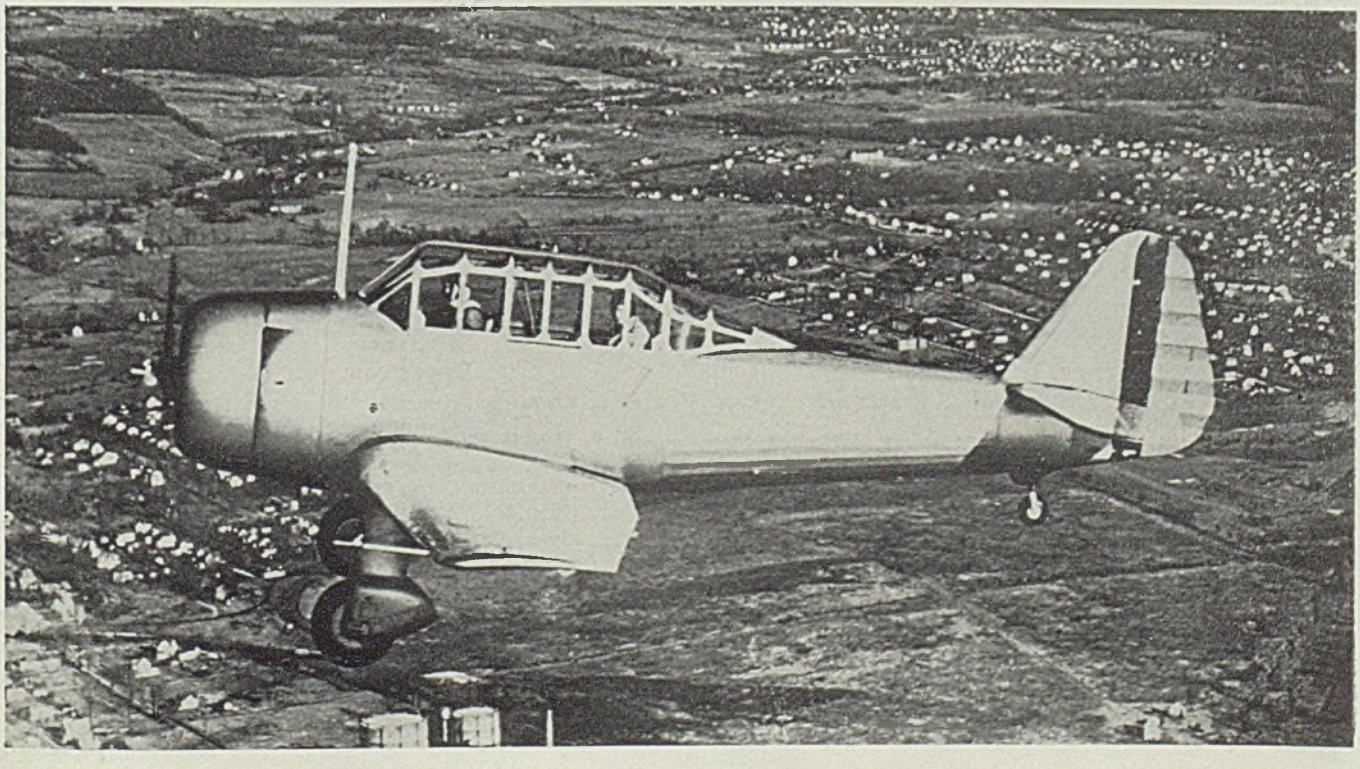
Illustrated is a group that attended the Cleveland meeting. F. W. Lorenz (left foreground), production engineer, Continental Motors, Detroit, is explaining parts and processes to D. C. Sawyer (foreground right), chrome division, C. L. Gougler Machine Co., Kent, O.—*Cleveland Press* photo



"First-Line-of-Defense" News of the Week, Illustrated

■ Above, U.S.S. MASSACHUSETTS, $75,000,000, 35,000-ton dreadnaught sliding down the ways at Bethlehem Steel Co.'s Fore River yard, Quincy, Mass. Immediately a crane swung into position on these ways the keel for the new light cruiser U.S.S. FLINT. Associated Press photo

■ Below, first stainless steel military airplane ever built —a basic trainer for the United States Army Air Corps by Fleetwings Inc. of Bristol, Pa.—making test flight. The use of stainless spot-welding was employed extensively in its construction, company reports. Acme photo



Wagner Act Greatest Obstacle to Defense, Steel Engineers Told

■ MAXIMUM production is the nation's most vital need today, and the greatest obstacle to this is the Wagner act, declared E. J. Kulas, president, Otis Steel Co., Cleveland, last week. He spoke at the banquet of the Association of Iron and Steel Engineers, which held its thirty-seventh annual convention and exhibition in Public Auditorium, Cleveland.

The act should be amended immediately, he said, to provide for "a cooling-off period" between a strike vote and the actual calling of a strike; to provide for a vote of all employes on the issue of a strike; to deny reinstatement and back pay to those participating in violence in a strike; and amended so that a strike enforced by a minority, contrary to a majority vote, would be outlawed.

During the past year the membership of the association was increased by 216 members. Announcement was made that the association's new 550-page book describing all wide strip mills in this country will be ready for distribution in November. It is probable that next year's meeting will be held in Pittsburgh.

F. W. Cramer, electrical engineer, Carnegie-Illinois Steel Corp., Pittsburgh, in presenting the crane specification committee's report stressed the fact that bad joints in crane trackage cause more impact than is set up at the skull crackers. He pointed out that it is easier to maintain sound runways than to design cranes on a heavier basis.

42% Ore Bridges 30 Years Old

Forty-two per cent of the ore bridges in this country are more than 30 years old; only 11 per cent have been built during the past 15 years. These data were mentioned by G. Wolfe, special engineer, Dravo Corp., Pittsburgh. He expressed the opinion that the probable safe life of bridge cranes cannot be more than 30 years when operated under normal stress conditions. In some cases the trolley has been made largely of aluminum to afford a greater load carrying capacity.

In discussing a paper dealing with bessemer design and operation, J. S. Fulton, Ingersoll-Rand Co., New York, pointed out that in some installations 30 per cent of the generated air never reaches the bessemer vessel. Further discussion of this paper by H. McFeaters, chief engineer, Pennsylvania Engineering Works, New Castle, Pa., brought out the fact that designs already are prepared for 75-ton bessemer converters and 2000-ton mixers. The maximum under American practice at present is 30-ton bessemers and 1700-ton mixers.

H. W. Graham, director of metallurgy and research, Jones & Laughlin Steel Corp., Pittsburgh, raised a question that should interest steelmakers. He pointed out that in 1940 we made 67,000,000 tons of openhearth steel, 3,500,000 tons of bessemer steel and 2,000,000 tons of duplex steel. This year indications are that open hearths will produce 82,000,000 tons, bessemers 5,000,000 tons and the duplex process a little under 3,000,000 tons. Converter capacity of the country can blow 16,000,000 tons at present.

"The country needs more steel we are told," stated Mr. Graham. "If we are to produce 90,000,000 tons of steel next year how are we going to do it?

"New blast furnaces will give us more iron but if we are to make

New Officers and Directors of Association of Iron and Steel Engineers

Top row, left to right:

I. N. Tull, electrical superintendent, Republic Steel Corp., Cleveland; director.

James Farrington, electrical superintendent, Wheeling Steel Corp., Steubenville, O., honorary director.

A. R. Dibben, assistant electrical superintendent, Youngstown Sheet & Tube Co., East Chicago, Ind.; director.

C. H. Williams, assistant chief engineer, Carnegie-Illinois Steel Corp., Pittsburgh; director.

C. L. McGranahan, assistant general superintendent, Jones & Laughlin Steel Corp., Pittsburgh; second vice president.

C. C. Wales, vice president, Hamilton Bridge Co. Ltd., Hamilton, Ont.; director.

P. F. Kinyoun, combustion engineer, Bethlehem Steel Co., Lackawanna, N. Y.; director.

W. H. Burr, electrical superintendent, Lukens Steel Co., Coatesville, Pa.; honorary director.

Lower row, left to right:

G. C. Pfeffer, superintendent of power, Florence Pipe Foundry & Machine Co., Florence, N. J.; director.

W. J. Wilson, chief electrician, American Cast Iron Pipe Co., Birmingham, Ala.; director.

F. H. Dyke, superintendent blooming, bar and hot strip mills, Wheeling Steel Corp., Steubenville, O.; director.

T. E. Hughes, superintendent of maintenance, Carnegie-Illinois Steel Corp., Duquesne, Pa.; president, in center of group.

F. E. Flynn, district manager, Republic Steel Corp., Warren, O.; first vice president.

R. S. Shoemaker, lubrication engineer, American Rolling Mill Co., Middletown, O.; director.

Brent Wiley, Association of Iron and Steel Engineers, Pittsburgh; managing director.

L. F. Coffin, superintendent mechanical department, Bethlehem Steel Co., Sparrows Point, Md., and newly elected treasurer of the association, was not present when group picture was taken.

more steel then we must use more iron because of the scrap shortage. You can build more open-hearth furnaces or you can put more iron through the bessemer converter." He warned engineers, operators and metallurgists that they must face the future of making more steel with a larger percentage of iron than they have in the past, and this involves a larger use of the bessemer process.

M. F. Morgan, engineer, Republic Steel Corp., Cleveland, emphasized the fact that no sintering plant should be built solely for the purpose of sintering flue dust. Advantage should be taken of the excess carbon in the dust to sinter fine iron ore, as well. He explained that the best way to handle sludge is to first filter it and then ease it into the sintering mixture in as small doses as possible. He cited the use of an ignition furnace which extends 83 inches over the bed. At this 1000-ton plant the pallets move at the rate of 83 inches per minute, thus affording a 1-minute ignition period. He warned operators that tonnage at sintering plants is being jeopardized merely because they are "babying" their ignition systems.

The Otis Steel Co. was host to about 500 members and guests of the association Wednesday afternoon. A tour was made of the hot and cold strip mills.

Pressure for Higher Steel Wages Growing

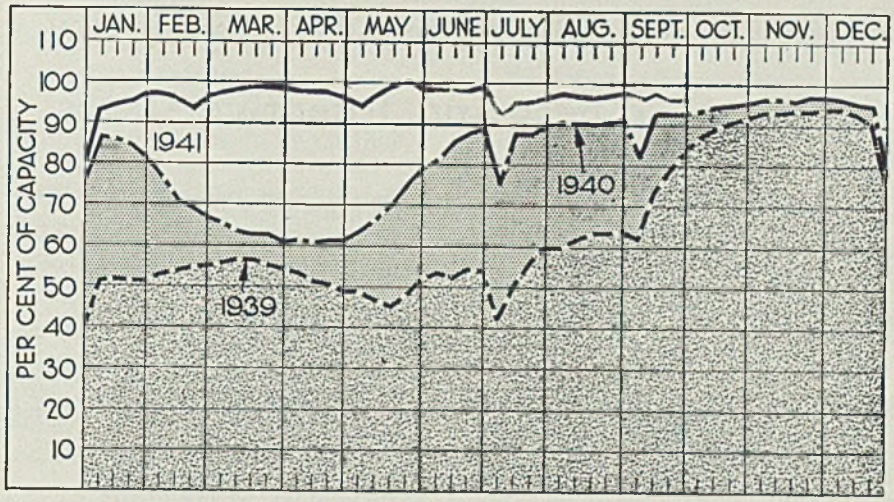
PITTSBURGH

■ Predictions that new labor difficulties soon will arise in the steel industry are being made by some observers here. They believe that when the Steel Workers Organizing Committee winds up its negotiations with the "Little Steel" companies, the union will turn its attention to the realignment of present contracts. Principal issues will be the closed shop, either with or without checkoff, and increases in wages.

Increasing pressure for higher wages is coming from the rank and file of union membership. Some sporadic disputes have arisen, such as the illegal walkouts at Benwood Works of Wheeling Steel Corp., where workers demanded a 35 per cent increase.

On the closed shop issue, the recent difficulties at Clairton coke works of Carnegie-Illinois Steel Corp. are a good example. Several hundred workers sat down, also illegally, because two did not belong to the union.

Some of the locals in this district already are on record with wage increase resolutions, contending the increase granted last spring has been absorbed by increased living costs.



PRODUCTION . . . . Steady

■ PRODUCTION of open-hearth, bessemer and electric furnace ingots last week continued at 96 per cent. Three districts advanced slightly, three were lower and six were unchanged. A year ago the rate was 93 per cent; two years ago it was 84 per cent.

Youngstown, O.—With 76 open hearths and three bessemers in production the operating rate continued at 98 per cent. Carnegie-Illinois Steel Corp. blew in a blast furnace at Ohio works after relining. A stack at Brier Hill works of Youngstown Sheet & Tube Co. was blown out for a new lining.

Chicago—Rose 1 point to 101 per cent. Three plants increased production slightly, two dropped and one was unchanged. Four of the six plants are well above rated capacity.

Cincinnati—Off 5 points to 83 per cent. Four open hearths are now idle for repair.

Birmingham, Ala.—Steady at 95 per cent, with 23 open hearths in production.

St. Louis—Declined 7 points to 91 per cent as result of labor trouble affecting one producer.

Detroit—Declined 8 points to 87 per cent as four open hearths were taken off for repairs. Resumption is expected this week.

Central eastern seaboard—Maintained 95 per cent for the fourth week.

Buffalo—Held 90½ per cent.

New England—With one open hearth still down for repairs the rate continued at 90 per cent.

Pittsburgh—Repairs held production at 98 per cent, though pressure for output calls for a higher rate.

Wheeling—Advanced 5 points to 91 per cent, making up part of the previous week's decline.

Cleveland—Sharp increase by one producer and small gain by another advanced the rate 1 point to 95½ per cent.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Sept. 27	Change	Same week 1940	Same week 1939
Pittsburgh	98	None	88.5	79
Chicago	101	+ 1	96	84
Eastern Pa.	95	None	92	61
Youngstown	98	None	84	86
Wheeling	91	+ 5	97	88
Cleveland	95.5	+ 1	86	87.5
Buffalo	90.5	None	90.5	72
Birmingham	95	None	97	86
New England	90	None	85	100
Cincinnati	83	— 5	88	78.5
St. Louis	91	— 7	80	72
Detroit	87	— 8	94	99
Average	96	None	93	84

Monarch Completes 25,000th Engine Lathe

■ Surprise party staged by employes in honor of Wendell E. Whipp, president, Monarch Machine Tool Co., Sidney, O., was held last week to commemorate completion of the twenty-five thousandth engine lathe manufactured by the company.

Group of 34, each with more than 20 years' service at Monarch, gathered at Mr. Whipp's home to express their appreciation of his leadership. Bronze plaque of the plant, bearing names of all who have served 20 years or more and testifying to Mr. Whipp's development of the enterprise, was presented him by the company's oldest employe in terms of service.

OPM Issues Complete List of Priority Orders, Numbers and Effective Dates

■ A TABULATION of "M" orders, "P" orders, "E" orders and "L" orders and several miscellaneous was issued last week by the Division of Priorities, Office of Production Management.

"M" Orders

An order in this class, which can usually be identified by an "M" serial number—for example, M-3, M-10, etc.—is designed to regulate the distribution and flow of a given material into defense and essential civilian channels.

The typical order in this class is imposed on the supply of a raw material, for example, zinc. It defines "defense orders" and provides that such orders must be given preference over nondefense orders; it sets up various rules and regulations governing the distribution of the material. Each order varies in detail, because of the differing problems in each material.

The "M" order (M for material) differs completely from the limited blanket-rating orders in the "P" series. An "M" order, for example, tells how a given material may be distributed; a "P" order helps the company or companies holding it to get the material. Thus an "M" order regulates distribution of steel, while a "P" order has been granted to freight car builders to help them get steel. The list of "M" orders follows:

M-1: Aluminum, effective March 22, 1941.

M-1-a: Supplementary Order—Schedule of Preference Ratings, effective March 22, 1941.

M-1-b: Supplementary Order—Modifies M-1 and M-1-a with respect to deliveries of low-grade aluminum, effective April 11, 1941. (Extension)—extends M-1, M-1-a and M-1-b to Dec. 31, 1941, effective May 20, 1941.

M-1-c: Supplementary Order—To direct the distribution of aluminum scrap and secondary aluminum, effective June 10, 1941.

M-2: Magnesium, effective March 24, 1941.

M-2-a: Supplementary Order, effective March 24, 1941. (Extension)—Extends M-2 to Sept. 30, 1941, effective April 2, 1941.

M-3: Tungsten, effective March 26, 1941.

M-3-a: Supplementary Order—Preference Rating Schedule, effective March 26, 1941. (Extension)—Extends M-3 and M-3-a to Aug. 31, 1941, effective June 20, 1941. Note: M-3 and M-3-a revoked by GPO M-29, issued Aug. 30, 1941.

M-4: Neoprene, effective March 28, 1941. Note: M-4 expired June 30; included under provisions of M-13 issued June 9, 1941.

M-5: Nickel-bearing Steel, effective April 10, 1941.

M-5-a: Supplementary Order, effective April 10, 1941. (Amendments), effective April 30, 1941.

M-5-b: Supplementary order, effective June 17, 1941. Note: M-5, M-5-a and M-5-b, as amended, revoked by GPO M-21-a issued Sept. 16, 1941.

M-6: Nickel, effective May 15, 1941.

M-7: Borax and Boric Acid, effective June 9, 1941.

M-7-a: Supplementary Order—Extends M-7 to July 30, 1941. (Extension)—Extends M-7 to Aug. 30, 1941. Note M-7 expired Aug. 30, 1941

M-8: Cork, effective May 31, 1941.

M-9: Copper, effective May 29, 1941. (Amendment), effective June 10, 1941. (Amendment), effective July 9, 1941.

M-9-a: Supersedes M-9, as amended, effective August 2, 1941.

M-10: Polyvinyl Chloride, effective June 9, 1941.

M-11: Zinc, effective July 1, 1941. (Amendment), effective July 1, 1941.

M-11-a: Supplementary Order, effective July 1, 1941.

M-11-b: Supplementary Order, effective Aug. 1, 1941.

M-11-c: Supplementary Order, effective Sept. 1, 1941. (Interpretation), effective Sept. 15, 1941.

M-11-d: Supplementary Order, effective Oct. 1, 1941.

M-12: Cotton Linters, effective Aug. 10, 1941. (Extension)—Extends M-12 to July 31, 1941, effective Sept. 10, 1941.

M-13: Synthetic Rubber (includes Neoprene), effective June 9, 1941.

M-14: Tungsten High-speed Steel, effective June 11, 1941.

M-15: Rubber, effective June 20, 1941.

M-15-a: Supplementary Order, effective June 27, 1941. (Amendment), effective Aug. 4, 1941. (Amendment)—White Sidewall Tires, effective Aug. 8, 1941.

M-16: Tricresyl and Triphenyl Phosphates, effective Aug. 30, 1941.

M-17: Pig Iron, effective Aug. 1, 1941.

M-18: Chromium, effective July 7, 1941. (Amendment), effective Aug. 22, 1941.

M-19: Chlorine, effective July 26, 1941.

M-20: Calcium-Silicon, effective, July 29, 1941

M-21: Steel, effective Aug. 9, 1941. (Amendment), effective Sept. 9, 1941.

M-21-a: Supplementary Order—Relating to Alloy Iron, Alloy Steel and Wrought Iron, effective Sept. 16, 1941.

M-21-b: Supplementary Order—Relating to Steel Warehouses, effective Sept. 3, 1941. Note: M-5, M-5-a, M-5-b, as amended, revoked by M-21-a.

M-22: Silk, effective July 26, 1941. (Amendment), effective Aug. 2, 1941. (Amendment), effective Aug. 12, 1941. Interpretation, effective Aug. 26, 1941.

M-23: Vanadium, effective Aug. 14, 1941.

M-25: Formaldehyde, Paraformaldehyde, Hexamethylenetetramine and Synthetic Resins, effective Aug. 23, 1941. (Amendment), effective Aug. 28, 1941.

M-26: Silk Waste, Silk Noils, and Garnetted or Reclaimed Silk Fiber, effective Aug. 8, 1941. (Amendment), effective Sept. 5, 1941.

M-27: Phenols, effective Aug. 30, 1941.

M-28: Chlorinated Hydrocarbon Refrigerants, effective Aug. 22, 1941.

M-29: Tungsten, effective Aug. 31, 1941. Note: M-3 and M-3-a revoked by GPO M-29.

M-30: Ethyl Alcohol and Related Compounds, effective Aug. 28, 1941.

M-31: Methyl Alcohol, effective Aug. 28, 1941.

M-32: Potassium Perchlorate, effective Aug. 28, 1941.

M-33: Potassium Permanganate, effective Aug. 28, 1941.

M-34: Toluene, effective Aug. 28, 1941.

M-35: Phosphorus Oxychloride, effective Aug. 30, 1941.

M-36: Manila Fiber and Manila Cordage, effective Aug. 29, 1941.

M-37: Rayon Yarn, effective Sept. 13, 1941.

M-37-a: Supplementary Order, effective Oct. 1, 1941.

"P" Orders

The following list is a tabulation of limited blanket ratings issued so far by the Division of Priorities.

A limited blanket rating, which can usually be identified by a "P" serial number—for example, P-17, P-22, etc.—is a rating granted to a company or group of companies to facilitate the acquisition of scarce material needed by these companies for defense or essential civilian production.

The blanket rating is differentiated from the ordinary individual preference rating certificate in this way: the individual certificate applies to an individual order or contract; the blanket rating can usually be used continuously over a set period of time to apply to many deliveries of scarce materials. The blanket rating, in other words, covers continuing operations while the individual rating applies only to one order or contract. The "P" orders:

P-1: Material for the Production of Electric Traveling Cranes, effective March 12, 1941, rating A-1-c. Note: Revoked by PRO P-5.

P-2: Material for the Production of Machine Tools, effective March 28, 1941, rating A-1-a. Note: Revoked by PRO P-11.

P-3: Material Entering into the Production of Airframes, effective April 29, 1941, rating A-1-d. (Extension No. 1)—Extends P-3 to Oct. 31, 1941, effective Sept. 18, 1941.

P-4: Material Entering into the Production of Airplane Engines and Propellers, effective April 29, 1941, rating A-1-c. (Extension No. 1)—Extends P-4 to Oct. 31, 1941, effective Sept. 18, 1941.

P-5: Material Entering into the Production of Cranes, effective May 26, 1941, rating A-1-a. (Amendment), effective June 14, 1941. Note: Revokes PRO P-1.

P-5-a: Material Entering into the Production of Cranes and Hoisting Equipment, effective Aug. 1, 1941, rating A-1-a. Note: Revokes PRO P-5.

P-6: Defense Supplies Rating Plan, effective date May 31, 1941, rating A-10.

P-6-a: Civil Aircraft, Repair Parts and Accessories, effective July 21, 1941, rating A-10.

P-7: Material and Equipment Entering into the Production of Merchant Ship Construction, effective June 12, 1941, ratings A-1-a (1941), A-1-b (1942), A-1-c (1943).

P-8: Material Entering into Freight Car Construction, effective June 18, 1941, rating A 3.

P-9-a: Materials Entering into the Production of Airframes for Heavy Bombers, effective June 26, 1941, rating A-1-b.

P-9-b: Aircraft Engines for Heavy Bombers, effective June 26, 1941, rating A-1-b.

P-9-c: Aircraft Propellers for Heavy Bombers, effective June 26, 1941, rating A-1-b.

P-9-d: Gun Turrets for Heavy Bombers, effective June 30, 1941, rating A-1-b.

P-9-e: Gun Sights, Bomb Sights and Gunfire Controls for Heavy Bombers, effective June 30, 1941, rating A-1-b.

P-9-f: Turbo Superchargers for Heavy Bombers, effective June 30, 1941, rating A-1-b.

P-10: Material and Equipment Entering into the Conversion of Ships, effective June 19, 1941, rating AA.

P-11: Material for the Production of Metal Working Equipment, effective July 1, 1941, ratings A-1-a, b, c. Note: Revokes PRO P-2.

P-12: Aluminum Scrap, effective June 26, 1941, rating A-10.

P-13: Material Entering into the Production of Airframes, effective July 3, 1941, rating A-1-b.

P-14-a: Material and Equipment Entering into the Construction of Ship Ways, effective July 12, 1941, rating A-1-a (1941).

P-14-b: Material and Equipment Entering into the Construction of Ship Ways, effective July 12, 1941, rating A-1-b (1942), A-1-b (1943).

P-15: Material for Electrical Relays and Solenoid Assemblies, effective July 11, 1941, rating A-1-d.

P-16: Material for Radio Receiving, Transmitting and Directional Equipment, effective July 11, 1941, rating A-1-c.

P-17: Material Entering into the Production of Canning Machinery and Equipment, effective July 9, 1941, rating A-2.

P-18: Material Entering into the Production of Cutting Tool Equipment, effective July 31, 1941, rating A-1-a. Note: Revoked by PRO P-18-a.

P-18-a: Materials for the Production of Cutting Tools, effective Aug. 28, 1941, rating A-1-a. Note: Revokes PRO P-18.

P-19: Material Entering into the Construction of Defense Projects, effective July 18, 1941, rating as assigned.

P-19-a: Material Entering into the Construction of Defense Projects (limited to the Priorities Critical List), effective July 18, 1941, rating as assigned.

P-19-b: Material Entering into the Construction of Certain Defense Projects with Protected Delivery Dates effective July 30, 1941, rating as assigned.

P-20: Material Entering into the Construction of Specified Locomotives, effective July 21,

1941, rating A-3.

P-21: Material Entering into the Repair and Rebuilding of Steam, Electric or Diesel Locomotives Whether for Railroad, Mining or Industrial Use, effective July 21, 1941, rating A-3.

P-22: Repairs, effective Sept. 9, 1941, rating A-10. (Interpretation No. 1), Sept. 15, 1941. (Interpretation No 2), Sept. 24, 1941.

P-23: Materials for the Production of Mining Machinery and Equipment, effective July 29, 1941, rating A-3.

P-24: Material Entering into the Production of Experimental Research Work, effective Aug. 5, 1941, rating A-1-b.

P-25-a: Parts, Accessories and Equipment for Light Tanks, effective Aug. 11, 1941, rating A-1-f.

P-25-b: Light Tanks, Spare parts and Accessories, effective Aug. 11, 1941, rating A-1-f.

P-25-c: 30-caliber and 37 mm. Guns, effective Aug. 11, 1941, rating A-1-f.

P-25-d: Gasoline and Diesel Engines, effective Aug. 11, 1941, rating A-1-f.

P-26-a: Parts, Accessories and Equipment for Medium Tanks, effective Aug. 11, 1941, rating A-1-d.

P-26-b: Medium Tanks, Spare Parts and Accessories, effective Aug. 11, 1941, rating A-1-d.

P-26-c: 37-mm. and 75-mm. Guns, effective Aug. 11, 1941, rating A-1-d.

P-26-d: Gasoline and Diesel Engines, effective Aug. 11, 1941, rating A-1-d.

P-29: Health Supplies Rating Plan, effective Aug. 25, 1941, rating A-10.

P-31: Materials for the Production of Foundry Equipment and Repair Parts, effective Sept. 5, 1941, rating A-1-b.

P-32: Parts for the Maintenance and Repair of Farm Machinery and Equipment, effective Aug. 20, 1941, rating A-10.

P-33: Farm Machinery and Equipment, effective Aug. 20, 1941, rating B-1.

P-38: Material Entering into the Production of Radio Sondes, effective Aug. 26, 1941, rating A-1-d.

P-39: Material for the Production of Arc Welding and Resistance Welding Machines, effective Sept. 12, 1941, rating A-1-c.

P-41: Material Entering into the Construction, Maintenance and Operation of Defense Projects, effective Aug. 27, 1941, rating A-1-a.

P-42: Material Entering into the Production of Canning Machinery and Equipment, effective Aug. 21, 1941, rating A-3.

P-42-a: Material Entering into the Production of Canning Machinery and Equipment, effective Sept. 12, 1941, rating A-7.

P-43: Research Laboratories Supplies and Equipment, effective Aug. 28, 1941, rating A-2.

P-46: Utilities—Maintenance, Repair and Supplies, effective Sept. 17, 1941, rating A-10.

P-47: Material Entering into the Maintenance and Repair of Air Transportation Facilities, effective Sept. 6, 1941, rating A-3.

P-51: Material Entering into the Production of Canning Machinery and Equipment, effective Sept. 22, 1941, rating A-3.

P-52: Material Entering into the Production of Aircraft Accessories, effective Sept. 15, 1941, ratings as assigned.

P-53: Parts for the Maintenance and Repair of Textile Machinery and Equipment, effective Sept. 13, 1941, rating A-10.

P-54: Material Entering into the Production of Defense Products (Motor Trucks, Truck Trailers and Passenger Carriers), effective Sept. 12, 1941, rating A-3.

P-55: Material Entering into the Construction of Defense Housing Projects, effective when issued, rating as assigned.

P-56; Mines—Maintenance, Repair and Supplies, effective Sept. 22, 1941, rating A-1-a (emergency repairs) A-8. Note: P-22 revoked as provisions apply to mines.

P-57: Material Entering into the Production of Replacement Parts for Passenger Automobiles and Light Trucks, effective Sept. 18, 1941, rating A-10.

NOTE: Where a gap appears in the series, this indicates that a pending order to which a "P" number has been assigned has not yet been issued.

"E" Orders

"E" stands for equipment. So far, only machine tools and cutting tools have been covered by these orders. An "E" order is similar to an "M" order in that it affects the distributor of the item covered, so that defense needs can be filled first.

"E" orders issued so far are:

E-1: Machine Tools, effective March 28, 1941. Supplementary Order No. 1, effective July 7, 1941. Note: Revokes E-1.

E-2: Cutting Tools, effective July 17, 1941. (Amendment), effective July 25, 1941.

E-2-a: Supplementary Order, effective Aug. 28, 1941. Note: Revokes E-2, as amended.

"L" Orders

The "L" orders are limitation orders, setting limits on production of the materials or items covered. Orders issued so far in this series are:

L-1: To Restrict the Production of Motor Truck and Public Passenger Carriers, effective Aug. 30, 1941. Note: Amended by L-1-a.

L-1-a: To Restrict the Production of Medium Motor Trucks, Truck Trailers, Passenger Carriers and Replacement Parts, effective Sept. 12, 1941. Note: Amends L-1.

L-2: To Restrict the Production of Passenger Automobiles, effective Sept. 13, 1941.

L-3: To Restrict the Production of Light Motor Trucks, effective Sept. 13, 1941.

L-4: To Restrict the Production of Replacement Parts used in the Repair of Passenger Automobiles and Light Trucks, effective Sept. 18, 1941.

Miscellaneous Orders

Priorities Regulation No. 1, effective Aug. 27, 1941.

Priorities Regulation No. 2, effective Sept. 9, 1941.

General Metals Order No. 1, Note: Terminated Sept. 23, 1941. Restrictions imposed covered by Regulation No. 1.

British Pianos Offered; Materials Lacking Here

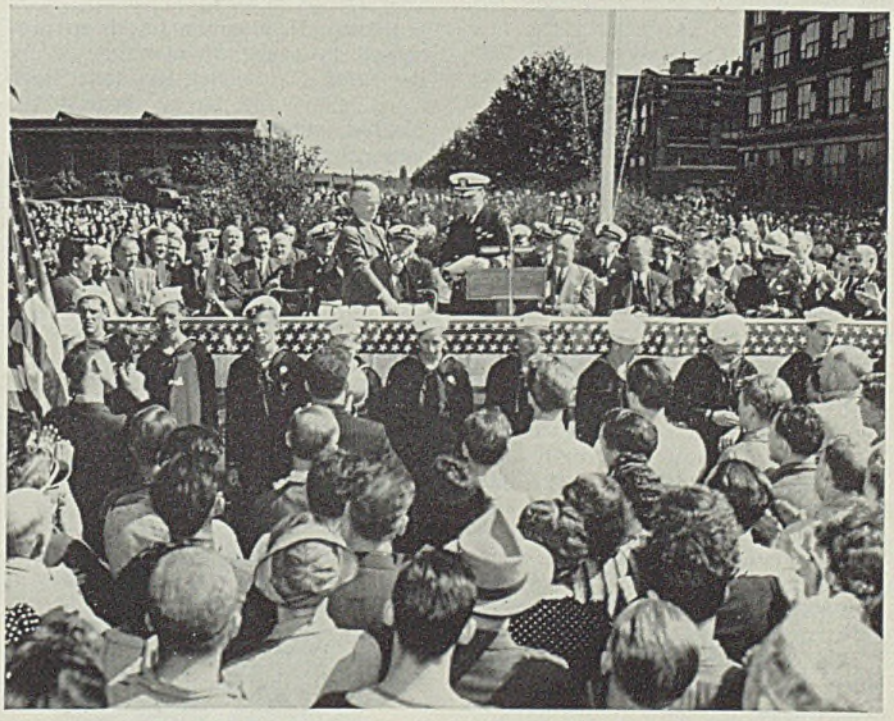
■ Piano manufacturers are facing a shortage of metals and other materials as result of priorities under the national defense program. In the meantime, it is reported that the American market is being invaded by British piano builders who apparently are experiencing little difficulty in obtaining needed materials.

Although the amount of metal required by piano manufacturers is small in comparison with quantities available and needed for defense and export, OPM has made no comment on the estimate of needs presented to it.

Spokesmen for the industry state that substitutions already have begun. For example, pedals are being made of cast iron instead of brass. Cast iron, however, must be plated, and there another difficulty arises. Steel for strings is another problem. Bass strings must be wound with finer wire to weight or "load" them, so as to deepen tones. Manufacturers are resigned to the use of steel windings instead of copper.

A large British piano manufacturer, Whelpdale, Maxwell & Codd Ltd., London, is said to be soliciting orders from dealers and department stores in this country, quoting prices described as being "definitely competitive". The British company admits frankly that it and others are under government pressure to sell to America.

An Award Won, a Prize To Hold



■ Navy "E" pennant was presented to General Electric Co.'s Erie, Pa., works Sept. 19 in recognition of the division's excellent progress on defense work. Rear Admiral W. H. P. Blandy, chief, Navy Bureau of Ordnance, presented the pennant and later made a group award of special lapel buttons to employes. Guard of honor lining the platform was comprised of Sea Scouts, sons of G-E Erie works employes. A number of companies have received this "E" pennant; point of the picture is the manner in which General Electric dramatized the event

MEN of INDUSTRY

■ **B. C. HEACOCK,** formerly president, Caterpillar Tractor Co., Peoria, Ill., was recently elected chairman of the executive committee. **L. B. Neumiller,** formerly vice president, has been made president.

♦

R. J. Forkey has been named sales engineer for upper and western New York state by Norton Co., Worcester, Mass. Mr. Forkey, a graduate of Worcester Polytechnic Institute, has been connected with Norton Co.'s research laboratories and the sales engineering department at Worcester.

♦

George L. Randall was recently appointed advertising manager by Wickwire Spencer Steel Co., New York, and its subsidiary, American Wire Fabrics Corp. Mr. Randall was first employed by Wickwire Spencer as assistant advertising manager in 1935. His appointment follows resignation of **K. A. Zollner,** advertising manager the past 15 years.

♦

John Brooks, assistant production manager in charge of customer contacts at AC Spark Plug Division of General Motors Corp., Detroit, with which he has been associated for 18 years, has been loaned to the British Purchasing Commission as advisor on planning and production.

♦

W. J. Greene, general sales manager, L. S. Starrett Co., Athol, Mass., was recently named vice president in charge of sales. **J. R. Cullen,** long associated with the company's export department, has been appointed export manager.

♦

G. K. Viall, Chain Belt Co., Milwaukee, has been named to head a new division of research and development, currently in process of organization. He will retain his position as vice president in charge of construction machinery division.

B. F. Devine, with the company since 1909, has been promoted to manager of the construction division. He will continue to supervise this division's sales management.

♦

Ray Peterson, vice president and plant manager, R. G. LeTourneau Inc., Peoria, Ill., has resigned to engage in business for himself as a distributor of equipment made by

George L. Randall

LeTourneau and Caterpillar Tractor Co. **Elmer Isgren,** plant superintendent, will succeed Mr. Peterson as plant manager.

♦

George N. Harmon has been promoted to assistant manager, Warren-Niles, O., district, Republic Steel Corp., Cleveland. He succeeds **B. W. Norton,** who was recently named general superintendent of blast furnaces and mines in Republic's southern district, with headquarters at Birmingham, Ala. In 1938 Mr. Harmon was named superintendent, Niles strip tin department and general superintendent, sheet and tin departments, Warren and Niles works, in 1940.

W. D. Murphy

Whose election as president of the National Industrial Advertisers Association was announced in STEEL, Sept. 22, page 23. Now an account executive for Reincke-Ellis-Younggreen & Finn Inc., Chicago, Mr. Murphy formerly was research engineer for Bethlehem Steel Co. and United States Steel Corp.

♦

James S. Knowlson, president, Stewart-Warner Corp., Chicago, has resigned as president, Radio Manufacturers' Association, Washington, because of pressure of other business. He had been re-elected president of the association last June.

♦

Ross M. Blackburn, Chicago district sales manager, Buda Co., Harvey, Ill., was elected president, Track Supply Association, at the organization's annual meeting in Chicago, Sept. 15-18. Meeting was held during the fifty-sixth annual convention of the Roadmasters and Maintenance of Way Association. Mr. Blackburn had been first vice president.

Other officers named were: **Harry C. Hickey,** Rail Joint Co., Chicago, first vice president; **H. M. McFarlane,** O. F. Jordan Co., East Chicago, Ind., second vice president; and **Lewis Thomas,** Q & C Co., 59 East Van Buren street, Chicago, secretary-treasurer. These companies are all manufacturers of railway supplies.

♦

Frederick G. Russell, since 1912 traffic manager, Landers, Frary & Clark, New Britain, Conn., has retired after serving the company for 70 years, having started when he was ten years old.

♦

W. G. Prasse, formerly eastern representative for Oilgear Co., Milwaukee, was recently appointed sales manager.

♦

Leo A. Behrendt, formerly vice president and plant manager, American Crucible Co., has joined the Crucible Division of Joseph Dixon Crucible Co., Jersey City, N. J.

♦

William Pohn, Pohn Iron & Metal Co., Chicago, has been re-elected president, Chicago chapter, Institute of Scrap Iron and Steel Inc. Other officers re-elected are: First vice president, **Harry S. Lewis,** Price Iron & Steel Co., Chicago; second vice president, **Frank Gross-**

man, Grossman Bros. Co., Milwaukee; third vice president, **R. A. Heller,** W. Heller & Son Inc., Peoria, Ill.; secretary, **Ralph Michaels,** Hyman-Michaels Co., Chicago; treasurer, **Henry Rosenthal,** Briggs & Turivas Inc., Blue Island, Ill.

♦

W. F. Kurfess, vice president, Joseph T. Ryerson & Son Inc., Chicago, has been ordered to active duty in the United States Navy. He will leave soon for Washington to assume charge of the Steel Division, Bureau of Ships, Navy Department. Mr. Kurfess, who has been with Ryerson since 1912, attended the U. S. Naval Academy at Annapolis, served as a naval lieutenant in the World war and has continued in the Naval Reserve.

♦

A. M. Degner, plant manager, Surface Combustion Co., Toledo, O., was elected president, National Association of Foremen, at the organization's eighteenth annual convention, Hotel Statler, Cleveland, last week.

Vice presidents elected included **C. C. Kendrick,** Met-L-Wood Co., Chicago; **Norman Huff,** Ford Instrument Co., Long Island City, N. Y.; and **S. S. Bodine,** Shell Oil Co., East St. Louis, Ill. **E. F. Seving,** Sidney Grain Machinery Co, Sidney, O., was elected treasurer, and **William E. Loeffler,** Bowling Green, O., executive secretary.

♦

Howard E. Emigh has become associated with Federal Foundry & Steel Co. Ltd., London, Ont., as assistant superintendent in charge of rolling.

♦

C. Peter Couch, former president, Kansas City Southern railroad, has been named chairman of the board and chairman of the executive committee. **William N. Deramus,** was elected to succeed Mr. Couch.

♦

H. W. Johnson has been elected a vice president, Chicago, Burlington & Quincy railroad, and will continue as comptroller. **Bert Vickery** has been selected to succeed **A. T. Williams,** treasurer and assistant secretary, who will retire Oct. 2.

♦

Edgar F. Heckert, manager, service department, York Ice Machinery Corp., York, Pa., has been appointed special assistant to the general works manager.

■ Motion pictures produced by the United States Steel Corp. and its subsidiaries are "proving of great value in training courses throughout the United States where thousands of workers are fitting themselves for national defense jobs." Each month more than 3000 men in classrooms, factories and arsenals study the details of steelmaking through the medium of these films.

DIED:

■ **Charles A. Stillman,** 68, vice president, Goodyear Tire & Rubber Co., Akron, O., at his home in that city recently. Mr. Stillman, who entered the steel industry at Birmingham, Ala., served as president, Rogers-Brown Iron Ore Co., which mined ore in Minnesota, and later became an executive in the Steel & Tube Co. of America, Chicago. He joined Goodyear in 1921.

♦

Thomas K. O'Brien, 77, retired mechanical engineer, at his home in Mount Vernon, N. Y., Sept. 23. Member of the American Society of Mechanical Engineers, Mr. O'Brien was the holder of several patents for automobile and airplane devices. He had retired 12 years ago as general manager, Allen Riveting Co., Bronx, N. Y.

♦

Donald G. Henderson, 51, chairman of the board, Consolidated Steel Corp., Los Angeles, at his home in Hermosa Beach, Calif., recently. Mr. Henderson first became associated with Consolidated in 1930, was elected treasurer in 1931, vice president in 1934 and president in 1938, and accepted the position as chairman several months ago.

♦

Ward F. Simmons, metallurgical engineer, formerly associated with American Steel & Wire Co. at Duluth, Minn., has joined the technical staff of Battelle Memorial Institute, Columbus, O.

♦

Herman A. Brunn, 67, president of Brunn & Co., Buffalo, auto body manufacturers, at his home in Buffalo, Sept. 21.

♦

Henry Lindenberger, 72, president, U. S. Reduction Co., East Chicago, Ind., Sept. 26.

♦

Lacey H. Morrison, since 1931 editor of *Diesel Power,* and consultant to the Navy in diesel engineering training, in Port Washington, Long Island, Sept. 20. Member of the Society of Automotive Engineers, he was also a founder and honorary member, Oil and Gas Power Division, American Society of Mechanical Engineers.

♦

Robert V. Good, 50, since 1936 manager, Philadelphia works, General Electric Co., Sept. 17, at his home in Drexel Hill, Pa.

♦

George M. Wilson, 77, former supervisor in the plants of American Locomotive Co. at Paterson, N. J., Dunkirk, N. Y., and Montreal, Que., at Schenectady, N. Y., Sept. 17.

♦

Edward F. Teichman, 62, credit manager, R. Wallace & Sons Mfg. Co., Chicago, silversmiths, in that city, Sept. 18. He had been associated with the company 40 years.

♦

Major Baron Nicholas Ivanovitch Troskoff, 49, electrical engineer and air conditioning expert for General Electric Co., Schenectady, N. Y., at his home in New York recently. He came to this country in 1923, was graduated from Stamford University in 1929 as an electrical engineer and joined General Electric on the west coast about 15 years ago.

♦

George Edward Collings, 87, one of the founders and vice president emeritus, Dow Chemical Co., Midland, Mich., at his home in Cleveland, Sept. 24. He resigned last May as vice president and a director of Dow Chemical, positions he had held since the company's founding in 1897.

♦

John R. Sexton, 52, eastern sales manager, Standard Stoker Co. Inc., New York, manufacturer of locomotive and steamboat stokers, in Chicago, Sept. 22.

Foundry Equipment Sales Index Lower in August

■ Foundry Equipment Manufacturers' Association, Cleveland, reports index of net orders closed for new equipment in August was 298.2, compared with 368.4 in July and 273.3 in June. Index for repairs was 356.9, compared with 326.9 in July and 304.7 in June. Total sales index was 312.9 in August, 358.1 in July and 281.1 in June.

Indexes are percentages of monthly averages of sales to metalworking industries, 1937-39. Practical comparisons of figures on the old base can be determined by multiplying by 1.328.

Bethlehem's Cambria and Maryland Units Renamed

■ Maryland and Cambria units of Bethlehem Steel Co. will be known in future as Sparrows Point and Johnstown plants. These changes, which mark the passing of two names long famous in the steel industry, are in line with Bethlehem's policy to identify each of its plants with the town or city in which it is located.

4,518,000 Tons Scrap Consumed in August

■ August consumption of iron and steel scrap totaled 4,518,000 gross tons, according to estimates by the Institute of Scrap Iron and Steel Inc.

Increased Steel Production Through Simplification Aim of New OPM Project

WASHINGTON

■ OPM'S PROJECT to increase steel production from existing facilities by concentrating on a minimum number of steel specifications, compositions, sizes and shapes (STEEL, Sept. 22, p. 31), will get under way first on carbon and alloy steel plates, and on aeronautic steels.

Technical committees, representing both users and producers of steel, are being organized to work with the Administrative Committee composed of representatives of the American Iron and Steel Institute, American Society for Testing Materials, Society of Automotive Engineers and the War and Navy Departments.

The technical committees will take full advantage of the standardization already accomplished. In all planning, the committees will keep constantly in mind the degree of scarcity of critical metals and alloying elements and the need for conserving them for the most effective utilization in the defense program.

Goal of the project as defined by the Administrative Committee is to establish as promptly as possible a selected list of steel specifications, to be designated National Emergency Specifications, which in effect involves the selection of the minimum number of steel specifications necessary to meet the direct and indirect requirements of national defense.

Consideration will be given to nondefense requirements for steel in establishing the list.

OPM intends, through the Iron and Steel Section, to use the list as an aid in administering steel priorities and allocations.

To Use Present Specifications

It is not intended to write new specifications, but primarily to select from existing specifications the practical minimum, in order to get maximum production of planes, tanks, guns, ships and other defense *materiel*.

Administrative Committee personnel includes a representative and alternate, or alternates, of each of the five co-operating groups. C. L. Warwick, OPM consultant, will be chairman.

Members include: Representing the American Society for Testing Materials, N. L. Mochel, manager of metallurgical engineering, Westinghouse Electric & Mfg. Co.; and alternate, Jerome Strauss, vice president, Vanadium Corp. of America.

Representing the Society of Automotive Engineers, F. P. Gilligan, secretary-treasurer, Harry Souther Engineering Co.; and alternate, J. B. Johnson, chief of materials section, Army Air Corps.

Representing the American Iron and Steel Institute, E. C. Smith, chief metallurgist, Republic Steel Corp.; and alternate, C. M. Parker, committee on manufacturing problems of the institute.

Representing the War Department, Lieut. Col. W. R. Slaughter; and alternates, Maj. J. H. Frye, Lieut. J. H. Fitch and J. B. Johnson.

Representing the Navy Department, Lieut. Commander E. C. Forsyth; alternate, Lieut. Commander J. E. Sullivan.

Advisors include: H. S. Rawdon, chief of division of metallurgy, National Bureau of Standards; and alternate, W. H. Swanger, metallurgist, National Bureau of Standards.

N. F. Harriman, vice chairman, Federal Specifications Executive Committee, Procurement Division, Treasury Department.

J. W. McNair, engineer, American Standards Association.

H. LeRoy Whitney, executive consultant, Iron and Steel Section, OPM; and alternate, G. B. Waterhouse, consultant, Iron and Steel Section, OPM.

C. E. Stryker, Standards Co-ordination Branch, Aircraft Section, OPM.

C. W. Test, steel industrial specialist, Civilian Allocation Division, OPM.

E. J. Hergenroether, consultant, Conservation and Substitution Section, OPM.

K. D. Williams, principal materials engineer (metallurgical), Bureau of Ships, Navy Department.

War Emergency Steel Specifications Schedule Established by British

■ "WAR Emergency British Standard Schedule of Wrought Steels in the Form of Bars, Billets, Light Forgings and Stampings up to 6-inch Ruling Section for General Engineering Purposes" has been published by the British Standards Institution, 28 Victoria street, London, S. W. 1. It takes the form of a 116-page pamphlet identified as "B. S. 970: 1941 (En. Series) and supersedes B. S. 5005, 5008, 5010 and part of 5006. The schedule is to be reviewed in January of 1942.

"It has been recognized for some time that revision of B. S. 5005:1924 was necessary as it was inadequate in presenting the best selection of wrought steels for automobiles and, moreover, it has not been sufficiently well recognized in using these specifications (particularly 5005/-402) that the tests quoted can only be obtained on material of limited mass," states the foreword.

"Meantime, under the chairmanship of Dr. W. H. Hatfield, F. R. S., the Technical Advisory Committee of the Special and Alloy Steels Committee of the Steel Control of the Ministry of Supply, composed of steelmakers, representatives of the Services and the BSI, working in consultation with important consumers, has been engaged on a rationalization of specifications for special and alloy steels to meet war conditions. This committee placed its services unreservedly at the disposal of the BSI and is acting in an advisory capacity in the preparation of War Emergency British Standard Specifications to give effect to its recommendations for special and alloy steels. Advantage has been taken of the valuable work of the TAC in preparing, at the request of the Materials Committee of the Production Executive, this new series of specifications with a view to providing a comprehensive schedule of steels for general use in industry."

Concurrently, B. S. 971 is being issued. This represents part of the work of the TAC and is a classification in 33 groups of all the steels regarded as acceptable standard steels for war purposes supplied in the form of billets, bars and light forgings up to and including 6-inch ruling section. In this, certain steels are recommended as the most suitable and alternates to these are given. The two schedules are complementary. B. S. 971 contains a large amount of valuable and informative data to facilitate the task of designers in selecting the most suitable and economical steel with particular reference to the influence of mass.

Various Factors Covered

B. S. 970 covers manufacture of steel, heat treatment definitions, general definitions, mechanical tests, provision of test pieces, heat treatment for forgings and heat treatment of forgings and drop forgings, alternative treatment for case-hardening steels, margins of manufacture, inspection, testing facilities, approved metallurgists, relaxation in regard to specifications. The steels dealt with in the schedule shall comply in all respects with the requirements laid down and may be subjected to both the chemical analysis and the mechanical tests, "unless it is specified that the mechanical tests only will be applied."

The accompanying reproduction of Table 2 from B. S. 970 shows the chemical as well as the mechanical

properties of the steels that have been selected for applications involving hardening and tempering. Altogether the steels selected are 58 in number, being identified by the numbers "B. S. En. 1" to "B. S. En. 58." A page, on the average, is given over to each one of these steels.

The pamphlet does not go into detail in regard to the difficult and stormy process through which the new schedule of standard steels came into being. It is understood that not until Dunkerque did the British metallurgists realize the seriousness of the emergency and it took that disaster to permit compositions of many differences of opinion with respect to the subject of standard steels.

Composition and Properties of British Steels

(Reproduced from current publication issued by the British Standards Institution.)

TABLE 2. B.S. En. 12 to 30. STEELS FOR HARDENING AND TEMPERING 40 to 100 tons per sq. in. Ultimate Tensile Stress

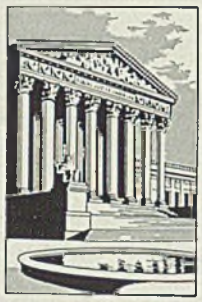
BARS, BILLETS, LIGHT FORGINGS AND STAMPINGS UP TO 6 in. RULING SECTION

The mechanical properties specified are obtainable only up to a limit of thickness or ruling section named below

B.S.	Type of Steel.		C.	Si.	Mn.	Ni.	Cr.	Mo.	V.	40/50 tons tensile.	45/55 tons tensile.	50/60 tons tensile.	55/65 tons tensile	60/70 tons tensile.	65/75 tons tensile.	70/80 tons tensile.	80/90 tons tensile.	100 tons min. tensile.
B.S. En. 12	TAC.8A.	Manganese-Nickel.	·30/·45	·35 max.	1·50 max.	1·00 max. (opt.)	—	—	—	all sizes	—	—	—	—	—	—	—	—
B.S. En. 13	TAC.8B.	Manganese-Nickel-Molybdenum.	·25 max.	·35 max.	1·40/1·80	·30/·70	—	·25/·40	—	all sizes	—	—	—	—	—	—	—	—
B.S. En. 14	TAC.8W.	Carbon-Manganese for Welding.	·30 max.	·35 max.	1·75 max.	·30 max.	—	—	—	up to 4"	up to 2½"	—	—	—	—	—	—	—
B.S. En. 15	TAC.9B.	Carbon-Manganese Steel Higher Tensile.	·30/·40	·35 max.	1·25/1·75	—	—	—	—	all sizes	up to 2½"	up to ⅞"	—	—	—	—	—	—
B.S. En. 16	TAC.9A, TAC.10A, TAC.11A, TAC.12A. TAC.13B.	Manganese-Molybdenum.	·25/·40	·35 max.	1·30/1·80	—	—	·20/·40	—	—	all sizes	up to 4"	up to 2½"	up to 1⅛"	up to ⅞"	—	—	—
B.S. En. 17			·3/·4	·35 max.	1·30/1·80	—	—	·40/·55	—	—	all sizes	all sizes	up to 4"	up to 2½"	up to 1⅛"	—	—	—
B.S. En. 18	TAC.9C, TAC.10B, TAC.11B.	Carbon-Chromium.	·35/·45	·35 max.	·60/1·20	·30 max.	·80/1·20	—	—	—	up to 4"	up to 2½"	up to 1⅛"	—	—	—	—	—
B.S. En. 19	TAC.9D, TAC.10C, TAC.11C, TAC.12B, TAC.13C, TAC.14E.	Chromium-Molybdenum.	·35/·45/	·35 max.	·50/·80	—	·90/1·50	·25/·40	—	—	all sizes	up to 4"	up to 2½"	up to 2½"	up to 1⅛"	up to 1⅛"	—	—
B.S. En. 21	TAC.9E.	3% Nickel.	·25/·35	·35 max.	·35/·75	2·75/3·50	·30 max.	—	—	—	up to 4"	up to 2½"	—	—	—	—	—	—
B.S. En. 22	TAC.10D, TAC.11D.	3½% Nickel	·35/·45	·35 max.	·50/·80	3·25/3·75	·30 max.	—	—	—	all sizes	up to 4"	up to 2½"	—	—	—	—	—
B.S. En. 23	TAC.10F, TAC.11F, TAC.12E, TAC.13D.	3% Nickel-Chromium.	·25/·35	·35 max.	·45/·70	2·75/3·75	·50/1·00	·65 max. (opt.)	—	—	—	all sizes	all sizes	all sizes	up to 2½"	—	—	—
B.S. En. 24	TAC.10E, TAC.11E, TAC.12C, TAC.13A, TAC.14A, TAC.15A, TAC.16A.	1½% Nickel-Chromium-Molybdenum.	·35/·45	·35 max.	·40/·80	1·00/2·00	·50/1·50	·20/·40	—	—	—	above 4"	above 2½"	up to 2½"	up to 2½"	up to 1⅛"	up to 1⅛"	up to 1⅛"
B.S. En. 25	TAC.11G, TAC.12D, TAC.13E, TAC.14B, TAC.15B, TAC.16B.	2½% Nickel-Chromium-Molybdenum. (med. carbon)	·25/35	·35 max.	·40/·80	2·00/3·00	·50/1·00	·40/·70	—	—	—	—	above 4"	above 2½"	above 2½"	above 1⅛" up to 4"	above 1⅛" up to 2½"	above 1⅛" up to 2½"
B.S. En. 26	TAC.13F, TAC.14C, TAC.15C, TAC.16C.	2½% Nickel-Chromium-Molybdenum. (high carbon)	·35/·45	·35 max.	·40/·80	2·00/3·00	·50/1·00	·40/·70	—	—	—	—	—	—	—	above 4"	above 2½"	2½" to 4"
B.S. En. 27	TAC.11H, TAC.12F, TAC.13G, TAC.14D.	3% Nickel-Chromium-Molybdenum.	·25/·35	·35 max.	·70 max.	3·00/3·75	·50/1·30	·20/·65	—	—	—	—	all sizes	all sizes	all sizes	up to 4"	—	—
B.S. En. 28	TAC.12G, TAC.13I, TAC.14F. TAC.15D.	3½% Nickel-Chromium-Molybdenum.	·25/·40	·35 max.	·70 max.	3·00/4·50	·75/1·50	·20/·65	·25 max. (opt.)	—	—	—	—	all sizes	all sizes	up to 4"	up to 2½"	—
B.S. En. 29	TAC.11I, TAC.12H, TAC.13H, TAC.14G, TAC.16E.	3% Chromium-Molybdenum.	·15/·35	·35 max.	·65 max.	4·00 max.	2·50/3·50	·30/·70	·25 max. (opt.)	—	—	—	all sizes	all sizes	up to 4"	up to 4"	—	up to 2½"
B.S. En. 30	TAC.16D.	4¼% Nickel-Chromium.	·25/·35	·35 max.	·35/·60	3·75/4·50	1·00/1·50	·65 max. (opt.)	—	—	—	—	—	—	—	—	—	over 4" (O.H. &T.) up to 2½" (A.H. &T).

Windows of WASHINGTON

Priorities Division, other government agencies conducting survey to find who's violating regulations and orders. Crackdowns may follow . . . Appropriations for defense plus British orders in this country exceed sixty millions . . . War Department analysis shows 60 per cent of selected prime contracts were subcontracted. Zinc producers exempted from part of Priorities Regulation No. 1



By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ NATIONAL survey of compliance with priorities orders and regulations have been started by more than 250 field offices of the Division of Priorities, the Department of Labor, Department of Commerce, Treasury Department and the Federal Trade Commission.

Representatives of these agencies will visit plants of both defense and nondefense manufacturers to check on compliance with priority rules.

Data gathered by the field offices will be factual; any enforcement activities growing out of the survey will be handled by the Priorities Division. A division statement said:

"One of the first jobs to be done with the help of the field offices of other government agencies will be to check among plants using critical materials, in which there are now serious shortages.

"Information in the hands of the Priorities Division indicates that a number of violations have occurred. In some cases, it is indicated that certain manufacturers have used preference ratings to obtain critical materials which were subsequently used for nondefense purposes.

"In other cases preference ratings have been used to buy material for stockpiling in violation of priorities regulations which state that excess inventories shall not be maintained.

"It is believed that the number of willful violators is relatively small. Because of the critical shortages which exist, however, such violations may make it difficult for a defense manufacturer to obtain a sufficient quantity of a given material for defense production.

"It is desirable, therefore, to see to it at once that supplies are directed from violators to that real majority of American industry, which patriotically co-operates, so that it may not be penalized by the 'cheating' and illegal activities of a few."

Highspots of the Week's Washington News

General Metals Order No. 1 revoked; restrictions it imposed on accumulation of inventories covered by Priorities Regulation No. 1.

Steel warehouse customers advised they need not file Form PD-1.

Zinc producers exempted from provision of Priorities Regulation No. 1 which makes mandatory acceptance of all defense orders; will continue to allocate shipments in accordance with provisions of General Preference Order M-11.

Preference Rating Order P-22 interpreted to permit application of A-10 rating on repair and maintenance materials ordered prior to issuance of order, Sept. 9.

Quota for production of repair parts for passenger cars and light trucks established; A-10 priority rating assigned to deliveries of such parts within limits established; A-3 rating established for repair parts for heavy and medium trucks and large passenger carriers.

Eighteen subcommittees of the Iron and Steel Defense Industry Advisory Committee appointed.

Scrap steel price amended to establish parity among consumers in the Cincinnati area and to create incentive for sale of scrap rail and rerolling rails.

Acetic acid bulk sale prices frozen at about third quarter levels by Office of Price Administration.

Mining companies granted A-1-a rating for deliveries of emergency repair materials and A-8 for material required for emergency inventory or for operating supplies or for maintenance of mine.

Priorities Division launched nation-wide survey to obtain factual data to be used in enforcing its orders and regulations.

Priority assistance assured for privately-financed defense housing units; project preference ratings will be granted.

Zinc pool for October was established as 27 per cent of August production.

Preference Rating Order P-46, covering utilities maintenance, repair, was amended to permit producers to use closing day of fiscal year which ended in 1940 for determining practical working minimum inventory, instead of Dec. 31 as originally required.

Alloy iron, as used in Supplementary Order M-21-a, does not include ferroalloys, but means castings containing the alloying elements mentioned in the order in excess of the percentages fixed, according to an interpretation by OPM.

Appointments Made to Civilian Supply Staff

Appointment of Dr. Reavis Cox as supervisor of industry branches, and of the chiefs of five industry branches in the Division of Civilian Supply has been announced by Joseph L. Weiner, deputy director. Dr. Cox, chairman of the marketing department, Wharton School of Finance and Commerce, University of Pennsylvania, has been serving as assistant director of the division. In his new post, he will have general supervision over the nine branches recently set up in the division.

Jesse L. Maury, former head of the nonferrous metals section, was named chief of the electrical ap-

pliances and consumers durable goods branch.

Nathan G. Burleigh, former head of the agricultural, forest and general products section, was named chief of the industrial and office machinery branch.

Barton Murray, who drafted the civilian allocations program for rayon yarn and who has engaged in other activities in the textile field under the Division of Civilian Supply, was named chief of the rubber and rubber products branch.

Maury Maverick, who has been in service as an assistant and consultant to Leon Henderson, administrator, OPM, was named chief of the state and local government requirements branch.

John L. Haynes, who has been specializing in the lumber and building materials field of civilian supply, was named chief of the lumber and building materials branch.

Norbert A. McKenna, who became chief of the pulp and paper branch when it was under the production division of the OPM, will continue to serve as head of that branch. Under a recent organization, its functions were transferred to the division of Civilian Supply.

Weiner stated that he expects to announce in the near future names of chiefs of the three remaining branches.

At present in order to take care of immediate necessities of these branches, Mr. McKenna and Mr. Haynes have been asked to serve temporarily as acting chiefs of printing and publishing branch and the plumbing and heating branch, respectively. Andrew Stevenson, of the automotive transport and farm equipment branch, is acting chief of that branch.

General Metals Order No. 1 Revoked by Priorities Division

General Metals Order No. 1, issued by the OPM Priorities Division May 1, was revoked last week in an order by Priorities Director Nelson.

Termination of the order does not lift the restrictions it imposed on the accumulation of inventories, however, as these are included in Priorities Regulation No. 1, issued Aug. 27.

Warehouse Customers Need Not File PD-1

Steel distributors have been requested by the Priorities Division to advise their customers that in ordering from warehouses they need not apply for a priority preference on Form PD-1. Only where tonnage is placed with a mill is it necessary to fill out this form and the division states that requests for priorities on PD-1 against warehouse tonnage will be ignored.

Requests for preferences in ordering steel from the distributors have been cluttering up the Priorities Division unnecessarily.

Zinc Order Clarified by Division of Priorities

An interpretation clearing up a contradiction between the terms of General Preference Order M-11, which sets forth the manner in which producers of zinc must ship to customers, and the paragraph in Priorities Division Regulation No. 1, which makes mandatory the acceptance of all defense orders, was issued last week by the Priorities Division.

Necessity for the interpretation arose from the fact that under the terms of the zinc order a producer, after setting aside a stipulated amount for the zinc pool, must ship to each of his customers a pro rata amount of his commitments to them. If, after making deliveries to a customer, the producer were required to accept a defense order, it might make impossible compliance with the requirement.

It has been ruled, therefore, that to this extent Regulation No. 1 does not apply to producers of zinc.

Persons needing metallic zinc, zinc oxide, or zinc dust to fill defense orders, who are experiencing difficulty in obtaining these materials, should make application to the Zinc Branch of OPM for allocations as in the past. Applications for metallic zinc and zinc dust should be made on PD-94, and for zinc oxide on PD-62.

A-10 Rating May Be Applied To Orders Placed Before Sept. 9

In an interpretation of Preference Rating Order P-22, Priorities Director Nelson has ruled the A-10 rating provided for materials for essential repairs to plants in certain listed essential industries may be applied to goods ordered before the issuance of P-22 on Sept. 9.

A manufacturer wishing to apply the A-10 rating to deliveries to him of material ordered previous to Sept. 9 should furnish his supplier with a duplicate copy of his purchase order, endorsed in the manner specified in P-22.

60.2 Per Cent of 50 Prime Defense Orders Subcontracted

Fifty prime contracts awarded by the War Department's Ordnance branch and aggregating $271,651,962, have been subcontracted to the amount of $163,538,720 or 60.2 per cent, it was reported last week to Robert P. Patterson, under secretary of war. Subcontractors receiving work from the prime award recipients totaled 9974.

Highest percentage of subcontracting was reported for those companies working on tank and combat vehicles. In this instance, $98,519,010 of $151,677,398 in prime contracts was farmed out, 65 per cent of the total. Artillery contracts covered by the survey showed 54.3 per cent in subcontracts; small arms, 56.6 per cent; ammunition, 54.5 per cent; and defense aid, 50 per cent.

Prime contractor showing highest percentage of subcontracts was Dutton-Lainson Co., Hasting, Nebr., for practice shells. Of an award totaling $206,323, subcontracts comprised 82.5 per cent, or $169,539.

In some cases subcontracts were for raw materials or finished parts, which under the new and restricted definition of subcontractor, would not now be considered as such. When the contracts were let, however, they were so held.

Average reported number of subcontractors per prime contractor: Artillery, 202; tank and combat vehicles, 244; small arms, 115; ammunition, 167; and defense aid, 75. Total average of subcontractors per prime contractor was 199.

Defense Appropriations, British Orders Total $60,016,000,000

Appropriations for national defense and British war orders in the United States totaled $60,016,000,000 by the end of August.

Of this figure United States appropriations, contract and tonnage authorization and Reconstruction Finance Corp. commitments amounted to $56,357,000,000 and foreign orders in the United States, most of which were British, came to $3,659,000,000.

Largest single category was airplanes, amounting to $12,518,000,000, or 20.8 per cent of the total. Ordnance, with $11,937,000,000 allotted, called for 19.9 per cent. Third largest item was $11,512,000,000, or 19.2 per cent of the total, for marine construction, of which $8,154,000,000 was for naval vessels and $3,358,000,000 for merchant vessels. Industrial facilities, including machinery and real estate, are costing $5,954,000,000, or 9.9 per cent of the authorized program.

Allotments for construction of posts, depots, fortifications and residential housing comes to $4,783,000,000 or 8 per cent, while appropriations for all other purposes total $13,312,000,000 or 22.2 per cent of the total. This classification includes combat equipment other than ordnance, clothing and supplies, pay, subsistence and travel of both the armed forces and civilian defense employees.

Iron and Steel Defense Subcommittees Named

■ APPOINTMENT of 18 subcommittees of the iron and Steel Defense Industry Advisory Committee was announced last week in Washington by the Bureau of Clearance of Defense Industry Advisory Committees.

The subcommittees were selected by A. D. Whiteside, government presiding officer, from nominations made by the industry. For personnel of the Iron and Steel Defense Industry Advisory Committee see STEEL, July 28, p. 32.

The subcommittees and their members are as follows:

—ALLOY BARS, TOOL STEEL, STAINLESS STEEL—

J. H. Parker, Carpenter Steel Co., Reading, Pa.
J. M. Schlendorf, Republic Steel Corp., Cleveland.
A. T. Galbraith, Crucible Steel Co. of America, New York.
S. D. Williams, Copperweld Steel Co., Warren, O.
Hiland G. Batcheller, Allegheny Ludlum Steel Corp., Brackenridge, Pa.
C. E. Tuttle, Rustless Iron & Steel Corp.,, Baltimore.
Roy C. McKenna, Vanadium-Alloy Steel Co., Latrobe, Pa.
Henry Timken Jr., Timken Roller Bearing Co., Canton, O.
Frank Gibbons, Carnegie-Illinois Steel Corp., Pittsburgh.
Rufus Tucker, Bethlehem Steel Corp., Bethlehem, Pa.
J. O. Rinek, Universal Cyclops Steel Corp., Bridgeville, Pa.

—TUBULAR—

E. P. Corey, Youngstown Sheet & Tube Co., Youngstown.
J. K. Beeson, Pittsburgh Steel Co., Pittsburgh.
W. F. McConnor, National Tube Co., Pittsburgh.
F. J. O'Brien, Globe Steel Tubes Co., Milwaukee.
William C. Connolly, Ohio Seamless Tube Co., Shelby, O.
J. E. Holmes, Republic Steel Corp., Cleveland.
Walter Wiewell, Jones & Laughlin Steel Corp., Pittsburgh.
R. R. Lawson, Summerill Tubing Co., Bridgeport, Conn.
Boyd Watson, Spang-Chalfante & Co., Pittsburgh.

—SHEETS, STRIP and TIN PLATE—

George Totten, Carnegie-Illinois Steel Corp., Pittsburgh.
Arthur Long, Youngstown Sheet & Tube Co., Youngstown.
N. C. Reed, Wheeling Steel Corp., Wheeling, W. Va.
Thomas M. Galbreath, Sharon Steel Co., Sharon, Pa.
J. A. Henry, National Steel Corp., Pittsburgh.
F. H. Loomis, Republic Steel Corp., Cleveland.
W. J. Adamson, Allegheny Ludlum Steel Corp., Pittsburgh.
Benton Wilner, Inland Steel Co., Chicago.
R. C. Todd, American Rolling Mill Co., Middletown, O.
K. L. Griffith, Bethlehem Steel Co., Bethlehem.
N. B. Randolph, Granite City Steel Co., Granite City, Ill.

—RAILS and ACCESSORIES—

H. E. Stall, Bethlehem Steel Co., Bethlehem.
N. H. Orr, Colorado Fuel and Iron Corp., Denver.
W. J. Hammond, Inland Steel Co., Chicago.
J. C. Dillworth, Carnegie-Illinois Steel Corp., Pittsburgh.
M. H. Geisking, Tennessee Coal, Iron & Railroad Co., Birmingham.

—CARBON BARS, SEMIFINISHED and SHELL STEEL—

W. F. Vosmer, Republic Steel Corp., Cleveland.
L. B. Worthington, Carnegie-Illinois Steel Corp., Pittsburgh.
L. R. Steuer, Bethlehem Steel Co., Bethlehem.
C. H. Longfield, Youngstown Sheet & Tube Co., Youngstown.
E. L. Wetstein, National Steel Corp., Pittsburgh.
R. T. Rowles, Jones & Laughlin Steel Corp., Pittsburgh.
N. H. Orr, Colorado Fuel & Iron Corp., Denver.
J. B. Andrews, Jr., Andrews Steel Co., Newport, Ky.
Otto Seidenbecker, Wisconsin Steel Co., Chicago.

—WIRE PRODUCTS—

John May, American Steel & Wire Co., Cleveland.
C. F. Stone, Atlantic Steel Co., Atlanta, Ga.
J. K. Beeson, Pittsburgh Steel Co., Pittsburgh.
John P. Distler, Republic Steel Corp., South Chicago, Ill.
J. F. Hazen, Bethlehem Steel Co., Bethlehem.
Ford Schusler, Keystone Steel & Wire Co., Peoria, Ill.
A. R. Baldwin, Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
N. H. Orr, Colorado Fuel & Iron Co., Denver.
D. Rollins, Wickwire Spencer Steel Co., New York.

—PLATES and SHAPES—

C. M. Daniels, Bethlehem Steel Co., Bethlehem.
A. C. Roeth, Inland Steel Co., Chicago.
A. H. Warren Jr., Carnegie-Illinois Steel Corp., Pittsburgh.
V. A. Jevon, Jones & Laughlin Steel Corp., Pittsburgh.
Paul M. King, Worth Steel Co., Claymont, Del.
M. H. Geisking, Tennessee Coal, Iron & Railroad Co., Birmingham.
G. S. Eastburn, Central Iron & Steel Co., Harrisburg, Pa.
William Vosmer, Republic Steel Corp., Cleveland.

—WAREHOUSE—

R. J. Stayman, Carnegie-Illinois Steel Corp., Pittsburgh.
Joseph L. Block, Inland Steel Co., Chicago.
N. W. Foy, Republic Steel Corp., Cleveland.
J. V. Honeycutt, Bethlehem Steel Co., Bethlehem.
R. M. Allen, Allegheny Ludlum Steel Corp., Pittsburgh.
N. D. Scott, Wheeling Steel Corp., Wheeling, W. Va.
E. P. Severns, Continental Steel Corp., Kokomo, Ind.
Tracy Manville, Columbia Steel Shafting Co., Pittsburgh.

—ORE—

Elton Hoyt, 2nd, Pickands, Mather & Co., Cleveland.
J. G. Munson, U. S. Steel Corp. of Delaware, Pittsburgh.
E. B. Greene, Cleveland-Cliffs Iron Co., Cleveland.
H. A. Berg, Woodward Iron Co., Woodward, Ala.
Patrick Butler, Butler Bros., St. Paul.

—COLD FINISHED BARS—

J. T. Somers, Wyckoff Drawn Steel Co., Pittsburgh.
C. F. Goldcamp, Jones & Laughlin Steel Corp., Pittsburgh.
Tracy Manville, Columbia Steel & Shafting Co., Pittsburgh.
W. R. Howell, Bliss & Laughlin Inc., Harvey, Ill.
R. E. Fitzsimons, Fitzsimons Co., Youngstown.
M. E. O'Brien, Inland Steel Co., Chicago.

—PIG IRON—

J. T. Whiting, Alan Wood Steel Co., Conshohocken, Pa.
G. W. Striebing, Interlake Iron Corp., Cleveland.
A. M. Harper, Carnegie-Illinois Steel Corp., Pittsburgh.
H. M. Wilson, Shenango Furnace Co., Pittsburgh.
R. M. Marshall, Pittsburgh Coke & Iron Co., Pittsburgh.
Kay Ford, Hanna Furnace Corp., Buffalo.
H. A. Berg, Woodward Iron Co., Woodward, Ala.
Robert E. Brooke, E. & G. Brooke Iron Co., Birdsboro, Pa.

—SCRAP—

R. W. Wolcott, Lukens Steel Co., Coatesville, Pa.
C. A. Ilgenfritz, Republic Steel Corp., Cleveland.
C. R. Miller Jr., U. S. Steel Corp., of Delaware, Pittsburgh.
H. E. Pape, Stanley Works, New Britain, Conn.
Wilmer Murphy, National Steel Corp., Pittsburgh.
William McMillan, National Malleable & Steel Casting Co., Cleveland.
Leigh B. Block, Inland Steel Co., Chicago.
W. A. Givens, Allegheny Ludlum Steel Corp., Pittsburgh.
Newman Ebersole, American Rolling Mill Co., Middletown, O.
C. R. Holton, Bethlehem Steel Corp., Bethlehem.

—CAST IRON PIPE—

N. F. S. Russell, U. S. Pipe & Foundry Co., Burlington, N. J.
W. D. Moore, American Cast Iron Pipe Co., Birmingham.
Spencer L. Hazard, Florence Pipe Foundry & Machine Co., Lynchburg, Va.
J. D. Capron, Glamorgan Pipe & Foundry Co., Lynchburg, Va.
Kent Clow Jr., James B. Clow & Sons, Chicago.

—FORGINGS and ARMOR PLATE

H. F. Weaver, Bethlehem Steel Co., Bethlehem.
Emil Lang, Erie Forge Co., Erie, Pa.
R. B. Heppenstall, Heppenstall Co., Pittsburgh.
H. H. Ziesing, Midvale Co., Nicetown, Philadelphia, Pa.
William Finkl, A. Finkl & Sons Co., Chicago.
R. B. Cooney, Carnegie-Illinois Steel Corp., Pittsburgh.

—STATISTICS, CODIFICATION and FORMS—

P. F. Boyer, Comptroller, Republic Steel Corp., Cleveland.
W. J. Creighton, vice president, Jones & Laughlin Steel Corp.
J. H. Hall, general auditor, Youngstown Sheet & Tube Co.
F. M. Hesse, treasurer, National Steel Corp.
M. D. Howell, vice president, United States Steel Corp., Pittsburgh.
C. L. Kingsbury, comptroller, American Rolling Mills Co., Middletown, O.
F. A. Shick, vice president, Bethlehem Steel Co., Bethlehem.

—PLANT EXPANSION—

Quincy Bent, Bethlehem Steel Corp.
William B. Gillies, Youngstown Sheet & Tube Co.
J. E. Lose, Carnegie-Illinois Steel Corp.
W. Sykes, Inland Steel Co.
C. M. White, Republic Steel Corp.
J. T. Whiting, Alan Wood Steel Co., Conshohocken, Pa.
H. A. Berg, Woodward Iron Co., Woodward, Ala.
F. B. Lounsberry, vice president, Allegheny Ludlum Steel Corp.
G. E. Rose, Wisconsin Steel Co., Chicago.

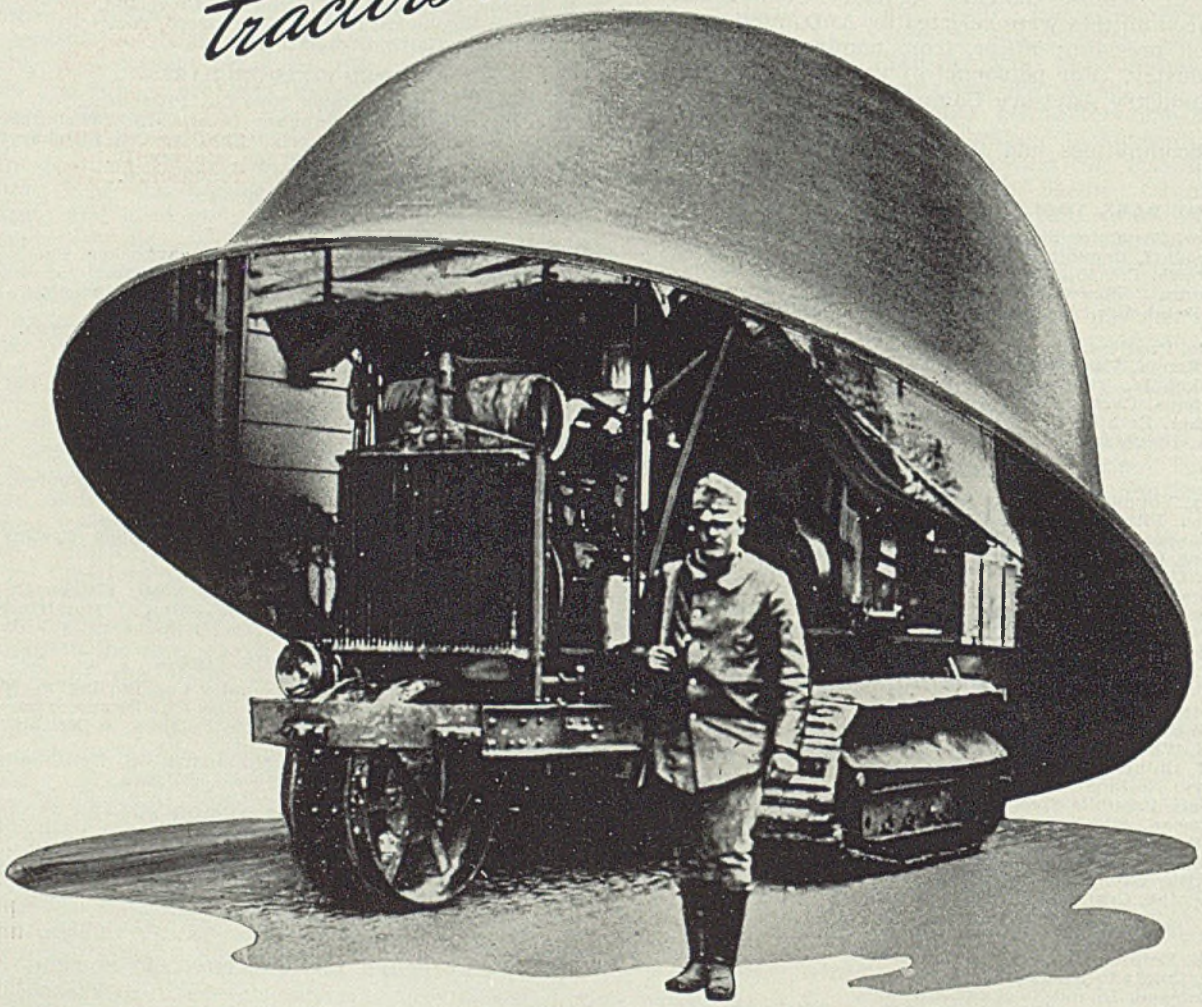
—STEEL CASTINGS—

F. B. Ernst, American Steel Foundries, Chicago.
W. H. Worrilow, Lebanon Steel Foundry, Lebanon, Pa.
Charles P. Whitehead, General Steel Castings Corp., Eddystone, Pa.
John E. McCauley, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Don Bakewell, Blaw-Knox Co., Pittsburgh.

—RESEARCH and CONSERVATION—

C. H. Weikel, Bethlehem Steel Corp.
D. R. G. Cowan, Republic Steel Corp.
K. J. Evans, Inland Steel Co.
K. G. Fuller, U. S. Steel Corp., of Delaware, Pittsburgh.
H. K. Weir, National Steel Corp.
Vere Brown, Allegheny Ludlum Steel Corp.

When tanks were only tractors with tin Hats—



Hyatts kept them going—*then*
Hyatts keep them going—*now*

TANKS . . . the "surprise weapon" of the Allies in the last war . . . were inspired by tractors with crawler treads perfected by Holt. Cushioning the shocks, keeping operating parts running true, Hyatt Roller Bearings helped carry the load and ably won their chevrons. Then back to "civvies," improved Hyatts have been doing their peace-time job well ever since. Therefore, these dependable bearings are again being drafted for tanks as well as army trucks, gun mounts, airplanes and other equipment in today's defense program. Hyatt Bearings Division, General Motors Sales Corporation, Harrison, N. J., Chicago, Pittsburgh, Detroit, San Francisco.

PHOTO BY U. S. ARMY SIGNAL CORPS.
Like tanks, Hyatts have been improved in design, but their traditional quality manufacture prevails even through "all out" production.

HYATT
Quiet
ROLLER BEARINGS

(At top) Allied photo taken "Somewhere on the Western Front," 1915 is that of a Holt Caterpillar Tractor with front wheel . . . prototype of present "Caterpillar" full crawler tractor of today.

Mirrors of MOTORDOM

Breakdown of production allocations for passenger cars forecasts manufacturing trend, but materials shortages and lackadaisical market may preclude attainment of ceiling figures . . . Highlights of Pontiac, Ford, Lincoln, De Soto and Chevrolet lines for 1942 are presented . . . Ford gearing to produce 30-ton and 60-ton tanks for Army. Stepping up defense production as rapidly as possible

By A. H. ALLEN
Detroit Editor, STEEL

DETROIT

■ PARTS manufacturers still interested in automobile production schedules in the months ahead have been studying allocation figures for December passenger car output in order to obtain some clue as to their releases for motor accounts. As far as is known now, January, 1942, allocations will duplicate the December figures, while February and March will see further retrenchment. April, May, June and July of 1942 will show successive slashes from the February-March totals. Outlook is about as follows:

	Dec., Jan. (each)	% Reduction from Dec., 1940	Feb., March (each)
Chevrolet	45,180	51.2	39,962
Buick	16,452	51.1	13,984
Pontiac	14,358	48.0	11,127
Olds	11,753	50.9	9,659
Cadillac	3,874	55.3	2,251
Total GM	90,567	50.8	76,983
Plymouth	25,184	48.8	21,407
Dodge	11,863	52.1	10,084
Chrysler	6,028	61.1	5,124
De Soto	4,196	56.8	3,566
Total Chrysler	47,271	52.3	40,181
Ford	32,307	50.9	27,460
Mercury	4,426	58.9	3,762
Lincoln	1,275	52.5	1,085
Total Ford	38,009	52.1	32,307
Studebaker	8,834	18.4	7,509
Hudson	6,476	*25.8	5,504
Nash	5,500	45.0	4,675
Packard	5,771	22.0	4,906
Willys	1,944	*137.4	1,652
Crosley	476	*1260.0	71
Total for all	204,848	48.4	173,788

*Gain.

The seemingly good break in allocations for companies like Studebaker, Hudson, Willys and Crosley is not entirely that but rather the fact their production last December was depressed for one reason or another and curtailment figures were not based on this month alone. The Crosley total was boosted considerably because of stocks of parts and subassemblies reportedly already on hand, awaiting only final assembly.

As mentioned here previously there is no certainty of any company reaching its allocated total. Already materials shortages are cropping up with increasing frequency and likely will become worse. It is possible that should shortages interfere with December production, any difference between actual output and the allocation could be transferred to the January schedule, raising it accordingly.

Furthermore, dealer surveys in the past few weeks indicate the public is lethargic as far as interest in new models is concerned. Higher prices—about $100 on an average—higher excise taxes, use taxes, sharply increased income taxes and an oversold market appear to be combining to slow the movement of what new models are already in showrooms. But the industry is not discouraged. All the 1942 cars are not yet on display, and all prices have not been announced. There is a feeling that the public is waiting to get a look at all models before doing any buying. Confidence still remains in the strength of a rising national income to bolster what appears now to be a lagging market.

Last week a special house committee investigating migratory defense labor held hearings here and heard reports of a number of automotive, state government and association officials. They warned that the sharp curtailment of automobile production would mean unemployment for around 100,000 by the end of the year. Priority systems and methods of awarding defense contracts also came in for criticism, consensus being that more primary defense contracts in this area would help the outlook for smaller manufacturing units.

R. J. Thomas, president of the UAW-CIO, read a statement to the committee in which he predicted that 215,000 auto workers would be seeking new employment by Dec. 15.

Heavier Frames on Pontiac

New Pontiacs (see p. 38) comprise two basic lines, one on 119-inch wheelbase, the other on 122-inch, with seven body types in the former and two in the latter. All are available with either 6 or 8-cylinder engine, $25 additional being charged for the 8. Mechanical changes involve improved sealing of front brakes and water pump, rear spring interliners (oil-soaked wood) and revamped oil cleaner. Front bumpers are 4 inches wider, headlamps are 10 inches farther apart and radiator grille is 9 inches wider. Front fenders are 50 per cent longer and extend back midway into the doors. Instrument panels feature a new "Burma" copper finish in combination with chromium trim. Rheostat has been added to the instrument panel light switch, permitting variation in intensity of illumination.

Frame side members and X-members are of heavier gage steel this year, adding 135 pounds to the weight of the frame and giving added rigidity and stability.

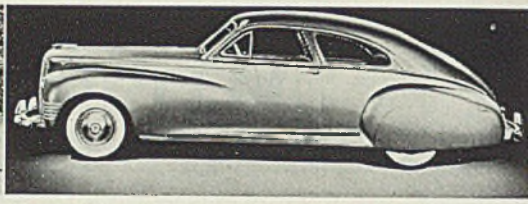
Ford Features Three Lines

Three lines of Ford cars are featured for 1942—the superdeluxe, the deluxe and the economy Special. The first two may be had with either 6 or V-8 engine, the latter with the 6 only. In appearance the cars are larger and more massive, with completely new frontal design, concealed running boards and wider fenders. Softer and more stable ride has been obtained by widening the tread 2¼ inches in the front and 1¾ inches in the rear. Steering mechanism has been made sturdier by a heavier column and by the combination of a track bar with the torsion bar to keep steering in alignment under all conditions. Both the V-8 and 6-cylinder engines are now rated at 90 horsepower, compression ratio on the former being 6.2 to 1, on the latter 6.7 to 1. Location of the engine fan has been changed to

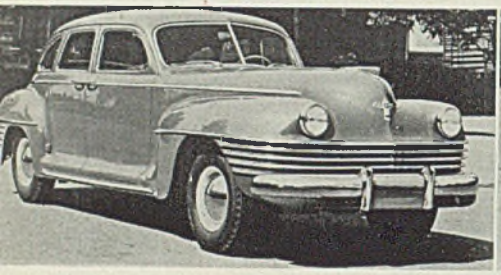
(*Please turn to Page* 40)

PONTIAC

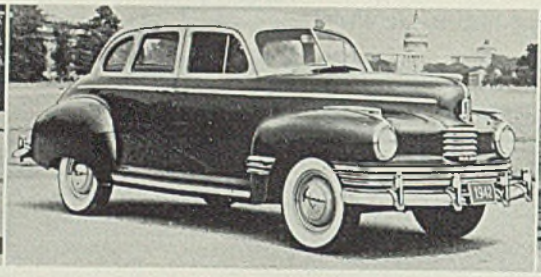
CHEVROLET



PACKARD



CHRYSLER



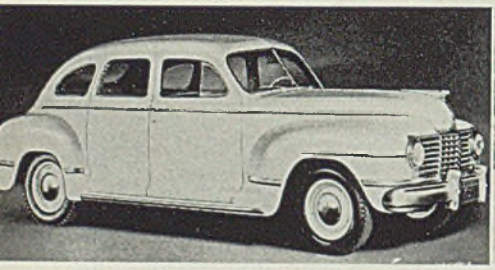
NASH

PLYMOUTH

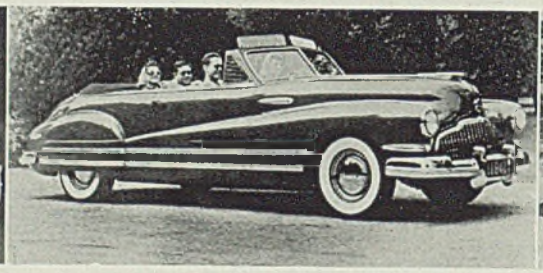
1942 Models on Parade

■ Distinctly not "war babies", these glittering 1942 creations of the automobile industry embody notable advances in styling and reflect creditably on the builders in view of the tremendous load of defense contracts. Longer, lower, wider and more massive bodies; emphasis on streamlining and concealed running boards, larger and sturdier bumpers and bumper guards are characteristics readily apparent. Not so apparent are ingenious changes made to conform with limitations on critical and strategic metals. How long the present design concepts can continue in manufacture is a question, but at least here is how they looked when they started. Not shown because pictures were unavailable are Cadillac, Crosley and Willys.

A salute to the designers, engineers and production experts of the nation's No. 1 consumer goods industry!

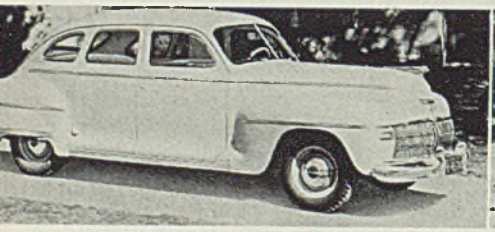


DODGE

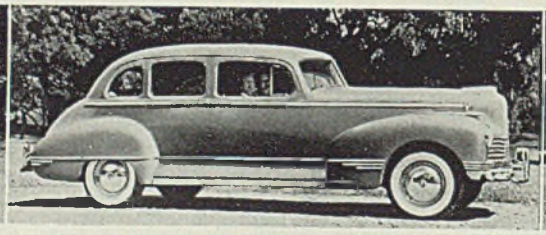


BUICK

FORD



DE SOTO



HUDSON

STUDEBAKER

LINCOLN ZEPHYR

MERCURY

OLDSMOBILE

MASTER CRAFTSMEN

Benvenuto Cellini, dean of goldsmiths, who lived in the fourteenth century, created many examples of metal working never excelled in craftsmanship.

Fine workmanship stands out as a standard for comparison; whether it be a set of book ends or a huge Diesel engine, a delicately carved letter opener, or a great chandelier, the value placed on it depends upon the skill required to produce it.

Products that serve long are noteworthy.

Benvenuto Cellini

THERMALLOY *the "EYE" of QUALITY*

THE ELECTRO ALLOYS COMPANY

CASTINGS FOR HEAT CORROSION

ELYRIA, OHIO

QUALITY CASTINGS SINCE 1918

improve cooling, the fan now being belt driven at higher than engine speed.

Buttons Open Lincoln Doors

Lincoln for 1942 offers four body types in the Zephyr and two each in the Continental and Custom models. Engine bore has been increased 1/16-inch raising horsepower to 130, compression ratio continuing at 7 to 1, with cast iron cylinder heads now in use. An engine refinement is a new type of flywheel with a number of "spokes" between hub and rim providing flexibility for cushioning small crankshaft deflections caused by power impulses of the engine.

Smaller wheels and lower springs have reduced overall height without sacrificing headroom. Front tread is 2½ inches wider. Handles have been discarded entirely in favor of pushbutton controls on both doors and luggage compartment.

Optional transmission innovation is a "Liquamatic" drive, comprising a combination of liquid flywheel or coupling, an automatic gear-shifting mechanism and an automatic overdrive. Transmission and overdrive unit are arranged to provide a total of six forward speeds, divided into an "emergency range" of two low speeds and a "driving range" of four speeds.

Automatic vacuum powered window lifts are available on Zephyr models at extra cost, are standard on other models.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1939	1940	1941
Jan.	356,962	449,492	524,058
Feb.	317,520	422,225	509,326
March	389,499	440,232	533,849
April	354,266	452,433	489,854
May	313,248	412,492	545,355
June	324,253	362,566	546,278
July	218,600	246,171	468,757
7 mos.	2,274,348	2,785,611	3,617,510
Aug.	103,343	89,866	.....
Sept.	192,679	284,583	.....
Oct.	324,689	514,374	.....
Nov.	368,541	510,973	.....
Dec.	469,118	506,931	.....
Year	3,732,718	4,692,338	.....

Estimated by Ward's Reports

Week ended:	1941	1940†
Aug. 30	39,965	27,645
Sept. 6	32,940	39,665
Sept. 13	53,165	66,615
Sept. 20	60,560	78,820
Sept. 27	78,535	95,990

†Comparable week.

More Power in De Soto

Horsepower of De Soto engines has been stepped up to 115 for the new models, comprising six in a deluxe line and eight in a custom series. Appearancewise, the cars are characterized by their lowness, wideness and accentuated streamlining; also by the retractable covers over headlights. Assembly difficulties have cropped up in connection with these lamp covers, which have slowed down early assemblies, but progress is being made in correcting the troubles. Other novel touches in the way of illumination include the use of a small light in the lower part of the plastic radiator ornament, setting it off brilliantly at night, and arrangement of instrument panel lights to come on when doors are opened.

Chevrolet Styling New

Last Friday Chevrolet unveiled its three lines for 1942—Special deluxe, Master deluxe and Fleetline. In the latter series a newly christened Aerosedan marks the first use by Chevrolet of the "fast back" body introduced by General Motors in 1939. Six models are available in both of the deluxe series, and two in the Fleetline.

Radiator grilles are wider and more massive, resembling somewhat the design used by Buick in 1941 models. Front fenders are carried back one-third of the way across the doors. Hoods are broader and deeper, and extend clear back to the front edge of the door, displacing the former cowl side panel. Headlamps are 7 inches farther apart; parking lamps have been relocated in the grille.

The usual long list of Chevrolet accessories is offered again this fall and it includes some new gadgets to intrigue the motorist. A Kleenex dispenser case, a hat holder, all-weather window shields, a whistling emergency brake release signal, vacuum-operated rear window wiper, vacuum operated windshield washer and the usual assortment of accessory lights, thermometers, compasses and seat covers are found on the list.

■ Endless stream of pistons on conveyor at Chevrolet plant in Flint, Mich., passes line of operators who weigh and check balance of each piston on specially designed scales. No part of the modern engine is more carefully designed, machined and inspected than the piston, which takes the direct impact of the cylinder explosion. In more than 20 years of manufacturing experience Chevrolet has produced 85,000,000 cast iron pistons

Record for Glassmaking

A record of two and a half years of continuous operation was chalked up for the 100-ton melting furnace in the Ford glass plant last Tuesday when the furnace was shut down for repairs after 904 days of

(*Please turn to Page* 109)

WING TIPS

Motor companies already planning low-cost private planes and engines for postwar market. General Motors and Ford indicate they are in the airplane business to stay . . . Seventy-ton experimental patrol bomber for Navy nearing completion. Keel for 117-foot hull was laid a year ago . . . Proposes clearing house for aviation fittings to level off unbalanced inventories . . . Offers jobs to released selectees

■ EVIDENCE is accumulating that aviation is destined to be the next great mass production industry in this country. Impetus of a vast expansion in military aviation is going to provide a corps of pilots, engineers and mechanics who, after the shooting, will not be satisfied to return to prosaic pastimes like hoeing corn or bumping dents out of fenders.

And this trained personnel will have plenty of planes to fly. Greatly expanded airplane plants and the stake the auto industry now has in plane production will take care of that. Granted that present types of military planes are not suited to commercial transport purposes, with the production facilities available a quick change to commercial designs should not take long.

Already there are inklings of what is to come. Henry Ford has stated publicly that his company is back in the airplane field to stay. When the bomber program is washed up, the Ford plant at Ypsilanti, Mich., will turn its ¾-mile long assembly line over to production of private and commercial planes. "A plane in every man's backyard," predicts Mr. Ford. It is likely Ford will build his own engines for such plants, too, as several designs of small engines suitable for private planes are being studied.

General Motors has gone even further than Ford, and now has an experimental private-type plane flying with a new 185-horsepower 400-pound engine of the two-cycle type. A development of the GM research laboratories, the engine is being touted by C. F. Kettering and E. R. Breech, the latter a GM vice president in charge of aviation and chairman of the board of North American Aviation Inc., as an ideal power plant for the low-price private plane of the future.

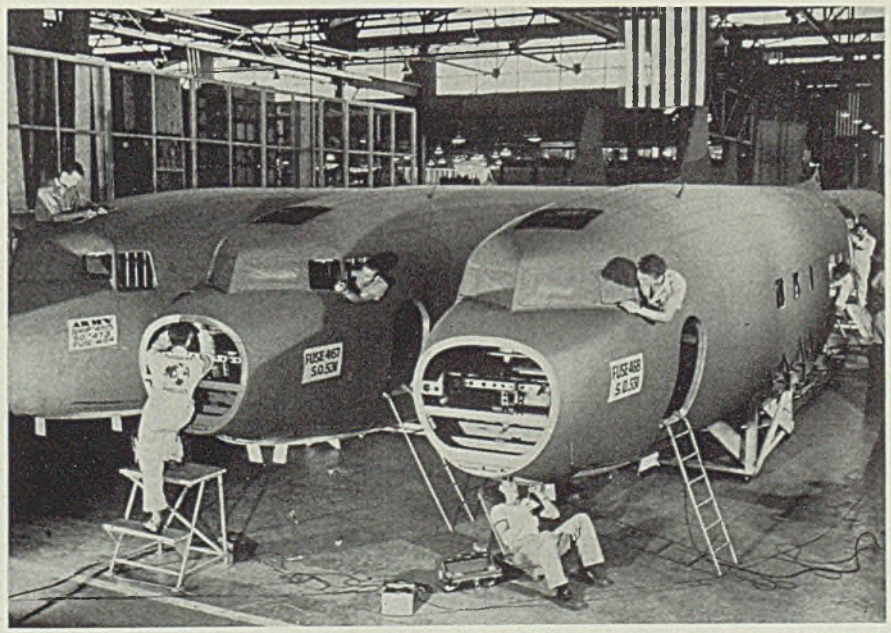
Messrs. Kettering and Breech have been quoted as of the opinion that a first-class private plane, seating four persons and cruising comfortably at around 150 miles an hour might be made and sold for something under $1500, far less than the price of any such plane today.

Obviously the engine, which is the principal cost detriment in a plane, will make use of as many standard types of automotive engine equipment and accessories as possible, probably would even be built in one of the corporation's automotive engine or diesel engine plants—certainly not at Allison which could not adapt its production facilities very well to an engine of this small size.

Hints have been dropped that the GM plane will be of steel frame construction, with fabric, or possibly plastic, covering. Ease of manufacturing and low maintenance cost seemed to dictate this type of construction.

Sales and service outlets for such an aviation enterprise already exist in the corporation, and some automobile dealers are said to be anxious to take on a line of good, low-cost planes to market to the public. Mark it down as a sure thing that General Motors will have airplanes for sale when the present emergency has been bridged.

Troopships of the Sky



■ Douglas C-53 troop transports, already camouflaged, roll down the assembly line at company's Santa Monica, Calif. plant. Designed for speed, load capacity and utility, each of these craft can carry 28 parachute troopers, fully equipped, in addition to two pilots and radio operator. They are adapted from Douglas' commercial airliners and now are being produced at a record rate

Navy Behemoth of Air Put on Torture Rack

The Navy's answer to the Army Air Corps' huge experimental bomber, the B-19, is an experimental patrol bomber of gargantuan proportions undergoing tests on torture

racks in one of the plants of Glenn L. Martin Co., Baltimore. Wing spread is 200 feet; a two-deck hull is 117 feet in length; normal gross weight is 140,000 pounds; power is furnished by four 2000-horsepower Wright duplex Cyclone engines.

So big is the new navy bomber that special ceremonies were held a year ago when the keel was laid. Original design for the ship was submitted in 1937. Shortly the near-complete ship will outgrow the assembly building where it is now housed and will be moved to a space twice as large in the new Martin D building.

Tests being made on the ship are interesting, and involve expenditure of around $100,000, it is said. Load tests are carried out in a 150-ton bridge-steel rig in which loads are applied by hydraulic power instead of dead weight, and about 150 technicians are continually swarming over the craft to watch test results.

Nerve center of the testing is a control desk directly under the prow of the hull. By means of a loud-speaker system and rows of switchboards and buttons the control chief guides the test, specifying exactly when, where and how much loads are to be applied. Lined in front of the control desk, in left battery and right battery facing the wings, are rows of observers sitting on backless benches, eyes glued to pressure gages and hands pumping, at commands, on long-handled levers which apply hydraulic pressure to jacks positioned at key spots against wings and hull.

As the wings are forced upward to simulate loads, stacks of lead bars at bow and tail and underneath the hull hold the ship down, gages showing the amount of overall lift being applied at each test point.

Spotted on the floor at eight positions back and forward of the wings are surveyors' levels, tripods resting firmly on steel plates set on concrete piers. At each level is an observer, sighting his instrument at first one dangling deflection gage and then another. These gages are accurately calibrated stocks which hang by long lines from 125 different points on the wings and hull. Degree of stress applied may be realized from the fact that at 100 per cent load the wing tips are deflected upward 6 feet. Direct pressures in excess of 250,000 pounds are said to be involved.

Plans To Avoid Tie-Up In Fittings Supplies

A. J. Weatherhead Jr., president of the company of that name in Cleveland, a leading manufacturer of aviation fittings, has evolved a method of leveling off the unbalanced inventories of fittings which exist throughout the airplane manufacturing industry. Setting up his company as a clearing house for inventory information on a trial basis with two airplane companies, the plan worked so well, overcoming temporary shortages and balancing out inventories, that the attempt is now being made to extend the idea to all aircraft producers buying from Weatherhead.

Monthly inventories of fittings stocks are sent to company offices in Cleveland, Los Angeles and New York. These, with current purchase orders, serve to give an over-all picture of fittings supplies, from which each producer can learn the location and quantity of fittings on which he can draw for immediate use. Records are not limited to fittings in actual use, but include all obsolete and slow-moving items as well.

The company president is of the opinion that the "program will eliminate many of the present shortages of fittings and will permit fittings manufacturers to plan their production by machine hours on long runs instead of attempting to meet stop-gap needs with short runs."

Consolidated Aircraft, in San Diego, Calif., now employing 24,000, and in process of adding another 16,000 employes by the spring of next year, has offered jobs to qualified men who are leaving Army or Navy service throughout the country by virtue of new exemptions.

Entirely new plant to supplement the present 600,000 square feet in production on airplane parts will be built by Briggs Mfg. Co., Detroit, award of $8,848,542 for land, buildings and equipment having been made last week by the Defense Plant Corp. The plant will be devoted to production of airplane equipment and calls for equipment totaling $5,684,754.

Trend of military aircraft deliveries this summer is shown by the following official figures: May, 1334; June, 1476; July, 1460; August, 1854.

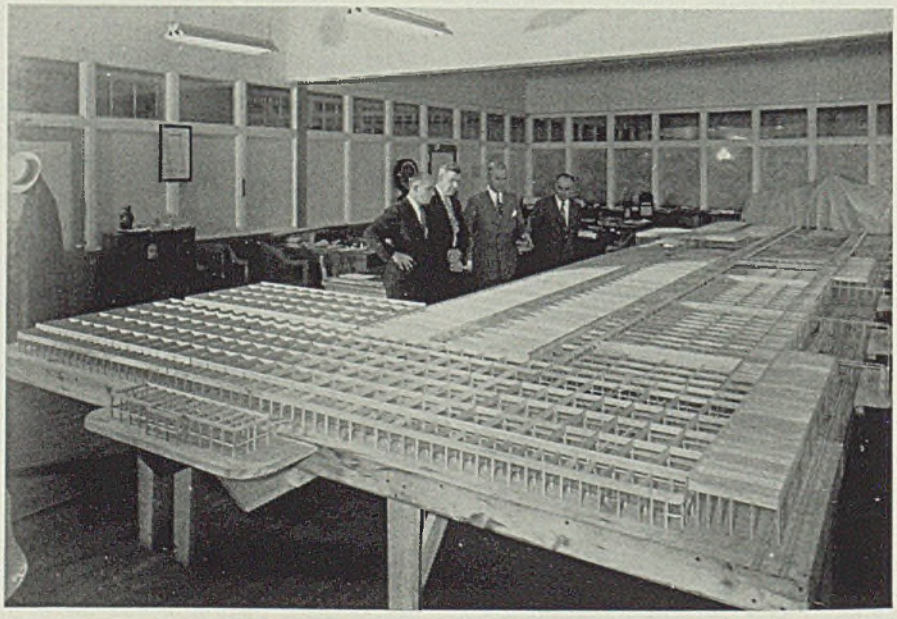
Decline in July was occasioned by lack of instruments and propellers for planes otherwise finished. This in turn was reflected by the sharp increase in August. September likely will show a total of around 1800.

Colonial Stack Lighted; Canadian Units Added

■ Colonial blast furnace, Riddlesburg, Pa., was relighted Saturday by Riddlesburg Coal & Iron Co., subsidiary of United States Pipe & Foundry Co. Output will be about 6000 tons per month. Coke ovens also have been rehabilitated. Coal mines have been in production for three weeks.

Steel Co. of Canada Ltd., Hamilton, Ont., blew in its new blast furnace last week, the largest in the Dominion, with rated capacity of 1000 tons per day. Current production is 750 tons per day. Canadian Furnace Co., Port Colborne, Ont., has relighted its stack after relining. Its capacity is 350 tons per day.

Model of $47,000,000 Ford Bomber Plant



■ Wood scale model of the $47,000,000 bomber plant Ford Motor Co. is building at Willow Run, Mich. Model is 1/96 actual size of the plant, which when completed will embrace 3,700,000 square feet of floor space. Left to right: William Pioch, chief of tool design department; Logan Miller, superintendent; C. E. Sorenson, Ford vice president; and H. B. Hanson, power and construction department

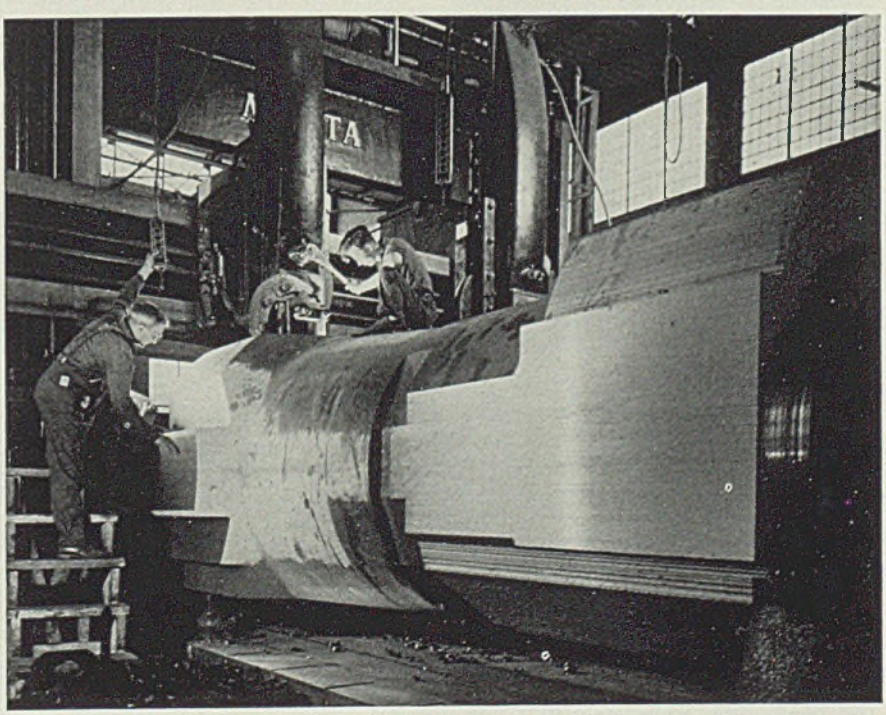
$80,482,133 National Defense Orders Placed in Week by War Department

■ DEFENSE awards reported last week by the War Department totaled $80,482,133. Ordnance Department again placed the greatest number of contracts, most of them small, and many for gages and other instruments. The orders included:

Ordnance Department Awards

Alden Supply Co., Philadelphia, washers, bolts, nuts, screws, $1458.14.
All-Steel Equipment Co. Inc., Aurora, Ill., stackbins, $2070.
Aluminum Co. of America, New Kensington, Pa., magnesium, $1295.
American Brass Co., Waterbury, Conn., gilding metal strip, $10,040.
American Fabricated Steel Co., Philadelphia, steel, $7125.
American Manganese Bronze Co., Philadelphia, manganese bronze, $52,700.
American Monorail Co., Cleveland, track for storehouse building, $7400.
American Optical Co., Southbridge, Mass., lens edging machines, $1083.
American Steel & Wire Co., Cleveland, steel, $10,639.81.
Armstrong, G. R., Manufacturers Supplies Inc., Chicago, hacksaw blades, $3196.80.
Associated Spring Corp., Wallace Barnes Co. Division, Bristol, Conn., springs, $1011.90.
Austin-Hastings Co., Cambridge, Mass., hack saw machines, $25,865.
Autoscrew Co., New York, screws, rivets and pins, $2114.46.
Babcock & Wilcox Tube Co., Beaver Falls, Pa., nickel tubing, $93,027.14.
Baker & Co. Inc., Newark, N. J., wire spools, $2500.
Barker Tool, Die & Gauge Co., Detroit, gages, $2404.
Bay State Abrasive Products Co., Westboro, Mass., grinding wheels, $2256.
Bendix Aviation Corp., Eclipse Aviation Division, Bendix, N. J., engine parts, $1107.72; Bendix Products Division, South Bend, Ind., miscellaneous parts, jets, pistons, plugs, seats, and valves, $1159.65; Scintilla Magneto Division, Sidney, N. Y., parts for tanks, parts for magnetos, $7240.01.
Bethlehem Steel Co., Bethlehem, Pa., alloy steel forgings, $26,478.75.
Bliss & Laughlin Inc., Harvey, Ill., steel, $81,541.11.
Boston Pipe & Fittings Co., Cambridge, Mass., ells and tees, $1729.23.
Brass & Copper Sales Co., St. Louis, brass, $3805.60.
Breeze Corps. Inc., Newark, N. J., parts for tanks, $1430.50.
Bridgeport Brass Co., Bridgeport, Conn., cartridge cases, $2227.50.
Bristol Brass Corp., Bristol, Conn., brass rod, $55.154.41.
Bristol & Martin Inc., New York, gages, $2515.
Brown & Sharpe Mfg. Co., Providence, R. I., micrometers, gages, protractors, plates, clamps, milling machines, $20,672.72.
Budd Wheel Co., Detroit, wheels, $1199.85.
Candler-Hill Corp., Detroit, parts for fuel pumps, $7463.75.
Canedy-Otto Mfg. Co., Chicago Heights, Ill., bench drills, $3404.
Carnegie-Illinois Steel Corp., Chicago, steel, $2444.77.
Carpenter Steel Co., Reading, Pa., steel, $136,569.11.
Chase Brass & Copper Co. Inc., Waterbury, Conn., brass strip, copper tubing, $59,570.66.
Cincinnati Milling Machine Co. Inc., Cincinnati, grinding machines, $22,578.
Clarage Fan Co., Kalamazoo, Mich., supply and exhaust fans, $2560.
Clark Equipment Co., Clark Tructractor Division, Battle Creek, Mich., truck-tractors, $2101.38.
Clark, W. E., Co., Boston, steel, $1127.
Colman, Frederick, & Sons Inc., Detroit, machines, $28,410.
Colonial Steel Co., Monaca, Pa., tool steel, $1470.
Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., parts for guns, $2510.58.
Columbus Bolt Works Co., Columbus, O., steel, $12,787.50.
Conkey, H. D., & Co., Conco Engineering Works Division, Mendota, Ill., hoists, $5682.96.
Continental Motors Corp., Muskegon, Mich., oil pump bodies, control bodies, $93,598.
Continental Screw Co., New Bedford, Mass., parts for guns, $2089.90.
Cortland Grinding Wheels Corp., Chester, Mass., grinding wheels, $1096.
County Supply Co., Plainfield, N. J., wrenches, $1494.26.
Crane Co., Davenport, Iowa, pipe and tees, reducers, flanges, $1028.80.
Crescent Insulated Wire & Cable Co., Trenton, N. J., steel, $1740.
Crucible Steel Co. of America, Midland, Pa., nickel and carbon steel bars, $1513.39.
Cutler-Hammer Inc., Boston, magnets, $1881.
Deacon, B. H., Co. Inc., Philadelphia, black steel and wrought iron pipes, $5541.33.
Denman & Davis, North Bergen, N. J., steel bar, $1188.87.
Derbyshire Machine & Tool Co., Philadelphia, dies, $9450.
Detroit Tap & Tool Co., Detroit, gages, $13,280.40.
Eaglesfield, R. D., Indianapolis, shells, $104,000.
Edgewater Steel Co., Verona, Pa., rolled rings, $1280.
Electric Wheel Co., Quincy, Ill., trailers, $14,296.50.
Engineering Tool Corp., Philadelphia, rear assembly bands, $6120.
Ensign-Bickford Co., Simsbury, Conn., safety fuzes, $3351.60.
Exact Weight Scale Co., Columbus, O., receptacles, brass weights, cups, and platters, $15,452.80.
Federal Machinery Sales Co., Chicago, heads, gages and chasers, $1214.30.
Federal Tool Corp., Chicago, gages, $2040.
Ferry Machine Co., Kent, O., tools, $1036.
Field, William H., Co., Boston, double saw tables, $1525.
Finkl, A., & Sons Co., Chicago, breech ring and alloy steel forgings, $44,325.
Fram Corp., East Providence, R. I., tubes and tees, $1438.25.
Fray, Russell R., Glendale, Calif., milling attachments, and boring heads, $24,625.
Gehnrich Corp., Boston, ovens, $1340.
General Electric Co., Schenectady, N. Y., electrical equipment, $1478.02.
General Machinery Corp., Niles Tool Works Division, Hamilton, O., parts for lathes, $12,485.
General Motors Corp., AC Spark Plug Division, Flint, Mich., instruments and parts, $5427.90; Chevrolet Motors Division, Detroit, trucks, $160,472.08.
General Motors Sales Corp., Hyatt Bearings Division, Harrison, N. J., roller bearings, $1140.
Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., boring, drilling, and milling machines, $31,350.
Gilbert & Barker Mfg. Co., Springfield, Mass., tanks for fuel oil storage, $1956.
Good Roads Machinery Co. of New York Inc., Albany, N. Y., snow removers for garage, $7395.
Grainger-Rush Co., Bethlehem, Pa., air circuit breakers, $2165.
Graybar Electric Co., Boston, malleable iron conduit clamps, $1947.51.
Great Lakes Steel Corp., Detroit, steel, $3566.20.
Greenfield Tap & Die Corp., Greenfield,

Machining at Bethlehem



■ Machining slides on forged steel breech ring of 16-inch naval gun in big multihead Mesta planer at Bethlehem Steel Co.'s plant, Bethlehem, Pa.

Mass., gages, $9228.
Groh, Edward, Metal Products, Philadelphia, screen guards on fire escapes, windows and doors, $1271.25.
Hanssen's, Louis, Sons, Davenport, Iowa, pliers, $2094.75.
Holger Hansen, Lynn, Mass., gages, $1627.
Hughes Keenan Co., Mansfield, O., tractor type crane, $6957.
Illinois Tool Works, Chicago, cutters, $1174.80.
Industrial Engineering Equipment Co., Davenport, Iowa, driving unit, $1098.
Industrial Tool & Die Works Inc., St. Paul, gages, $3991.
Ingersoll-Rand Co., New York, air compressors, $1435.
Interstate Mechanical Laboratories Inc., New York, gages, $1185.
Iowa Supply Co., Ottumwa, Iowa, radiators, $14,882.38.
Jahn, B., Mfg. Co., New Britain, Conn., dies, $2053.
J. C. H. Automatic Machine Works, Philadelphia, parts for cartridge cases, $2859.75.
Jones & Lamson Machine Co., Springfield, Vt., parts for lathes, projectors, $5201.35.
Kelly, John P., Philadelphia, castings, $3918.02.
Kent Aircraft & Machine Tool Co., Camden, N. J., gages, $15,410.
Kincaid Co. Inc., New York, parts for guns, $61,351.10.
Krueger, H. R., & Co., Detroit, drilling machines, multiple heads, $7492.
Landis, A. B., Sons Inc., Wyndmoor, Pa., parts for cartridge cases, $2275.
Landis Machine Co., Waynesboro, Pa., threading machines, $2047.75.
La Salle Steel Co., Hammond, Ind., steel, $4328.70.
Liberty Tool & Die Corp., Rochester, N. Y., gun parts, $1378.
Lincoln Electric Co., Cleveland, bronze electrodes, carbon arc welding heads, headcable assemblies and motor generators, $3865.12.
Lincoln Park Tool & Gage Co., Lincoln Park, Mich., gages, $5613.80.
Lindsley Mfg. Co., Milford, Conn., gages, $16,550.
Lorain Machine Tool Co., Cleveland, gun parts, $1460.
Lyon Metal Products Inc., Aurora, Ill., steel, $10,119.10.
Machinery Builders Inc., Long Island City, N. Y., jumble testing machines, $12,365.08.
Magnaflux Corp., Chicago, inspection machines, $6849.45.
Manning, Maxwell & Moore Inc., Bridgeport, Conn., gun parts, $3963.76.
Marshall & Huschart Machinery Co., Chicago, drilling machines, $36,430.
May Co., Moline, Ill., vacuum pumps, $1283.70.
Mechanical Laboratories Inc., Pittsburgh, inspection gages, $1230.
Mesta Machine Co., Pittsburgh, boring mills, alloy steel forgings, $335,331.50.
Midvale Co., Nicetown, Philadelphia, steel, $1105.05.
Midwestern Tool Co., Chicago, gages, $32,629.40.
Modern Tool & Die Co., Philadelphia, gages, $3625.95.
Monarch Machine Tool Co., Sidney, O., lathes, $28,778.16.
Murray Co., Atlanta, Ga., lathes, $458,502.
National Acme Co., Cleveland, slides, $1600.
National Forge & Ordnance Co., Irvine, Pa., alloy steel forgings, $4904.64.
National Machinery Co., Chicago, forging machines, $63,506.24.
National Twist Drill & Tool Co., Detroit, twist drills, $2338.63.
New Britain Machine Co., New Britain, Conn., bench legs, $3760.
New Monarch Machine & Stamping Co., Des Moines, Iowa, clips, straps and assemblies, $1696.70.
Niles-Bement-Pond Co., Pratt & Whitney Division, West Hartford, Conn., gages, $11,204.65.
Norton Co., Worcester, Mass., grinding wheels, $3106.70.
Oilgear Co., Milwaukee, parts for pumps, $1604.80.
Otis Elevator Co., Buffalo, steel castings, $8876.86.
Package Machinery Co., Springfield, Mass., clip-filling machines, $5000.
Pallet Sales Corp., Sussex, N. Y., pallets, $4360.
Peco Mfg. Corp., Philadelphia, lifting plugs, $48,422.
Peirce-Tredinich Co. Inc., Newark, N. J.,

Defense Officials Assist in Dedicating Machine Tool Plant

CHAMBERSBURG, PA. ■ Fifty guests, including officers of the United States Navy, OPM officials and leading industrialists, joined with the Chambersburg Engineering Co., Sept. 19, in dedicating the company's new machine tool plant, built because of heavy demand from the Navy for Sellers horizontal boring machines.

As the plant of William Sellers & Co. Inc.—in the heart of Philadelphia—is limited as to expansion, it was decided to handle this work at Chambersburg where there is ample room and where Sellers castings have been made for a number of years.

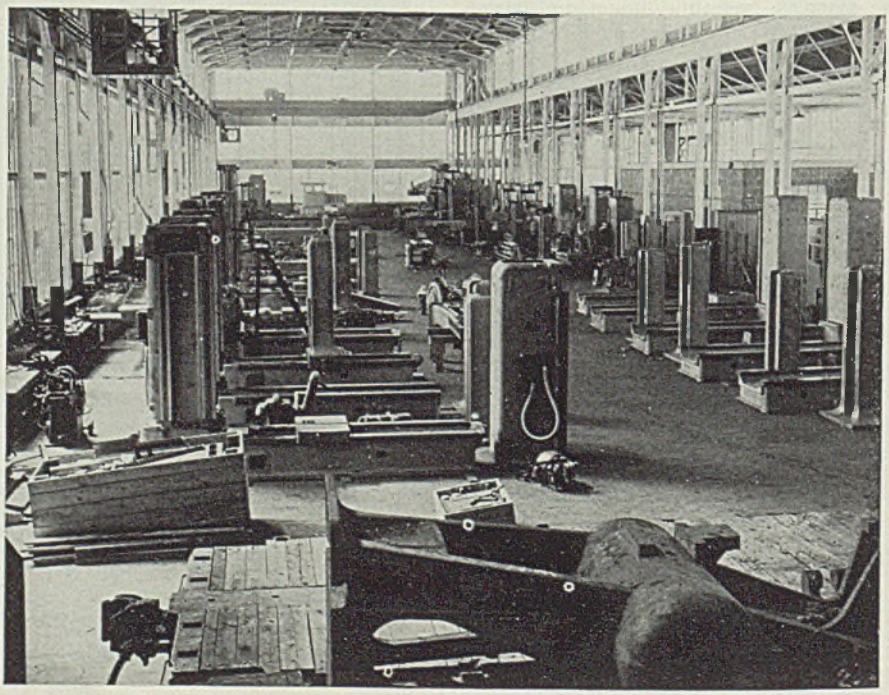
An extension at Chambersburg was authorized by the Navy Department by contract providing for its eventual acquisition by the Chambersburg company. The contract for building machine tools therein is between the Navy and William Sellers & Co., with Chambersburg Engineering acting as subcontractor. About 80 per cent of the weight of the machines will be made in Chambersburg; smaller parts will be machined in Philadelphia and assembled at Chambersburg.

The new building is 87 x 300 feet; there is a 60 x 90-foot painting bay; and also an auxiliary heating plant, electrical substation and compressor building. Ground was broken Dec. 5, 1940; the building was completed April 8, 1941—its cost having been held well within the estimated $600,000—and production started May 1, 1941.

During the dedication Capt. Edmund D. Almy, U.S.N., started the first completed machine, a 5-inch boring mill. Work was interrupted only 45 minutes for the ceremonies. Following invocation by Rev. Frank K. Bostian, Chambersburg, there were brief talks by Captain Almy, Mason Britton, chief of Tools Section, OPM, Washington, and Eugene C. Clarke, president, Chambersburg Engineering Co.

"While this dedication is merely a pause before the great work of production resumes, let us recognize that whatever of excellence comes out of this effort will be due to men—American men" declared Mr. Clarke.

Luncheon was served in one of the plant buildings and guests were then conducted through the establishment, including foundry, hammer building shops, and the new machine tool plant.



■ Chambersburg Engineering Co.'s new machine tool plant, showing Sellers horizontal boring mills for Navy Department in process of machining and erection

valves, nipples, flanges, joints; $4870.85.
Pennsylvania Forge Corp., Philadelphia, breech block forgings, $26,500.
Pike Trailer Co., Los Angeles, trailers, $1980.
Pittsburgh Steel Foundry Corp., Glassport, Pa., steel castings, $35,924.04.
Plume & Atwood Mfg. Co., Waterbury, Conn., brass strip, $23,902.32.
Poor & Co., Canton Forge & Axle Works, Canton, O., forgings, $4719.
Precise Tool & Mfg. Co., Farmington, Mich., gages, $15,100.
Quality Tool & Die Co., Indianapolis, gages, $3080.
Radiart Corp., Cleveland, fuzes, $1,610,-350.
Rathbone, A. B. & J., Palmer, Mass., steel, $7489.50.
Reliable Tool Co. Inc., Irvington, N. J., locators, punches, drills, $2760.
Republic Steel Corp., Chicago, steel, $5105.73.
Sampsel Time Control Inc., Spring Valley, Ill., parts for tanks, $1932.05.
Sandberg Equipment Co., Chicago, international shop "mules," and tractors, $5049.45.
Sharon Steel Corp., Sharon, Pa., steel, $2849.63.
Sieg Co., Davenport, Iowa, grinders, $1146.
Sowers Mfg. Co., Buffalo, mixing kettles, $98,550.
Staley Mfg. Corp., Columbus, Ind., motor repair stands, $27,720.
Standard Gage Co. Inc., Poughkeepsie, N. Y., gages, $3701.
Standard Machinery Co., Providence, R. I., roller bearings, $2430.
Standard Steel Spring Co., Blood Bros. Machine Co. Division, Allegan, Mich., flexible joints, $1415.
Stewart-Warner Corp., Chicago, instruments and parts, $5653.25.
Strong Steel Foundry Co., Buffalo, castings, $3751.25.
Taft-Peirce Mfg. Co., Woonsocket, R. I., duplex bench plates, blocks, parallels, gages, $7090.
Thomas Steel Co., Warren, O., steel, $16,-839.80.
Timken-Detroit Axle Co., Wisconsin Axle Division, Oshkosh, Wis., parts for tank final drive and parts for transmission, $43,361.04.
Timken Roller Bearing Co., Canton, O., bearings, $2768.80.
Toledo Scale Co., Boston, bench dial scales, and floor scales, $2190.70.
Union Spring & Mfg. Co., New Kensington, Pa., springs, $15,121.20.
Union Twist Drill Co., Chicago, cutters, $2619.12.
United Drill & Tool Corp., Whitman & Barnes Division, Detroit, drills, $3121.20.
U. S. Tool & Mfg. Co., Dearborn, Mich., steel cutters, $5663.40.
Ward La France Truck Corp., Elmira, N. Y., breaker assemblies parts, $1244.28.
Vinco Corp., Detroit, gages, plates, $53,-725.25.
Wallace Supplies Mfg. Co., Chicago, assemblies, $7365.
Walworth Co., Boston, seamless brass, $1068.59.
Weaver, Frank M., & Co. Inc., Lansdale, Pa., structural steel, $1457.
Weaver Mfg. Co., Springfield, Ill., trucks, $15,854.73.
Willard Storage Battery Co., Cleveland, storage batteries, $10,545.
Williams, J. H., & Co., Buffalo, forgings, $10,927.
Worthington Pump & Machinery Corp., Harrison, N. J., repair parts, for hydraulic high pressure pump, $4923.16.
Wright Aeronautical Corp., Paterson, N. J., flywheel hubs, $1584.
Zimmerman Steel Co., Bettendorf, Iowa, steel castings, $1595.62.

Signal Corps Awards

American Automatic Electric Sales Co., Chicago, switchboard cable, selectors,

225 Subcontractors for Antiaircraft Gun Mount

■ THIS 90 mm. antiaircraft gun mount, first to be built in United States by private industry, was presented to Army officials last week by Max W. Babb, president, Allis-Chalmers Mfg. Co., Milwaukee, at the company's LaPorte, Ind., works. Attended by Army, state of Indiana and company officials, the ceremony marked completion of preliminary work and beginning of large-scale production of this important defense weapon.

Allis-Chalmers shared the job with more than 225 other companies through subcontracting. Company's initial order for the antiaircraft gun mounts totaled $6,500,000. Of this, $2,600,000 is to be passed along directly to subcontracting firms. The mount comprises 3858 separate parts.

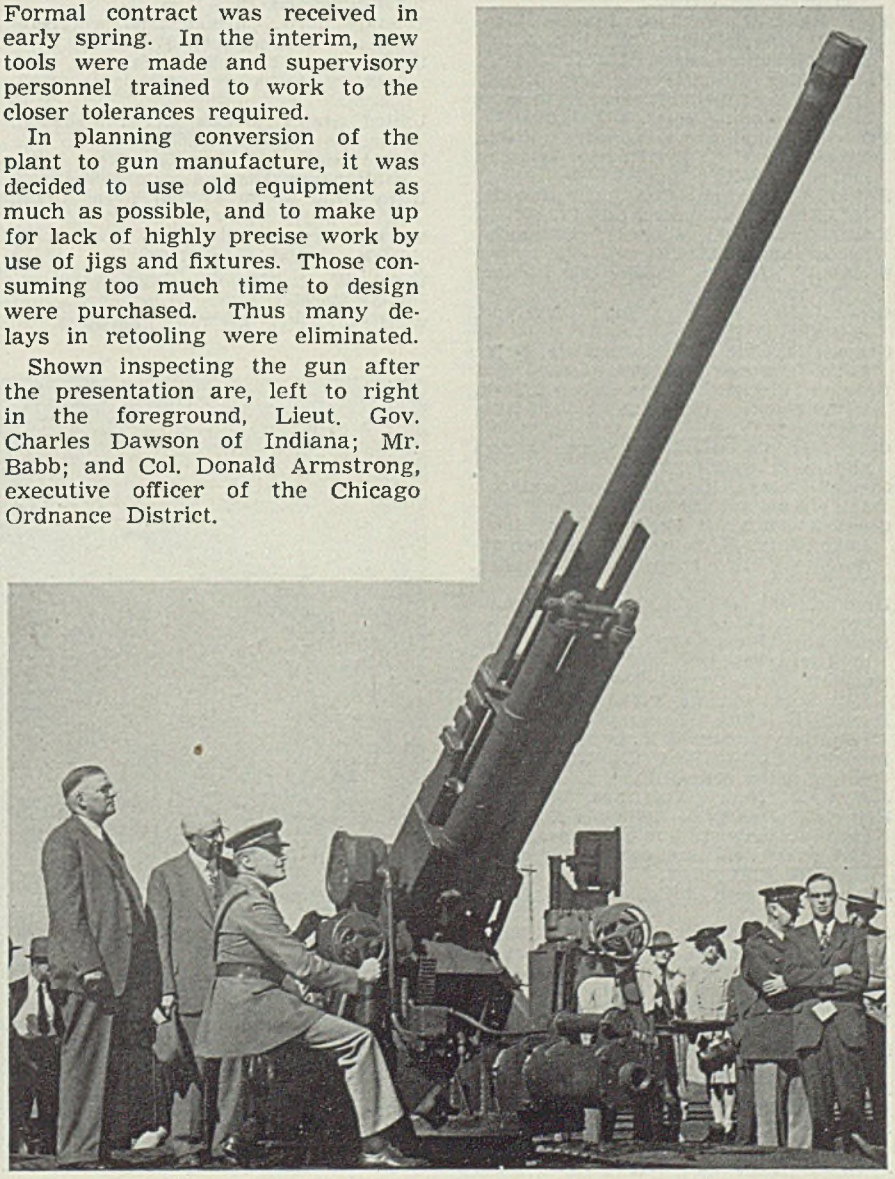
Reported "the best the army has today," and topping anything now used in Europe, the 90 mm. gun is said to be capable of blasting planes out of the air at heights to 35,000 feet. Approximately 3.54 inches in diameter, the gun can be "unlimbered from traveling position and placed into effective firing position within six minutes."

Manufacture illustrates the tremendous task undertaken by American industry in the rearmament program, as well as its ingenuity and adaptability. It marks successful completion of the job of converting a factory devoted to peace-time pursuits, in this case production of agricultural and road grading machinery, to extremely precise fabrication of "the world's most powerful antiaircraft unit."

Letter of indemnity was received by Allis-Chalmers from the government late last December. Formal contract was received in early spring. In the interim, new tools were made and supervisory personnel trained to work to the closer tolerances required.

In planning conversion of the plant to gun manufacture, it was decided to use old equipment as much as possible, and to make up for lack of highly precise work by use of jigs and fixtures. Those consuming too much time to design were purchased. Thus many delays in retooling were eliminated.

Shown inspecting the gun after the presentation are, left to right in the foreground, Lieut. Gov. Charles Dawson of Indiana; Mr. Babb; and Col. Donald Armstrong, executive officer of the Chicago Ordnance District.



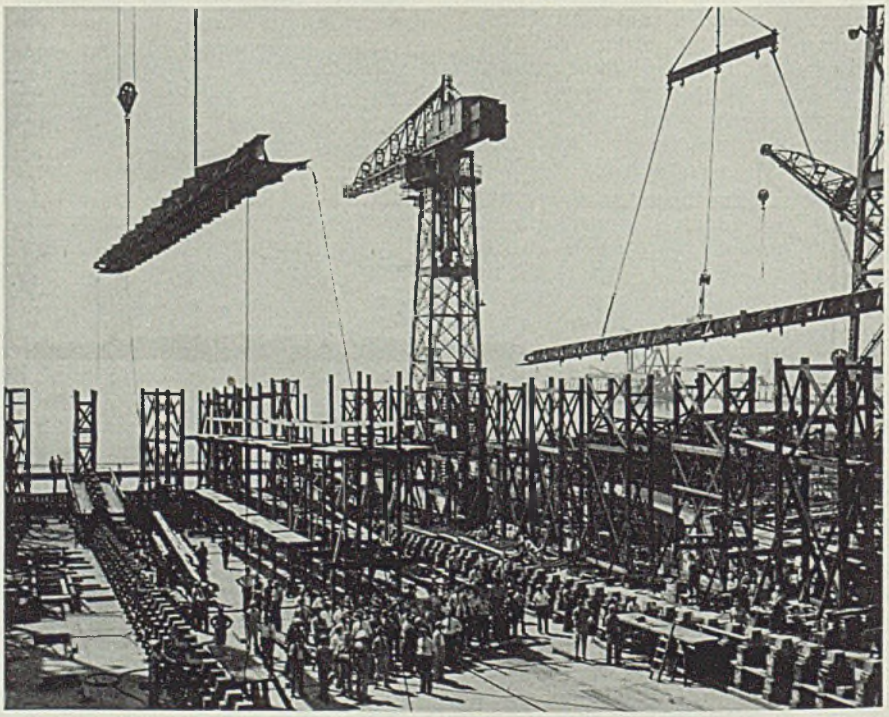
connectors, $121,744.19.
Bartlett Mfg. Co., Detroit, trimmers, $1480.
Brach, L. S., Mfg. Corp., Newark, N. J., switchboards, plug plate assemblies, jack plate assemblies, switches, $62,-464.23.
Bud Radio Inc., Cleveland, coil assemblies, cords and plugs, $53,397.50.
Bunnell, J. H., & Co., Brooklyn, N. Y., keys, $18,507.
Cardwell, Allen D., Mfg. Corp., Brooklyn, N. Y., jacks, binding posts, terminals, cases, telegraph sets, socket caps, $54,104.64.
Clayton & Lambert Mfg. Co., Detroit, torches, $5028.
Climax Engineering Co., Light, Plant & Power Unit Division, Clinton, Iowa, power units, $15,180.
Communications Products Co., Jersey City, N. J., cable, $7546.
Conkey, H. D., & Co., Conco Engineering Works Division, Mendota, Ill., reels, $86,995.86.
Copperweld Steel Co., Glassport, Pa., wire, $1874.35.
Cornelius, H. M., Co., New York, lanterns, $6500.
Deagan, J. C., Inc., Chicago, carrying cases, $1055.88.
Dietz, H., Co., Brooklyn, N. Y., maintenance equipment, rules, $14,714.86.
Eby, Hugh H., Inc., Philadelphia, binding posts, $7623.75.
Elcor Inc., Chicago, dynamotor units, $172,486.50.
Electrical Research Laboratories Inc., Evanston, Ill., interphone amplifiers and parts, $25,405.43.
Erco Radio Laboratories Inc., Hempstead, Long Island, N. Y., antenna and antenna tuning units, $18,025.
Federal Mfg. & Engineering Corp., Brooklyn, N. Y., terminal boxes, capacitors, sockets, binding posts, $22,646.90.
Federal Stamping & Engineering Corp., Brooklyn, N. Y., connector clamps, plugs, $14,250.
Federal Telegraph Co. Inc., Newark, N. J., radio equipment, $197,272.50.
Friez, Julien P., & Sons, Baltimore, barographs, $39,514.80.
Froiland Mfg. Co., Springfield, Mass., couplings, $1850.
General Dry Batteries Inc., Cleveland, batteries, $1798.36.
General Electric Co., Schenectady, N. Y., radio equipment, $94,909.
Graybar Electric Co. Inc., New York, switchboards, repeating coils, wire, $344,118.37.
Gray Mfg. Co., Hartford, Conn., keyers and parts, $110,432.72.
Greene, Eugene, Inc., New York, antenna equipment, $45,963.75.
Gussack Machined Products Inc., Long Island City, N. Y., shock absorber assemblies and snapslide assemblies, $1477.10.
Hammerlund Mfg. Co., New York, radio receivers, $146,481.
Harrisburg Steel Corp., New York, gas cylinders, $9340.
Harvard Lock Co. of New York Inc., New York, weights, $8342.
Herzog-Miniature Lamp Works Inc., Long Island City, N. Y., lamps, $2100.
Homelite Corp., Port Chester, N. Y., power units, $38,848.48.
Joslyn Co., New York, rings, $8607.
Kellogg Switchboard & Supply Co., Chicago, switchboards, microphones, head and chest sets and equipment, cable, cabinets, $351,518.05.
Kenly, Templeton, & Co., Chicago, jacks, $2140.
Leach Co., Oshkosh, Wis., mast bases and binding posts, $23,352.
Leich Electric Co., Genoa, Ill., switchboards, $2155.
Linde Air Products Co., New York, regulators, tanks and torch outfits, $1605.80.
Majestic Radio & Television Corp., Chicago, radio equipment, $322,754.95.
McElroy, T. R., Boston, recorders, reels, practice tapes, keyers, $8013.10.
National Carbon Co. Inc., New York, batteries, $7082.55.
Neumade Products Corp., New York, tables and racks, $3600.
North Electric Mfg. Co., Galion, O., head and chest sets, $3510.
Pan-American Mfg. & Supply Co., New York, direction finder equipment, $20,000.
Petroff, Peter A., New York, casings, nuts, shafts, tags, sleeves and keys, $10,838.10.
Philco Corp., Philadelphia, remote control equipment, $163,848.44.
Precision Mfg. Co., Chicago, boxes and binding posts, $21,882.25.
Radio Receptor Co. Inc., New York, transformers, coils, tubes, fan assemblies and switches, keyers and relays, other radio equipment, $67,257.45.
Rauland Corp., Chicago, transmitting equipment, $498,355.
Ray-O-Vac Co., Madison, Wis., batteries, $1091.40.
RCA Mfg. Co. Inc., Camden, N. J., oscillograph, generator, and test sets, $1512.
Roeblings John A., Sons & Co., New York, wire, $2327.30.
Rome Cable Corp., Rome, N. Y., wire, $2522.40.
Sheip, Henry H., Mfg. Co., Philadelphia, chests, $885.
Simplex Wire & Cable Co., Cambridge, Mass., wire, $1718.75.
Simpson Electric Co., Chicago, test sets, voltmeters, $4096.30.
Small Motors Inc., Chicago, coils, $1470.
Stackbin Corp., Providence, R. I., cabinets, $15,500.
Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y., switchboard equipment, $468,606.48.
Teletype Corp., Chicago, teletype receiving and sending sets, $70,889.45.
Ulmer, A. J., New York, fairlead, connectors, cases and terminals, $28,-356.25.
United States Motors Corp., Oshkosh, Wis., power units, $163,280.50.
United States Rubber Co., New York, cable assemblies and reels, $388,465.88.
Utica Drop Forge & Tool Corp., Utica, N. Y., pliers, $2514.
Warren Foundry & Pipe Corp., New York, manhole tops, $7425.
Welch, W. M., Mfg. Co., Chicago, barometers, $6885.
Western Electric Co. Inc., Kearny, N. J., cases and racks, $9276.90.
Weston Electrical Instrument Corp., New York, exposure meters, $1310.40.
Widin Metal Goods Co., Garwood, N. J., mast bases, mast sections, insulators, washers, $302,525.
Wind Turbine Co., Westchester, Pa., radio towers, $10,486.20.

Corps of Engineers Awards

Asco Supply Co. Inc., Glendale, L. I., N. Y., boilers and supplies, $2466.24.
Barber-Greene Co., Aurora, Ill., bucket loader and flight conveyor, Westover field, Chicopee Falls, Mass., $3527.
Belmont Iron Works, Royersford, Pa., structural steel, DeRidder, La., airport, $34,500.
Cole, R. D., Mfg. Co., Newman, Ga., steel water tank, Valdosta, Ga., airport, $25,785.
General Motors Sales Corp., LaGrange, Ill., diesel engines, generators and auxiliary equipment, Fairfax industrial district, Kansas City, Kans., $171,351.
Harnischfeger Corp., Milwaukee, diesel-powered shovels and replacements for same, $163,037.35.
Joyce-Cridland Co., Dayton, O., speed jack, traversing base, $2404.40.
Mion Construction Co., Atlanta, Ga., advanced twin engine flying school, Columbus, Miss., airfield, $4,212,319.47.
Republic Steel Corp., Cleveland, reinforcing bars and nuts, $10,744.72.
Standard Gas Equipment Corp., New York, ranges, bake ovens and fryers, Biloxi, Miss., training school, $8303.96.
Taylor Iron Works & Supply Co., Macon, Ga., steel water tanks, Moultrie, Ga., and Sebring, Fla., airports, $47,400.
Truscon Steel Co., Youngstown, O., sidewalls, roof decking, doors, aircraft assembly plant, Tulsa, Okla., $1,043,-444.50.
United States Steel Export Co., Washington, steel and wire, $2265.77.

Air Corps Awards

Ainsworth Mfg. Corp., Detroit, bomb shackle assemblies, $197,673.40.
American Seating Co., Grand Rapids, Mich., desks and chairs, $34,909.80.
Bendix Aviation Corp., Bendix Products Division, South Bend, Ind., struts, lock



■ Navy lays keel for two destroyers at Philadelphia yard: Five minutes after the fabricated units were swung in place, workmen were scrambling over them without ceremony, helping to rush the two-ocean navy to completion. NEA photo

rings, brake assemblies and wheel assemblies, $79,783.20.
Brewster Aeronautical Corp., Long Island, N. Y., gas tanks, $163,136.25.
Cambridge Instrument Co., New York, mixture indicators, $110,200.
Cedar Rapids Engineering Co. of Delaware, Cedar Rapids, Iowa, socket wrench handles, torque indicating handles, $104,266.50.
Cincinnati Electrical Tool Co., Cincinnati, buffers, polishers and grinders, $36,699.50.
Clark, James, Jr. Electric Co., Louisville, Ky., pedestal type grinders, $28,600.
Curtiss-Wright Corp., Curtiss Propeller Division, Caldwell, N. J., propeller assemblies, $156,032.
Dumore Co., Racine, Wis., buffers and polishers, $2962.
Folmer Graflex Corp., Rochester, N. Y., cameras, $235,684.15.
General Electric Co., Schenectady, N. Y., lamp assemblies, portable floodlight, inverter assemblies, $272,770.
Jacobs Aircraft Engine Co., Pottstown, Pa., crankcase assemblies, $99,867.50.
Machinery & Specialties Inc., Dayton, O., grinders and buffers, $14,264.04.
Mall Tool Co., Chicago, flexible shaft grinders, $9730.
Martin, Glenn L., Co., Baltimore, gun turrets, $123,071.
Okonite Co., Hazard Insulated Wire Works Division, Chicago, cable, $115,045.
Seifreat-Elstad Machinery Co., Dayton, O., bench type grinders, $21,388.80.
Standard Electrical Tool Co., Cincinnati, grinders, $1434.
U. S. Electrical Tool Co., Cincinnati, buffers, polishers, grinders, $88,241.91.

Quartermaster Corps Awards

American Safety Razor Corp., Brooklyn, N. Y., safety razors, $36,718.75.
Gillette Safety Razor Co., South Boston, Mass., safety razors, $48,090.63.
Osgood Co., Marion, O., crawler cranes and spare parts, $29,760.80.

Defense Contract Opportunities . . . . .

■ MANUFACTURERS with facilities capable of being adapted to defense production, and which are currently not fully engaged, are being provided opportunities to participate in that work as subcontractors. Contract Distribution Division, OPM, continues issuance, on a broader base, of data on available subcontract work through its district offices.

Data on prime contracts also are issued by the regional offices, which usually have specifications and drawings. Bids on this work, however, should be sent directly to the contracting officers. Opportunities reported to STEEL last week by the various offices:

Contract Distribution Division, OPM, Federal Reserve Bank Building, 230 South LaSalle Street, Chicago, asks for contractors for the following work:

ABC-909—Eastern manufacturer wishes to subcontract for: 7000 1 1/16" hex. steel screw machine parts; 2000 ⅞" hex. steel screw machine parts and 4000 15/16" hex. steel screw machine parts. Automatic and hand screw machines required; also small drill press equipment.

MSC-813—A Wisconsin manufacturer requires subcontracting facilities for machining various small parts made from alloy steels and bronze for control valves. Turret lathes, engine lathes, milling machines, vertical boring machines, broaching machines, and all types of gear cutting equipment, especially bevel, necessary. Materials to be furnished by prime contractor. Quantities on individual parts relatively small, but total volume of work very large. Blue prints are available at this office for examination.

HMC-729—An Ohio manufacturer is searching for steel gear-cutting facilities for spur and bevel transmission and differential gears used in five to twelve-ton road rollers. Sizes mostly 10" to 12" diameter, but a few as large as 24" in diameter. Quantities, minimum, 100 to 200. The company furnishing gear cutting facilities would be expected to supply gear blanks, although these may be supplied by the prime contractor if necessary. Details can be obtained from this office.

CC-813 — Urgent requirement for extensive number of machine hours within 300 miles of Chicago. Vertical boring mill, 144" or larger size range, ⅛" tolerance required; all hours available. It consists of heavy, rough machining on 10,000-pound steel castings estimated to take 25 to 30 hours. Several thousand pounds of metal to be hogged off. Mills must be heavy duty and high horsepower.

FBD-821—We have a call for screw machine parts of various sizes and types. Full particulars can be had by contacting this office.

PSC-816—We have available a subcontract of sizable proportion. The equipment required is of rather heavy nature. Requires vertical boring mills, taking a piece of 60" diameter. The shapes to be turned resemble ball races. Work for heavy lathes and heavy slab miller is also included. Material to be machined is armorplate or equal. Inspection of drawings at this office is invited.

OFM-811—Bids are requested on machine steel parts in lots of 5000-10,000. Screw machines of 1" capacity, automatic or hand, will suit well. Tolerances average. Drawings can be inspected at this office.

RAC-812—We have a call for a first class toolmaking establishment to fill a demand for dies and punches required in the manufacture of .30 cal. cartridges. Spring collets are also included in this order. Top flight lathe, internal and external grinding equipment is a necessity. Material should not be confused with commercial diemaking. Design is quite simple. Dimensions must be held within close limits and the finish on the working sides mirror-like. Heat treating and hardening directions are given and must be adhered to. This is a very desirable contract for a medium-sized tool shop, quantities worthwhile and deliveries demanded within reason. Drawings can be inspected at this office.

ALC-805—Facilities required for machining tank parts, such as the turret. Facilities should include precision vertical boring mills that will swing up to 6', horizontal boring mills with 3" bar, also lathes and milling machines for intricate operations. Castings to be furnished by the prime contractor. Blue prints available at this office for examination.

MGC-808—Manufacturer calls for bids on the machining of axles of small gun mounts. These are of built-up steel and welded construction. Machining requires lathes of at least 16" swing and 10' bed or 6' between centers, milling machines, horizontal or vertical, with a table of at least 48" working length. Universal grinder taking 65" between centers would be a great advantage. There are 1300 sets of two pieces each to be machined on this order, deliveries to begin in September. Drawings can be examined at this office.

SCA-808—Engine manufacturer wishes to subcontract for 6000 each of five different steel alloy parts for delivery at the rate of 350 per month, starting Nov. 1. Parts are made of ⅝" to 13/16" round nickel alloy steel, requiring automatic and hand screw machines, small lathes, external grinders that will take up to 9" between centers, small milling machines for cutting key-sets, threading, heat treating and cadmium plating. Precision work. Drawings can be studied in this office.

III-826—A Michigan manufacturer wishes to sublet two lots of extremely fine work requiring close tolerances, to be used in precision telescopes. Only the most accurate shops can be considered. The operations require milling, drilling, surface and disc grinders, lathe and turret lathe work. The lots are as follows: 1. On Set No. 1 the first order will be for 125 sets of the following aluminum parts — B-172949, B-173132, C-78175 and D-43795, delivery to start in November at the rate of 30 sets per month. 2. On Set No. 2 the first order will be for 65 sets of the following aluminum parts—A-31424, B-16055, B-10801, B-10802 and C-2775, delivery to start

■ This wire cable shell-lift grip, industrial application of the century-old Chinese woven straw "finger trap", facilitates easy and safe movement of high explosives. Mesh pressure is released and grip lifted from shell when catch shown held in the right hand of Miss Vivien Kellems, manufacturer, is released. Miss Kellems, interested by the Chinese toy, had its principle applied to a steel wire grip. Today she has a factory in New York producing varied cable grips for industry, armament production, and United States and British navies. Acme photo

in November at the rate of 15 sets per month. Both items carry an A-1-b rating and prime contractor will furnish castings, raw material and gages. However, tools, jigs, and fixtures must be made by the subcontractor.

GMC-905—Urgently needed: A Chicago manufacturing concern has work to subcontract for machining iron and steel castings, requiring planing, drilling, and milling. Require planers with minimum sizes of 6' x 16' x 24", radial drill presses in sizes varying from 3' to 6' arm, and (Cincinnati or American) milling machines from No. 1 to No. 6. Work is to be performed on castings ranging up to 10 tons. Castings furnished.

GMAD-906—Facilities urgently required to make special male and female spline gages. Also "GO" and "NO GO" plug thread gauges. Any open capacity on thread grinding equipment should be reported to this office.

SPG-804—Large concern making special units for the defense program wishes to subcontract work requiring the following equipment: 4 No. 330 Giddings & Lewis boring bars with 36" vertical travel, 48" cross feed, 30" x 60" table, 36" diameter index table; 18 Pratt & Whitney profilers (new type with fast spindles); 6 open side, milling type, gray planers with 48" x 48" x 8' traverse, 1 rail and 1 side head; Radial drills with minimum 4' radius single and multispindle drill presses up to 1" capacity. Manufacturing concerns accepted as subcontractors, who subsequently prove able to meet the exacting demands in this work, need have little fear of sufficient future work for machines of the type specified.

SCA-808—Engine manufacturer wishes to subcontract for 6000 each of 5 different steel alloy parts for delivery at the rate of 350 per month, starting November 1. Parts are made of ⅝" to 13/16" round nickel alloy steel, requiring automatic and hand screw machines, small lathes, external grinders that will take up to 9" between centers, small milling machines for cutting key-seats, threading, heat treating and cadmium plating. Precision work.

SWC-714—Parts of brass and steel to subcontract for automatic screw machines, single or multispindle, miscellaneous sizes up to 1" collet. Close tolerance work. Quantities large and small.

GE-711—This is an opportunity for pooling of facilities on the pouring and machining of large gray-iron castings up to 45-ton individual weights. Annealing furnaces to take castings up to 14' x 14' x 5' with equipment for vibrating. For machining, a 20' vertical boring mill for one operation, 14' for balance. Horizontal boring mill with bar 8' above floor. Planer 15' between uprights. 10' radial drill and smaller equipment. Priority A-1-a.

GEC-705—Work to subcontract for machining, gear-cutting, and grinding on two worm and gear parts of the following approximate dimensions. The steel worm-sleeve is 1¾" in diameter, 4½" long. The bronze worm wheel 1¼" in diameter with a ⅝" face. Small and large lots will be let. Partial quotations covering any of the operations of blanking, gear cutting or the finish grinding are also solicited. This is an opportunity for small shops with the necessary facilities to obtain defense work.

GEN-816—Several manufacturers have work for various sizes and types of gear hobbing machines. Also Gleason gear shapers as well as worm milling machines for production of spur-mitre and bevel gears, worm wheels and worms.

MPP-821—Wanted by Chicago manufacturer: Automatic screw machines with spindle or collet capacity from 3" to 6" in diameter. The tolerances vary from .001 to .003 on reamed holes and from .003 to .005 on turning, forming and facing. Also thread milling machines capable of cutting U. S. F. worms and Acme threads to within .0001" to .0005" limit on the pitch diameter. Both of the above items are urgently needed, but the need for the automatic screw machines is the most urgent. This work carries A-1-a and A-1-b priority ratings.

ERC-802—An Eastern corporation desires a source of supply for "GO" and "NO GO" thread gauges of special design.

GEC-822—An Indiana manufacturer has requirements at present for machining 50 units. Material is aluminum bronze, and steel castings. These 50 units should be finished within two weeks, or as quickly as possible, and three of these units will be required per week thereafter. The following equipment will be necessary in order to handle this requirement: Profile mill, horizontal boring mill, drill press, vertical mill, welding equipment, and a tapping machine.

IMMC-826—An Illinois manufacturer requires subcontracting facilities for the manufacture of high speed, inserted blades, for milling cutters. This work requires power hack saws, No. 2 or No. 3 milling machines, surface grinders, possibly equipped with Brown and Sharpe magnetic chucks, Universal or tool grinders, broaches for serrating, and heat treating equipment suitable for hardening and drawing to 63-65 Rockwell. Large quantities and continuous production. Subcontracts will be let for any part of this work.

EMC-827—A Chicago manufacturer wishes to sublet work to be done on two 42" to 56" Bullard vertical turret lathes. This is a very urgent requirement for aviation work.

DCSM-904—Marine Equipment—We have immediate requirement for propulsion machinery for 9 ships (alternate 18 ships) to be delivered at a Great Lakes port.

SGC-826—1. Large manufacturer wishes to sublet work that requires new type Pratt & Whitney profilers and multiple spindle presses for secondary operations. 2. Also, well equipped tool and die shops having jib boring equipment.

CWC-823—Tool room facilities capable of making special milling cutters for the aviation industry. These are special cutters, having only four teeth, some 5" and some 6" diameter, for climb milling of aluminum alloy at high speed.

HC-818—Close tolerance machine work on alloy steel parts for controls. Will require automatic screw machines ¾" to 1¼" capacity and hand screw machines of similar size; also small milling machines, small drill presses for accurate work and cylindrical grinders. Material can be furnished by prime contractor; also taps and jigs may be furnished by prime contractor.

GEC-815—Indiana manufacturer has requirement for machining 3000 to 5000 aluminum motor end cases for aircraft at rate of 750 per month continuously, also a number of steel motor castings of same size in substantial quantities at the same rate per month. Potter and Johnson automatic turret lathes required. Sample of machined casting and drawings can be inspected at Chicago office. Prospective bidders can examine operations at plant of prime contractor within 150 miles of Chicago.

MMD-813—Urgent requirement for extensive number of machine hours within 500 miles of Minneapolis. Job No. 1, vertical boring mill, size range, 96" or larger, ¼" tolerance required; all hours available. Job No. 2, vertical boring mill, size range, 144" or larger, ¼" tolerance required; all hours available. Job No. 1 consists of heavy, rough machining of 4000-pound steel castings, operations estimated to take about 12 hours. Job No. 2 consists of same work on 1000-pound steel castings estimated to take 25 to 30 hours. Between 1000 and 2000 pounds of metal to be hogged off on Job No. 1. Several thousand pounds of metal are to be hogged off on Job No. 2. Mills must be heavy duty and highly horse-powered.

NND-811—Facilities wanted to machine ship propellers 12' in diameter and height overall 4½'. Balancing equipment desirable but not absolutely essential. Propeller hubs also included in this schedule.

WHC-82—Machine work required on cast steel gear housings. Horizontal boring mills with 4" spindle, also 5' arm radial drill presses and 2A and 3A Warner & Swasey turret lathes best suited for this work. Material to be furnished by prime contractor. Quantity not very large.

EEC-81—Item 1—Subcontractors required to make small races for bearings. Automatic screw machines from ⅜" to ¾" capacity, also internal and external grinding equipment necessary. Polished finish on some surfaces. Material SAE 52-100 to be furnished by subcontractor. Quantities from 3000 to 10,000 on each part. Prints available. Item 2—Subcontractor required for small automatic screw machine work (4mm. collets). Metric threads. Flats on head of piece measure 2mm. Steel to be furnished by subcontractor.

IHC-805—Urgent requirement—for immediate facilities to make deep hole drills and reamers for guns. Drills are the straight flute type made in two sections. The drill proper is approximately ¾" diameter x 4⅛" long, and the shank to which it is butt-welded is 10' long. Reamers six-flute 5°, left hand spiral type made in two sections, the reamer proper being approximately 5¾" long. The shank into which it is screwed is 9' 11¼" long. These will be required in lots of 25, 50, and 100, with more to follow.

Machining facilities needed for large Meehanite castings used in the construction of a 17' gear hob. Castings range in weight from 20 to 30 tons and are finished to rather close and exacting limits. In all cases these castings are annealed, rough machined and then again given a normalizing soak at about 500 C., subsequent to the finishing operations. Delivery of castings will start in September and extend to the latter part of November. Following machines are required and the approximate roughing and finishing time is shown:

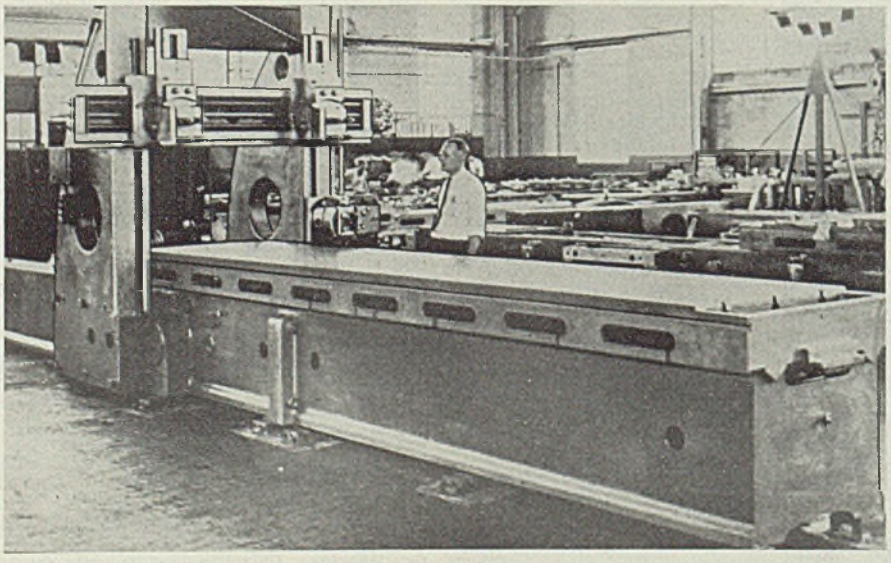
	Roughing Time (hours)	Finishing Time (hours)
12' wide planer	None	108
16' wide planer	756	792
16' vert. boring mill	294	1308
20' vert. boring mill	216	435
7" hor. boring bar	None	375
9' radial drill	None	366

Contract Distribution Division, OPM, 240 Rand Tower, Minneapolis, reports the following:

Sched. 3773—1200 seamless galley, steel tubs; 1200 welded steel galley tubs (ships) (chromium steel 18" x 21" x 24", without covers); Bureau of Supplies & Accounts, Navy Department, Washington; bids Oct. 2.

Sched. 8772—ammunition boxes including 490,000 ten gauge sheet steel; 490,000 liners; and six sets dies and jigs (ordnance); Bureau of Supplies & Accounts, Navy Department, Washington; bids Oct. 10.

Fast Work in Building Large Planers



■ Two months after signing contract for building 125 large planers, the Grand Rapids, Mich., stamping division of Fisher Body delivered the first machine, shown here. Fisher is undertaking construction of these tools for the OPM to relieve a bottleneck in this type of equipment and will complete the 125 units in ten months. Thirty years of experience in building patterns and dies for large autobody stampings proved helpful in expediting production of the planers, the center beds of which are 43 feet in length

Canada Expands Defense Supply Unit; Appointments and Orders for the Week

TORONTO, ONT.

■ FOUR new branches have been created within Canada's Department of Munitions and Supply to increase output in existing munitions plants and to assure a future expansion in keeping with further development of the country's raw materials and other resources, it was reported last week by C. D. Howe.

Minister of munitions and supply, Mr. Howe declared the new branches would comprise Tank and Gun Production, Ammunition Production, Munitions Contracts, and Industrial Planning and Engineering. The first three compose what was formerly the Munitions Production Branch; the latter was formed to co-ordinate duties of the Army Engineering Design Division with the Industrial Planning Division.

M. A. Hoey has been named deputy steel controller for the Dominion. Clarence W. Marshall was appointed assistant to the controller in charge of structural steel, and J. H. Dougherty was placed in charge of iron and steel castings. Selected as controller of construction was C. Blake Jackson, with G. K. Fisken named deputy controller.

Appointment as controller in steel makes each of the above a member of the Wartime Industries Control Board.

Department of Munitions and Supply reported 4057 contracts placed in the week ended Sept. 9. Total value was $29,583,272, and included orders aggregating $1,057,093 placed with companies in United States. Awards included:

Shipbuilding: Port Arthur Shipbuilding Co. Ltd., Port Arthur, Ont., $4,147,200; Grew Boats Ltd., Penetanguishene, Ont., $170,000; Miss-Can-Ada Mfg. Co. Ltd., Ottawa, Ont., $5155.

Dockyard supplies: William Kennedy & Sons, Owen Sound, Ont., $26,824; Page-Hersey Tubes Ltd., Toronto, $10,705; Anaconda American Brass Ltd., New Toronto, Ont., $12,806; Cordage Distributors Ltd., Dartmouth, N. S., $5780.

Land transport: Ford Motor Co. of Canada Ltd., Windsor, Ont., $645,865; General Motors Products of Canada Ltd., Oshawa, Ont., $155,540; Sicard Ltd., Montreal, Que., $10,249.

Aircraft: MacDonald Bros. Aircraft Ltd., Winnipeg, Man., $558,928; Canadian Pratt & Whitney Aircraft Ltd., Longueuil, Que., $13,507; Anglo-Canadian Wire Rope Ltd., Montreal, $24,570; Dowty Equipment Ltd., Montreal, $1,152,576; Noorduyn Aviation Ltd., Montreal, $8008; Overseas Requisition, London, England, $5292; R. Mulhall Ltd., Ottawa, $20,773; Ottawa Car & Aircraft Ltd., Ottawa, $26,859; National Steel Car Corp. Ltd., Malton, Ont., $13,890; Kelsey Wheel Co. Ltd., Windsor, $7450.

Instruments: Campbell Steel & Iron Works Ltd., Ottawa, $9940; Ontario Hughes-Owens Co. Ltd., Ottawa, $15,429; Thomas Pocklington Ltd., Toronto, $13,041; Stanley Mfg. Co. Ltd., Toronto, $46,500.

Electrical equipment: Canadian Marconi Co. Ltd., Montreal, $7815; Canadian Westinghouse Ltd., Ottawa, $23,302.

Machinery: Keating & Sons Co., Montreal, $12,370; Ottawa Brass Mfg. Co. Ltd., Ottawa, $11,444; Manton Bros. Ltd., Toronto, $22,500; J. D. Adams Ltd., Paris, Ont., $54,058; Dominion Road Machinery Co., East St. Goderich, Ont., $65,500; Northwestern Iron Works Ltd., Regina, Sask., $78,265.

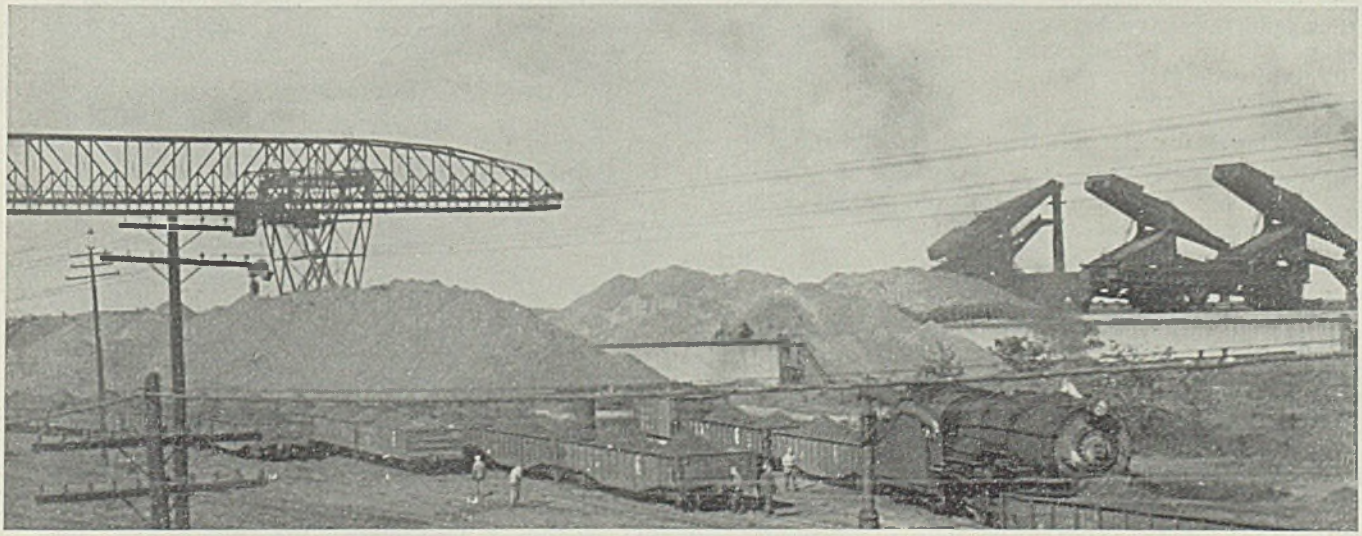
Ordnance: Dominion Bridge Co. Ltd., Lachine, Que., $513,000; John Inglis Co. Ltd., Toronto, $8500; Ford Motor Co. of Canada Ltd., Windsor, $799,476.

Munitions: Shawinigan Chemicals Ltd., Shawinigan Falls, Que., $137,009; Engineering Products Ltd., Montreal, $315,812; Overseas Requisition, London, England, $54,000; Metal Stampings Ltd., Toronto, $5333; Hilton Bros. Ltd., Winnipeg, $12,545.

War construction projects: T. C. Gorman Ltd., Halifax, N. S., $92,565; Connolly & Twizell, Montreal, $200,635; T. C. Gorman Construction Co. Ltd., Montreal, $356,300; R. Timms Construction Co. Ltd., Welland, Ont., $76,800; Assiniboia Engineering Co., Winnipeg, $71,503; Lockerbie & Hole, Edmonton, Alta., $78,497; Claydon Co. Ltd., Winnipeg, $120,000; E. G. M. Cape & Co. Ltd., Montreal, $200,000; Redfern Construction Co. Ltd., Toronto, $137,000; H. G. MacDonald, Edmonton, $800,000; Acadia Construction Co. Ltd., Halifax, $372,000; Atlantic Construction Co. Ltd., Halifax, $319,800.

Miscellaneous: Pictou Foundry & Machinery Corp., Pictou, N. S., $194,400; Canadian Kodak Sales Ltd., Toronto, $12,398; Walter Kidde Co. Ltd., Montreal, $23,846; Quebec Power Co., Quebec, Que., $60,300; Dominion Steel & Coal Co. Ltd., Montreal, $5371; Howard Furnace Co. Ltd., Toronto, $11,185; Toronto Iron Works Ltd., Toronto, $14,750; Universal Plumbing & Heating Co., Toronto, $10,500; Waterous Ltd., Brantford, Ont., $33,056; Gillette Safety Razor Co. Ltd., Montreal, $9000; Consolidated Optical Co., Ottawa, $25,000; Safety Supply Co. Ltd., Toronto, $85,500; General Steel Wares Ltd., Ottawa, $64,375; Way Sagless Spring Co., Toronto, $23,587; Toronto Iron Works Ltd., Toronto, $18,000; Bennett & White Construction Co., Calgary, Alta., $69,000; Page Equipment & Construction Co., Three Rivers, Que., $20,000; Partridge-Halliday, Winnipeg, $28,000; Dominion Chain Link Fence Co., Niagara Falls, Ont., $9000; Marion-Wilson Ltd., Montreal, $32,000.

Ore Stocks Growing at Lower Lake Ports



■ Three hundred thousand tons of iron ore has been piled up on Whiskey Island, Cleveland, to be distributed this winter to blast furnaces. Shown at extreme right are the Hulett unloaders removing ore from lake carriers and placing it directly in freight cars. At left is an ore bridge which also takes ore from vessels but distributes it in the yard, later to be reloaded into cars. Stocks at lower lake ports and blast furnaces Oct. 1 are expected to be about 41,000,000 tons, 4,000,000 tons more than a year ago. Total movement from the upper lakes will be between 76,000,000 and 78,000,000 tons, depending on the weather in the ensuing weeks. NEA photo

Roebling's Remarkable Century; Great American Symbol, Declares Henderson

TRENTON, N. J.

■ ONE HUNDREDTH anniversary of the founding of the John A. Roebling's Sons Co. was celebrated here Sept. 22 with a tour of inspection of the Trenton and Roebling, N. J., plants and a banquet at the Nassau Tavern, Princeton, N. J. More than 100 representatives of the business and technical press and company officials attended.

History of the Roebling organization started with the manufacture of wire rope by John A. Roebling in a meadow on his farm in Saxonburg, Pa., in 1841. Later he established a small factory and in 1848 moved to Trenton.

Since then the company's record has been one of unusual achievement. It built the first wire suspension bridge across the Monongahela river at Pittsburgh in 1847, and three years later started the suspension bridge across the gorge of the Niagara river at Buffalo.

The Brooklyn bridge, perhaps the most famous of all Roebling structures, came about 20 years later; injuries received while directing this job cost the life of the company's founder. In recent years the company has spun the cable for the George Washington bridge across the Hudson river in New York, and for the Golden Gate bridge at San Francisco.

Today the company occupies 417 acres of plant space; 258 buildings contain 4,500,000 square feet of floor space. Employment exceeds 6200 and branches are maintained in 13 cities, including New York, Cleveland, Los Angeles, San Francisco, Chicago, Philadelphia, Pittsburgh, Seattle, Atlanta, Ga., Boston, and Portland, Oreg.

Making Many Defense Items

Speakers at the banquet included William A. Anderson, Roebling president; C. G. Williams, executive vice president; and Leon Henderson, federal price administrator.

Mr. Anderson outlined the growth and development of the company, set the goal for future achievement. "No industry," he said, "is an institution apart from its workers or from the citizens of the surrounding community. Its destiny, its success or failure is dependent upon the success, security and loyalty of all who are a part of that industry.

"To these ends therefore and pledging our continued faith in the future of our great nation, its democratic way of life and its growing opportunities for all, the Roebling company at the end of 100 years looks ahead to a future of continued service and profitable enterprise."

Mr. Williams spoke of the amount of defense material being produced by the company. Roebling currently is making: Harbor defense nets; aircraft control, power and lighting cables; field signal wire; telephone and telegraph wire and cables; material for tanks; wire rope slings for lifting guns, tanks, shell; degaussing cable for repelling magnet mines; many types of wire rope and electrical cable for use on battleships; anchor cable for captive balloons; building and power and lighting cables for new defense plants and army cantonments; screen cloth for army camps and many other wire products.

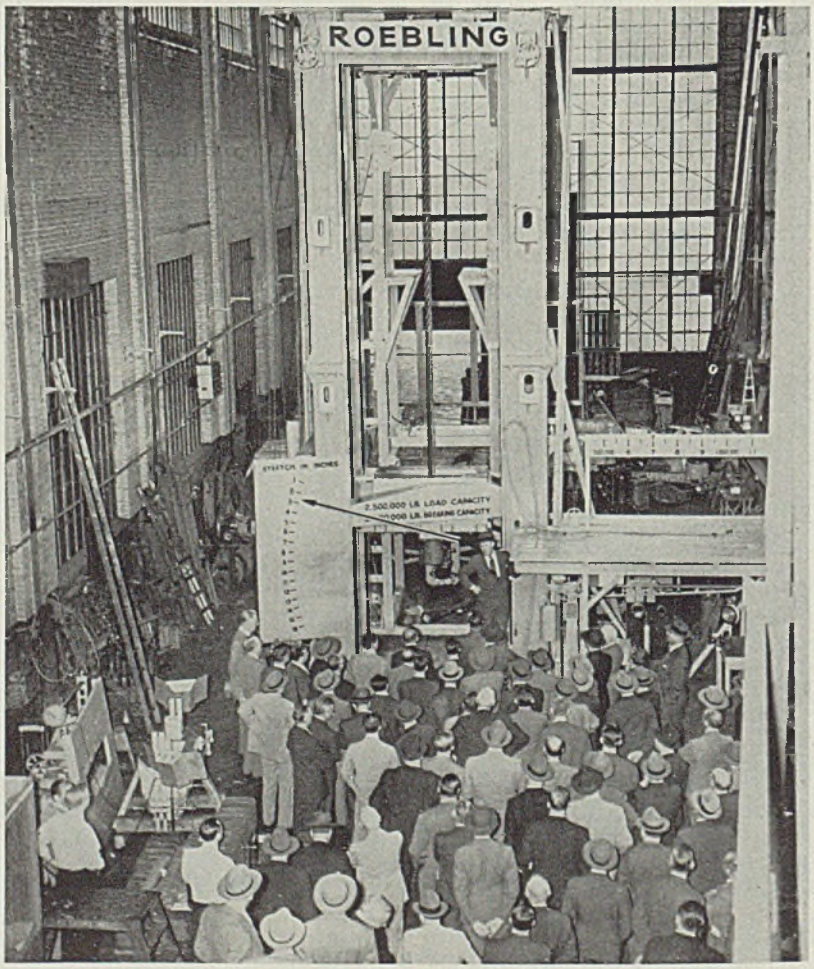
Price Administrator Henderson went on record as opposing federal emergency controls after the war. Washington, he said, plans to follow a course similar to that pursued at the end of the first World war of dropping emergency restrictions as quickly as feasible. He admitted that the controls might not be dropped as quickly as they were in 1918, pointing out that at that time there were certain inflationary tendencies that could well have been checked.

Mr. Henderson referred to the Roebling company as a symbol of the principles "which have made it possible for free men to establish free enterprises and prosper in a free country.

"Today we are engaged in a great co-operative effort to maintain such principles here and across the seas. We are striving to insure the continuation of conditions which made possible the growth of this great company."

He said there have been too many who have failed to realize the menace abroad, but that now there are convincing signs that after 15 months American industry is beginning to awaken and to throw the full weight of its productive capacity into the task of winning "this battle in defense of the principles of democracy."

Industry already is beginning to feel the squeeze of this effort, and



■ Guests of the Roebling company watched an interesting demonstration with 4-inch wire rope that finally broke at an approximate 800-ton pull. This rope, it was explained, could lift 25 M-3 28-ton army tanks without breaking

■ Featured speaker at Roebling's one-hundredth anniversary dinner was Leon Henderson, left. At the right, William A. Anderson, president. The federal price administrator took time out from duties at Washington to pay a tribute to the company, and to assure all industry that the government plans to drop emergency restrictions as quickly as feasible after the war

it will continue to feel it increasingly for many months, he stated. "Priorities will take their toll of those companies, particularly in the metals fabricating line, which have no defense contracts.

"My job, as I see it, is primarily one of helping to preserve American institutions when the emergency is over. I don't believe this country can stand up under the buffeting of another long drawn out deflation. The way to avoid that aftermath is to avoid its causes now.

"Pressures on the price structure are great. We will soon be pouring close to two billion dollars per month into production of armament."

Supports Price Control Bill

These dollars, he pointed out, will flow in large measure into pockets of working men and investors, who will seek to spend them on various necessities and luxuries making up the standard of living. This money will be falling into the consumer goods' market at the same time the supply of goods coming into the markets will be decreasing. Such a condition breeds inflation.

"It must be met in many ways—by heavier taxes, by sale of defense bonds, by curtailment of installment credit, by forced savings, all of which sop up purchasing power. But these devices are not enough. Price controls must be used to supplement them. That's the story behind my particular responsibility in this defense program."

He regarded the price control bill now before Congress as essential to effectively regulating prices. At the same time he did not believe that wages should be controlled. He admitted that demands are being made by labor in certain instances which should be curbed, but said that in bargaining between employers and employes on the question of wages as well as other matters should continue unfettered. His premise was that advances in living costs always come before increases in wages.

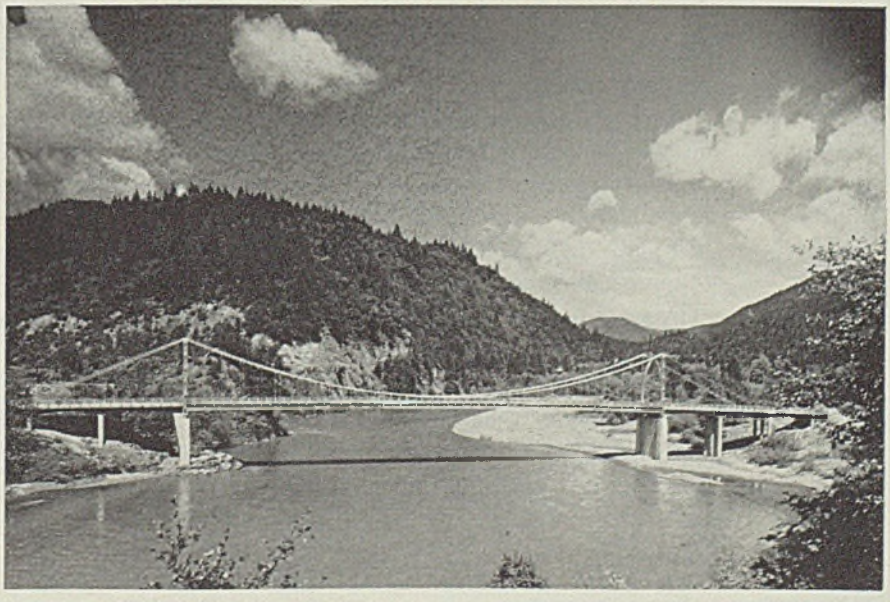
Introduced at the banquet were John A. Roebling, grandson and namesake of the founder; Joseph Metcalf Roebling, first vice president; William Roebling III, second vice president and a major in the field artillery on active duty at Ft. Dix, N. J.; Charles Roebling Tyson, secretary and treasurer.

Reports 16 Lake Ore Carriers Will Be Built

■ Sixteen iron ore vessels will be contracted for under the government program to expand facilities, according to present indications, it was stated last week by W. H. Gerhauser, president, American Shipbuilding Co., Cleveland, in the company's annual report. A request for 25 new carriers originally was contemplated by OPM.

Mr. Gerhauser also reported the Navy Department is claiming damages from American Shipbuilding because of late delivery of 12 net tenders. Company opposes the claim on grounds delay in delivery was due to causes beyond its control, including strikes, shortage of available skilled labor and slow receipt of materials.

Adjudged Most Beautiful Small Bridge



■ Adjudged the most beautiful small steel bridge completed in 1940 in a contest sponsored by the American Institute of Steel Construction, the Orleans bridge over the Klamath river in California was formally dedicated recently. A plaque awarded by the institute was unveiled by Howard A. Schirmer, structural engineer at the Bethlehem Steel Co., San Francisco. Bridge is steel suspension type, 360 feet long, with 135-foot and 170-foot girder spans of reinforced concrete at either end. Judson Pacific Co. was the fabricator

STEEL

Employing as a Patriotic Duty

■ DURING the next few months many industrial employers will be called upon to redistribute jobs on a grand scale. It may prove to be a very complicated operation.

In industries where the production of non-defense articles is to be curtailed sharply, it will be necessary for employers to scale down operations to the requirements of the new quotas for output.

In some cases, this curtailment may be matched by a corresponding expansion in defense work. When this happens, the shift of men from non-defense work to defense work presents no great difficulties.

However, it is not always possible to schedule curtailments and expansions to suit the employment set-up. More and more the problem of materials is becoming the determining factor.

• • •

This seems to be true in the case of many of the automobile, refrigerator, radio and similar manufacturing establishments. Present indications point to a real danger that the curtailment in non-defense work will cause thousands of men to remain idle weeks or months before enough new jobs in defense work are created to take up the slack.

This situation is forecast by tentative figures worked out by some of the automobile companies. For instance, General Motors estimates that on next March 31 it will have 58,000 fewer employes on its payroll than last June 30. A union official believes that by Jan. 1, 1942, at least 150,000 workers in the automobile industry will be jobless.

At the same time when industrial employers are engaged in this shift of personnel, hundreds of thousands of selectees will be returning from government service to civil life, and a greater number will be traversing the same path in the opposite direction.

• • •

Industry is committed to treating these returning soldiers fairly. As Brig. Gen. Lewis B. Hershey, director of selective service, says, "not only are former employers of these returning soldiers required by the selective training and service act to restore them to their former positions or to positions of like seniority, status and pay, but they also have a high moral and patriotic responsibility for doing so."

Industrial employers will want to cooperate with the selective service system to the utmost to place returning selectees promptly and satisfactorily. To do so will promote morale throughout the selective personnel of the army, navy and marine corps.

Industry also will want to co-operate wholeheartedly in reducing to the minimum the loss of valuable man-hours in the shift from non-defense to defense activity.

These concurrent problems are a challenge to industry's ingenuity and resourcefulness.

E. L. Shaner

EDITOR-IN-CHIEF

Sept. 29, 1941

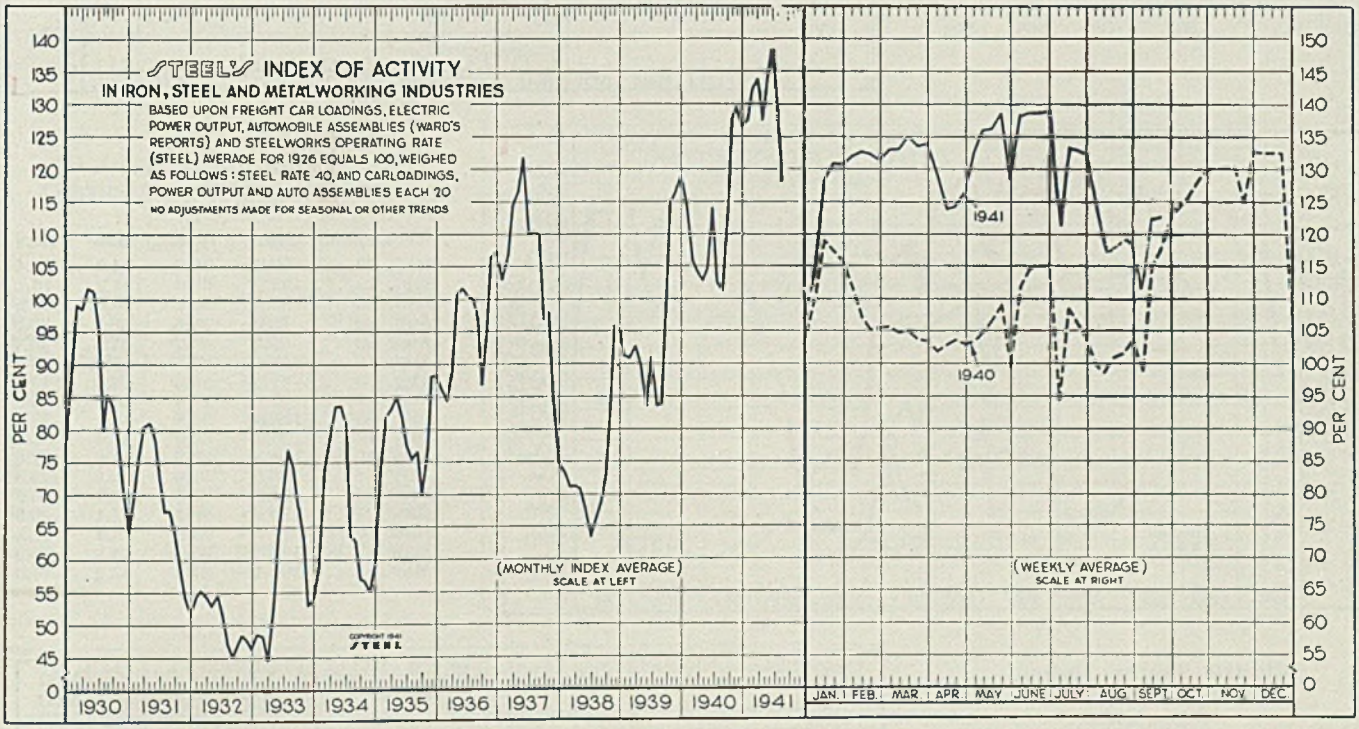
The BUSINESS TREND

Industrial Production Records Little Change

INDUSTRIAL production has recorded little change in recent weeks. Curtailment of operating schedules in some nondefense industries, due to tightening raw materials supplies, has tended to offset continued expansion in defense production. The gap between defense and nondefense activity is widening. However, output of most civilian goods industries remains above that recorded in the comparable period last year.

Steel's index of activity advanced 0.6 point to 122.9 during the week of Sept. 20, thus extending the upturn registered in the preceding week. Despite recent gains the index is currently well below the peak recorded to-date this year of 138.8, and also compares unfavorably with the 124.4 level registered in the corresponding period last year.

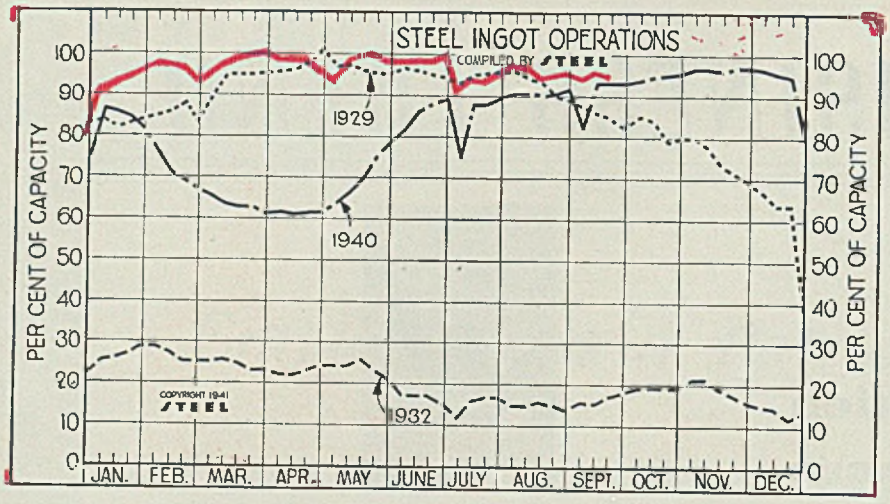
In the week ended Sept. 20 railroad freight traffic declined to 907,969 cars, compared with the preceding week's 1941 peak of 913,952. This is contrary to the normal seasonal trend and resulted mainly from a drop in coal loadings due to the "captive" mine strikes and by labor disturbances in the anthracite industry. The national steel rate eased one-half point to 96 per cent of capacity, while electric power output declined slightly to 3,232,190,000 kilowatts.



STEEL'S index of activity gained 0.6 points to 122.9 in the week ended Sept. 20:

Week Ended	1941	1940
July 5	120.9	94.2
July 12	133.4	108.5
July 19	133.2	106.0
July 26	132.9	103.4
Aug. 2	123.3	99.7
Aug. 9	117.5	98.4
Aug. 16	118.2	100.8
Aug. 23	118.5	101.4
Aug. 30	118.2	103.5
Sept. 6	111.8	98.7
Sept. 13	122.3	114.9
Sept. 20	122.9	124.4

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.	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2
March	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2	80.4	98.6
April	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7
May	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2
June	138.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8
July	128.7	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9
Aug.	118.1	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

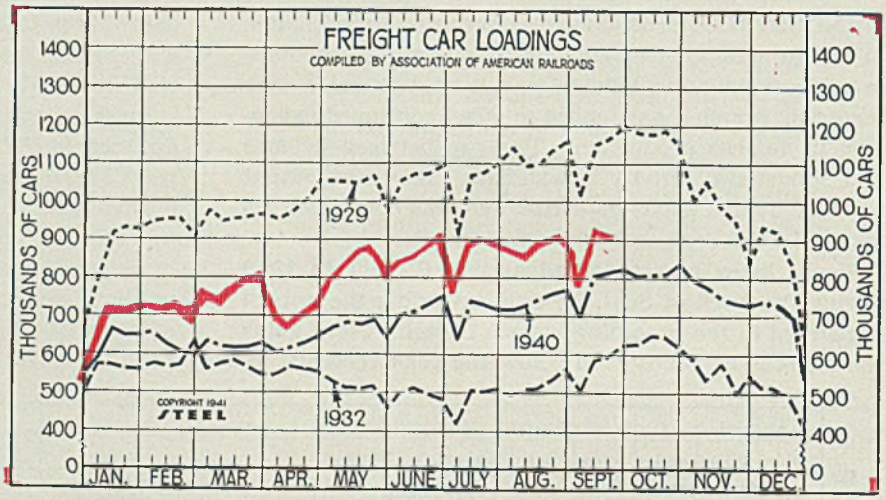
(Per Cent)

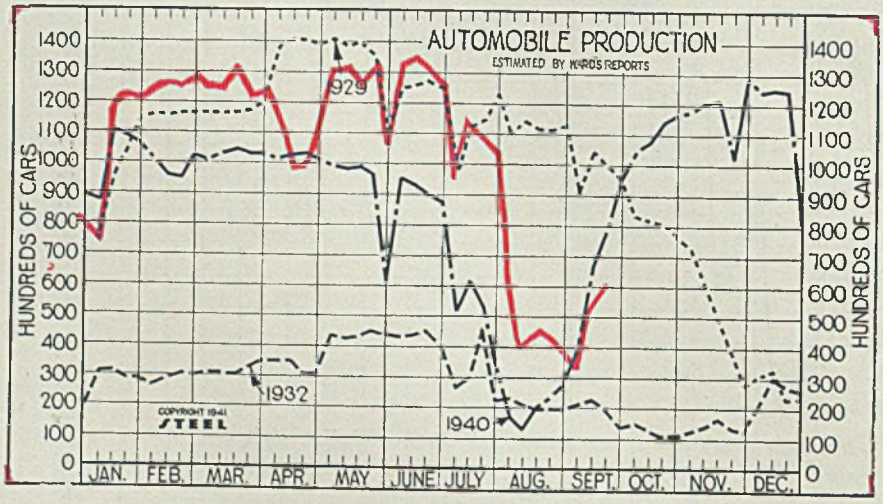
Week ended	1941	1940	1939	1938
Sept. 20....	96.0	93.0	79.5	48.0
Sept. 13....	96.5	93.0	74.0	46.0
Sept. 6....	95.5	82.0	62.0	41.5
Aug. 30....	96.5	91.5	64.0	44.5
Aug. 23....	96.0	90.5	63.5	43.5
Aug. 16....	95.5	90.0	63.5	41.5
Aug. 9....	96.0	90.5	62.0	40.0
Aug. 2....	97.5	90.5	60.0	40.0
July 26....	96.0	89.5	60.0	37.0
July 19....	95.0	88.0	56.5	36.0
July 12....	95.0	88.0	50.5	32.0
July 5....	92.0	75.0	42.0	24.0
June 28....	99.5	89.0	54.0	28.0
June 21....	99.0	88.0	54.5	28.0
June 14....	99.0	86.0	52.5	27.0
June 7....	99.0	81.5	53.5	25.5
May 31....	99.0	78.5	52.0	25.5

Freight Car Loadings

(1000 Cars)

Week ended	1941	1940	1939	1938
Sept. 20.....	908	813	815	676
Sept. 13.....	914	804	806	660
Sept. 6.....	798	695	667	569
Aug. 30.....	912	769	722	648
Aug. 23.....	900	761	689	621
Aug. 16.....	890	743	674	598
Aug. 9.....	879	727	665	590
Aug. 2.....	883	718	661	584
July 26.....	897	718	660	589
July 19.....	899	730	656	581
July 12.....	876	740	674	602
July 5.....	740	636	559	501
June 28.....	909	752	666	589
June 21.....	886	728	643	559
June 14.....	863	712	638	556
June 7.....	853	703	635	554
May 31.....	802	639	568	503





Auto Production

(1000 Units)

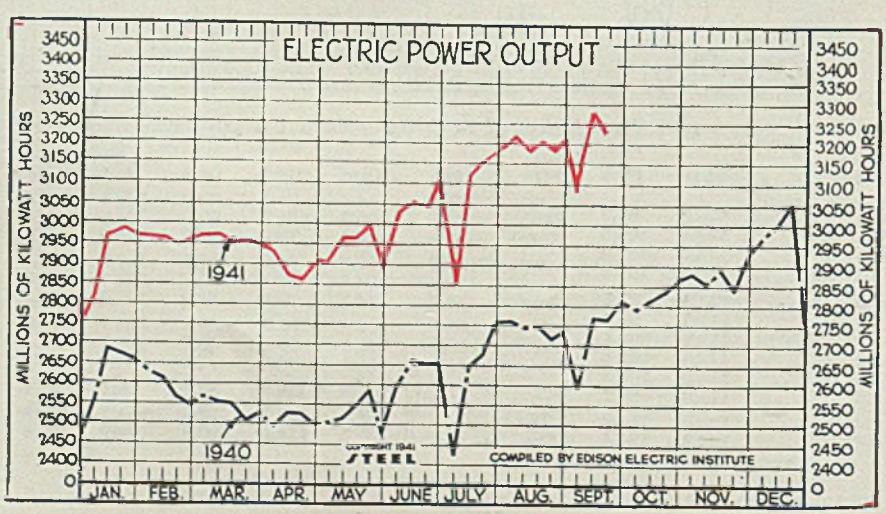
Week ended	1941	1940	1939	1938
Sept. 20....	60.6	78.8	54.0	20.4
Sept. 13....	53.2	66.6	41.2	16.1
Sept. 6....	32.9	39.7	26.9	17.5
Aug. 30....	40.0	27.6	25.2	22.2
Aug. 23....	45.5	23.7	17.5	18.7
Aug. 16....	45.6	20.5	13.0	23.9
Aug. 9....	41.8	12.6	24.9	13.8
Aug. 2....	62.1	17.4	28.3	14.8
July 26....	105.6	34.8	40.6	30.4
July 19....	109.9	53.0	47.4	32.1
July 12....	114.3	65.2	61.6	42.0
July 5....	96.5	52.0	42.8	25.4
June 28....	127.9	87.6	70.7	40.9
June 21....	133.6	90.1	81.1	40.9
June 14....	134.7	93.6	78.3	41.8
June 7....	133.6	95.6	65.3	40.2
May 31....	106.4	61.3	32.4	27.0

Electric Power Output †

(Million KWH)

Week ended	1941	1940	1939	1938
Sept. 20.....	3,232	2,769	2,538	2,211
Sept. 13.....	3,281	2,773	2,532	2,279
Sept. 6.....	3,096	2,592	2,376	2,110
Aug. 30.....	3,224	2,736	2,442	2,217
Aug. 23.....	2,193	2,714	2,434	2,202
Aug. 16.....	3,201	2,746	2,454	2,207
Aug. 9.....	3,196	2,743	2,414	2,198
Aug. 2.....	3,226	2,762	2,400	2,194
July 26.....	3,184	2,761	2,427	2,160
July 19.....	3,163	2,681	2,295	2,085
July 12.....	3,141	2,652	2,403	2,154
July 5.....	2,870	2,425	2,145	1,937
June 28.....	3,121	2,660	2,396	2,074

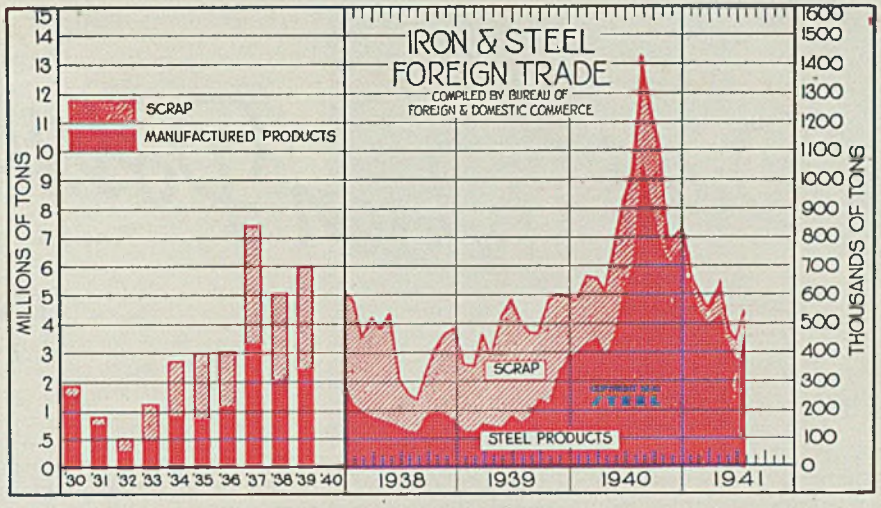
†New series: Includes additional governmental and power generation not previously reported.

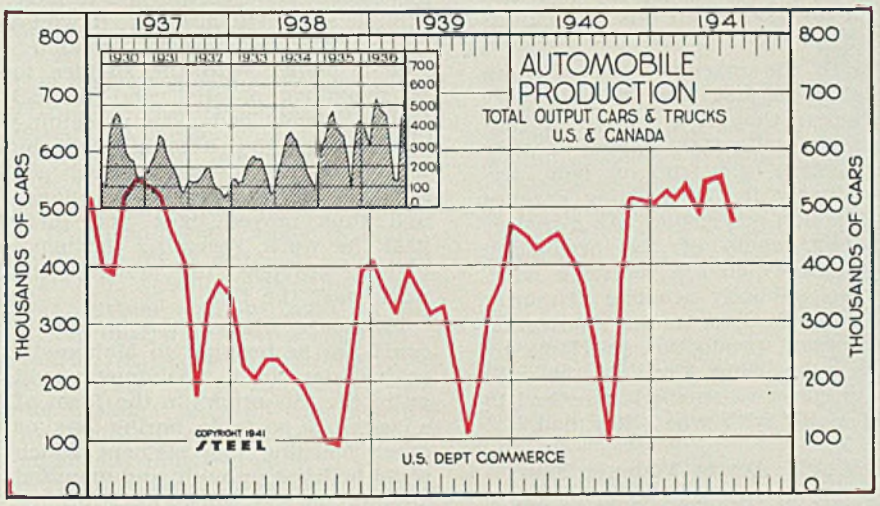


Iron and Steel Exports

(Thousands of Gross Tons)

	Steel Products		Scrap		Total
	1941	1940	1941	1940	1941
Jan.	653.8	396.1	45.1	187.5	698.9
Feb.	525.9	436.6	74.4	234.7	600.2
Mar.	512.8	457.1	54.4	206.9	567.2
April	515.7	391.8	120.2	221.2	635.8
May	409.8	471.5	62.9	312.5	472.7
June	398.7	617.7	59.0	318.4	457.7
July	478.0	707.8	59.9	327.1	537.9
Aug.	.....	1046.1	.....	346.1	.....
Sept.	.....	965.4	.....	251.1	.....
Oct.	.....	846.6	.....	258.5	.....
Nov.	.....	713.8	.....	74.3	.....
Dec.	.....	735.2	.....	70.0	.....
Total	.....	7,785.5	.....	2,823.1	.....





Automobile Production

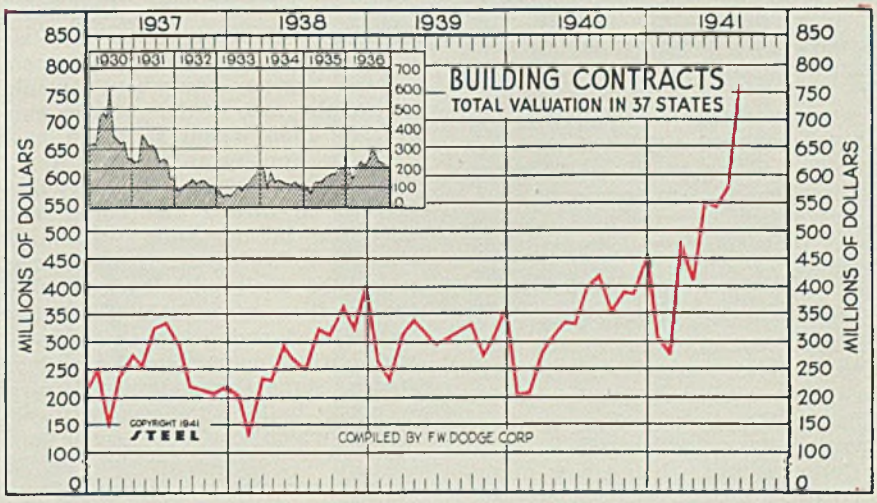
(Unit: 1000 Cars)

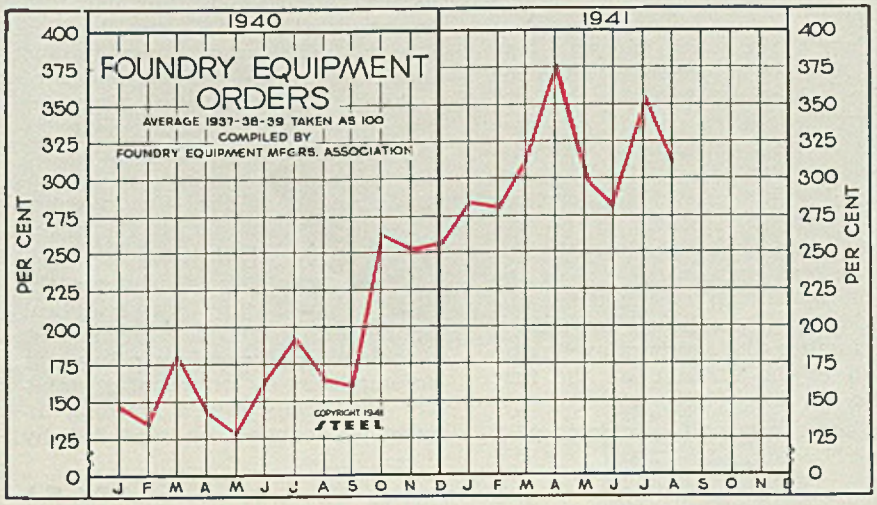
	1941	1940	1939	1938	1937
Jan.	524.1	449.3	357.0	227.1	399.2
Feb.	509.3	421.8	317.5	202.6	383.9
March	533.9	440.2	389.5	238.6	519.0
April	489.8	452.4	354.3	238.1	553.4
May	545.3	412.5	313.2	210.2	540.4
June	546.3	362.6	324.2	189.4	521.1
July	468.8	246.2	218.5	150.4	456.9
Aug.	.....	89.9	103.3	96.9	405.1
Sept.	.....	284.6	192.7	89.6	175.6
Oct.	.....	514.4	323.0	215.3	338.0
Nov.	.....	511.0	370.2	390.4	376.6
Dec.	.....	506.9	469.0	407.0	346.9
Ave.	.....	391.0	311.0	221.3	418.0

Construction Total Valuation In 37 States

(Unit: $1,000,000)

	1941	1940	1939	1938	1937
Jan.	$305.2	$196.2	$251.7	$192.2	$242.7
Feb.	270.4	200.6	220.2	118.9	188.3
Mar.	479.9	272.2	300.7	226.6	231.2
April	406.7	300.5	330.0	222.0	269.5
May	548.7	328.9	308.5	283.2	243.7
June	539.1	324.7	288.3	251.0	317.7
July	577.4	398.7	299.9	239.8	321.6
Aug.	760.2	414.9	312.3	313.1	281.2
Sept.	.....	347.7	323.2	300.9	207.1
Oct.	.....	383.1	261.8	357.7	202.1
Nov.	.....	380.3	299.8	301.7	198.4
Dec.	.....	456.2	354.1	389.4	209.5
Ave.	.....	$333.7	$295.9	$266.4	$242.8





Foundry Equipment Orders

Monthly Average

(1937-38-39 equals 100)

	1941	1940
Jan.	285.3	149.0
Feb.	281.1	135.7
March	315.2	183.2
April	377.2	145.2
May	298.7	129.1
June	281.1	164.9
July	358.1	194.4
Aug.	312.9	165.4
Sept.	....	161.2
Oct.	....	264.0
Nov.	....	254.2
Dec.	....	257.8

Dig for Hidden Possibilities IN EXISTING

■ IF THE esteemed Dr. Russell Conwell were now living, he could be of great service to the cause of national defense merely by delivering his oft-repeated address, "Acres of Diamonds", to manufacturers who have become obsessed with the idea that they are bogged down solely because of lack of certain additional heavy duty and high production machine tools.

Dr. Conwell's famous parable might arouse them to realization that in connection with their defense orders they are indulging in a little too much wishful thinking about extensive plant additions filled with types of machine tools which, as a matter of cold fact, are at the moment almost as unattainable as the mythical pot of gold at the end of the rainbow. It might inspire them to dig more diligently into realities in their existing plants, thereby uncovering hitherto unrealized production capabilities in machine tools which they already are fortunate enough to possess.

All this brings to mind that one of the principal differences between machine shops of 25 or 30 years ago and those of more recent times, is the extreme degree to which machine tools lately have come to be selected, especially to carry out specific operations. It used to be extremely difficult to obtain approval of new machines to handle new jobs, if the management had an idea that equipment already available in the shop came anywhere meeting the new demands.

Consequently, when a new manufacturing project was undertaken, production men literally burned the midnight oil thinking up, and working out answers to that eternal question, "How can we adapt our existing machines to handle the operations involved in this new work?" Only as a last resort did they ask for new types of machines, and only when they could prove that there was no other answer, did they get them.

In most cases it would have been better if management had loosened up and provided a reasonable amount of new equipment suitable to handle the new work. However, it must be admitted that under the circumstances production men did wonders with what they had to do with. In so doing, they demonstrated that "only a poor workman tries to blame all his difficulties on his tools".

With the machine tool situation what it is just now, it looks very much as though a revival of that oldtime self-reliant spirit among production men might help tremendously in the existing defense production emergency. As a matter of fact, some of the production miracles which are receiving widespread publicity are due primarily to its revival, or to its application to current production problems by men who went through the mill in the days when mechanics had to get along with what they had.

Would Amaze Younger Men

Some of the expedients to which such mechanics were driven—especially in jobbing shops—because of lack of what now would be considered "proper equipment", would amaze shopmen of the younger generation upon whom so much now depends. For instance, when a big diameter part such as a flywheel had to be turned and bored, and no lathe in the shop was large enough to swing it, it sometimes would be dealt with by reversing the position of a lathe headstock on the bed and doing the turning and boring operations from floor stands. Some engine lathes formerly were built with pivoted headstocks which could be set askew for taper turning or boring, or turned completely end-for-end so that big work could be "swung over the floor" as just described.

Then again, when an extra long job had to be machined and no lathe in the shop had a bed of sufficient length to handle it, two lathes—one minus its headstock—would be leveled and lined up end-to-end. With the work driven from the headstock of one lathe and supported on the tailstock center or in a center rest on the bed of the other, machining of the outer end would be accomplished by pulling the further tool carriage by linking it up to the carriage on the first lathe.

When a casting too wide to pass between the housings of the largest planer in the shop, or too high to pass under its crossrail had to have certain areas surfaced off, it would be blocked and leveled up alongside a planer with the surface to be machined parallel, and vertical to the planer bed. The machining would then be accomplished by means of an improvised "sidehead" mounted on the platen of the planer and thus moved back and forth past the work, reversing the usual planer practice of moving the work past the tool.

In cases where "the mountain could not be brought to Mahomet", as just described, "Mahomet would go to the mountain" in the form of a so-called portable boring bar or other machine tool element which could be lined up with, and mounted directly on the work. As a matter of fact, ingenious examples of this technique of bringing the tool to the work are in common use today in railway, marine, power plant and automotive repair shops.

A number of ingenious and effective boring, reaming and grinding units have been developed for such service shop use, which are now worthy of investigation in connection with regular production work. There are many places wherein they undoubtedly can be made to serve effectively when conventional equipment is unattainable, their cost being surprisingly reasonable and prompt delivery still being possible.

What can be done in the way of machining extra large work by means of a so-called portable unit is suggested by the setup depicted in Fig. 1. This shows how ground finish was given the periphery of a huge fabricated steel ring—far too big to be handled in any existing cylindrical grinding machine. The solution, as worked out by production men at the Westinghouse plant in East Pittsburgh, Pa., is apparent in the illustration.

While revolving slowly on the table of one of the largest vertical boring mills in the Westinghouse plant, this peripheral grinding was accomplished by means of a standard electrically driven grinding attachment carried on and fed by

By GUY HUBBARD
Machine Tool Editor, STEEL

SHOPS!

one of the vertical tool slides or sideheads of the boring mill. While necessarily a rather long drawn out operation, the work was done to close tolerance and fine finish in this manner. Not many shops could have done it even in this way, because the boring mill happens to be one of the few in the United States large enough to swing a part of such magnitude.

That traditional Yankee ingenuity by no means is dead—or even dormant—in America's machine shops, was further demonstrated to the writer only a few weeks ago in a well-known eastern machine tool plant. This was in connection with the building of a special machine tool of large capacity, destined for important defense work.

The particular problem to which I have reference was the cutting of internal spur gear teeth around the inside of a flange about 15 feet in diameter, integral with the underside of a massive circular cast iron table. The shop, well equipped though it is, had no gear cutting equipment which would come any-

(*Please turn to Page* 92)

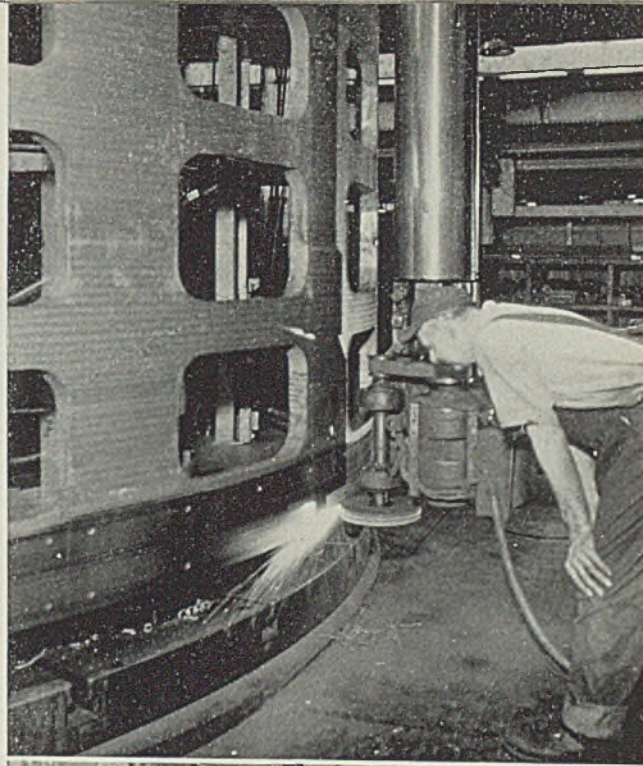


Fig. 1. (Top)—Huge fabricated steel ring, beyond range of any existing cylindrical grinder, was given precision ground finish in this manner at Westinghouse East Pittsburgh plant

Fig. 2. (Center)—A long, tedious hand lapping operation on leveling pots for anti-aircraft gun mounts was eliminated by Aetna-Standard engineers at Ellwood City, Pa., by this wabbling setup in a vertical boring mill

Fig. 3. (Left below)—When Aetna-Standard got up against an internal slide machining job on a 37 millimeter gun mount, technique of the horizontal boring bar was adapted to a planer, with results as shown here

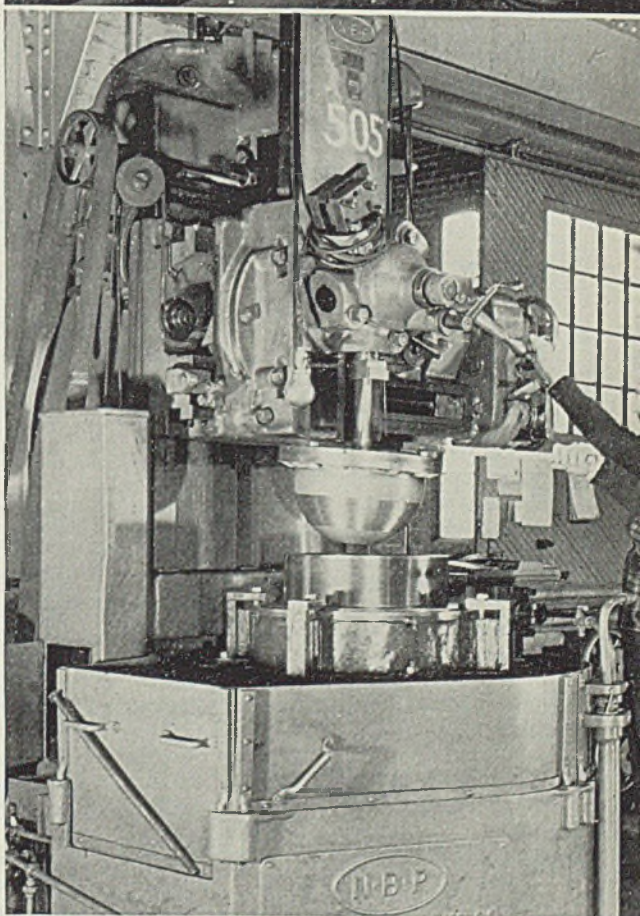
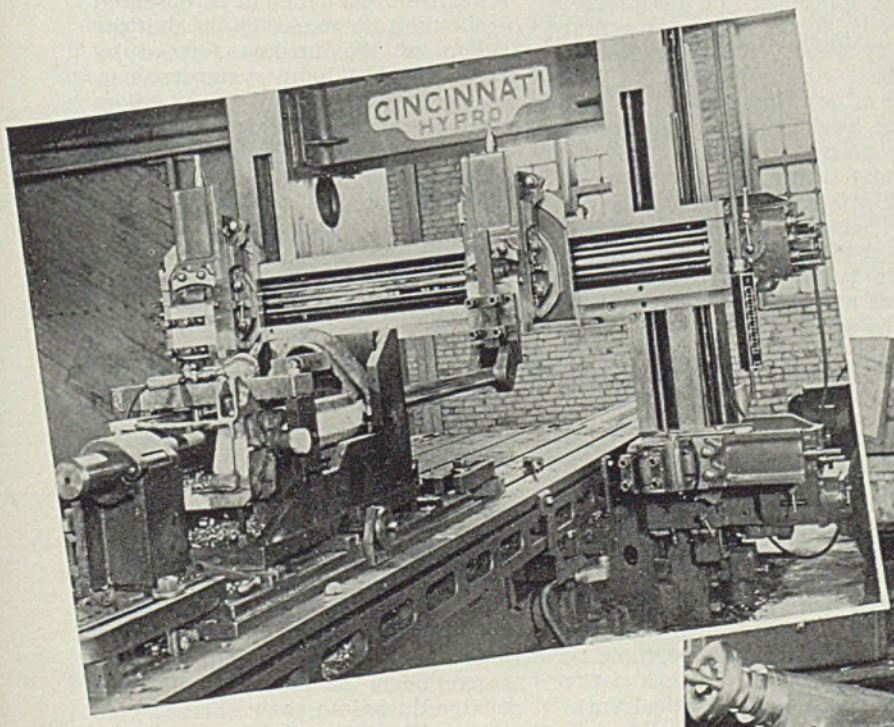
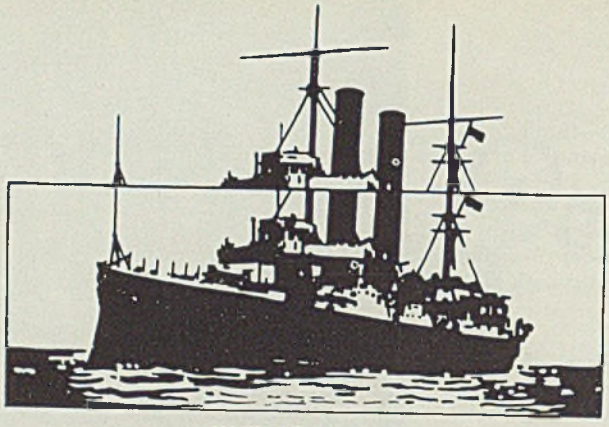
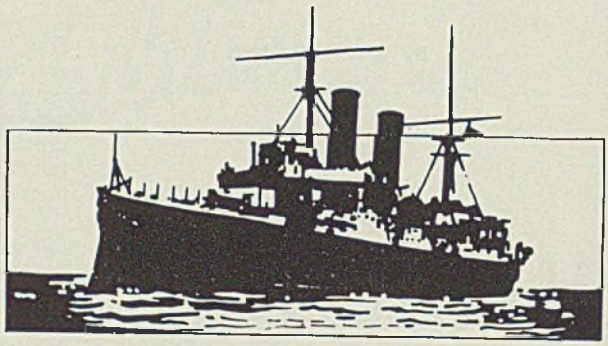


Fig. 4. (Right below)—The leveling mechanism of the 37 millimeter mobile gun mount involves machining of a large ball-and-socket joint. Here is method followed by Aetna-Standard Engineering Co. in machining the ball in a lathe





DUPLICATION



UNEQUAL MAGNIFICATION

Assembling the OPTICAL PARTS of a RANG

. . . . . due to the optical requirements, unusual manufacturing operations are involved in assembling rangefinders and other fire control instruments. Practice of an outstanding company in this field is described, and important patent developments discussed

This Is Number 31 in a Series on Ordnance and Its Manufacture, Prepared for STEEL *by Professor Macconochie.*

By ARTHUR F. MACCONOCHIE
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University of Virginia
University Station, Va.
And
Contributing Editor, STEEL

■ PREVIOUS articles in this series have explained the principles of rangefinder design and operation; analyzed a typical naval rangefinder; considered the manufacture of optical parts. Possibly a logical conclusion would be to see how these optical parts are assembled into a rangefinder at the manufacturer's. Certain features of considerable interest were developed by Barr & Stroud, Glasgow, during 1914-18 for facilitating rangefinder adjustments and minor fitting operations during manufacture and may be of interest.

In assembling a rangefinder optical system, the first step is the setting of the box containing the eyepiece prism. Adjustment of this box is made about two axes—that of the frame of the instrument, and another axis at right angles to it. The first produces a rotation of the images in their own plane; while the second is really a "halving" adjustment and is made so the images of the rims of the objectives form a complete circle—i.e., neither "deficient" nor in "duplication". (This applies to erect images only.) See Fig. 2. The equipment required for this setting includes a couple of collimators mounted with their axes coincident with the axis of the frame, and having their objects carefully located in the horizontal plane. Transverse movement of the box at this point will produce horizontal relative displacement of the images. The box is, therefore, given a first setting by means of the set screws in the back of the frame.

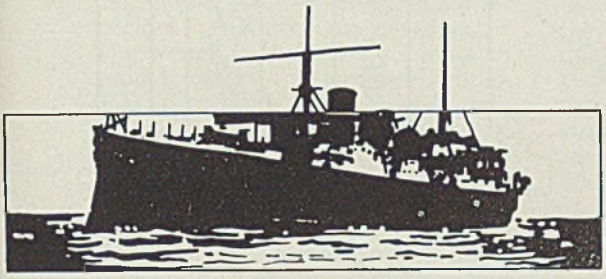
A pair of objective lenses of about the same focal length is now selected and placed in position in the rangefinder frame together with the eyepiece prism combination, the assembly being mounted as under service conditions, on a bench in front of two parallel collimators with axes at right angles to that of the frame as shown in Fig. 1. After placing the pentagonals, the combination takes on the aspect of a skeleton rangefinder. As in the arrangement for setting the eyepiece prism box (described last week), the illuminated objects at the ends of the collimator tubes are placed at the principal foci of the collimator lenses so each tube contains only parallel rays, equivalent to light from an infinite distance.

The objectives are now carefully adjusted until both images come to a focus in the same plane; and the bench carrying all the optical parts is rotated through a small angle about an axis normal to the plane of the system, thus causing the images to traverse the field of view horizontally. If both objectives are of the same focal length (except insofar as this is modified by the presence of the other optical parts) images of equal objects will be equal and their displacement will be the same. Hence if particular points are in coincidence at one end of the traverse, they will remain so throughout the total range of movement.

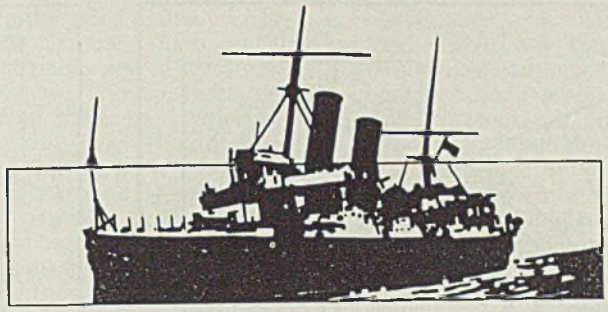
The effects of unequal magnification are shown in upper right hand diagram on this page, in which that part of the field above the separating line is greater than that of the lower. Another point to be observed —should it be necessary—is that the colors of the images formed by right and left hand system respectively should match. These colors are affected both by the silvering and the quality of the glass. The sum of the deviations of the pentagonals selected should also equal zero.

Our next concern is with the deflecting prism. In mounting this item it is obviously necessary that the plane containing the base of the instrument and target should cut the deflecting prism in a principal section, otherwise the image will have a displacement component at right angles to the separating line when the prism moves. This adjustment is made by experiment, the prism being rotated until its correct position is found.

The frame containing objectives, deflecting prism and eyepiece prism combination having now been mounted in the outer tube of the rangefinder, the pentagonals are next adjusted to their correct positions. There are several conditions



DEFICIENCY



DEFECTIVE "POI"

Fig. 1. (Immediate Right)—Preliminary assembly of the optical parts

Fig. 2. (Top of Both Pages)—Shows result of four different types of defects that may be encountered in adjusting the range-finder during manufacture. Some of them can be remedied by simple adjustments of the optical elements. Others require replacement or matching of certain elements

Fig. 3. (Right, Center)—Intended to show why the optical square or "pentagonal" may be rotated through a small angle about an axis normal to its principle face without alteration of the angle between incident and emergent beams. Solid lines indicate path of light ray; dashed lines are center lines drawn normal to the several faces of the square

Fig. 4. (Bottom)—Unique design of adjusting screw used to position pentagonal mounting

EFINDER

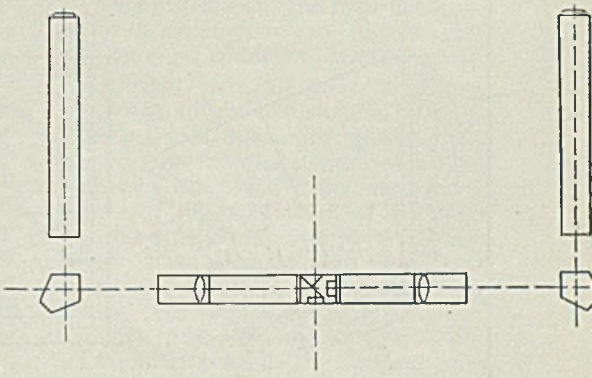
to be fulfilled. First, the distance between the intersections of rays from infinity with the prolongations of these rays through the optical centers of the objectives must be equal to the required base length. Next, if the eyepiece prism combination has been correctly set, the horizontal planes of symmetry of the pentagonals should lie in the base and target plane. Incorrect placing may produce "duplication" as shown in left diagram of opposite page; or "deficiency" as indicated in the diagram directly above, this page of same Fig. 2; or inclination of the images of perpendicular objects to the separating line as shown in the upper right hand diagram, Fig. 2. This is known as "defective POI" (parallelism of image). "Alteration with halving" may also occur.

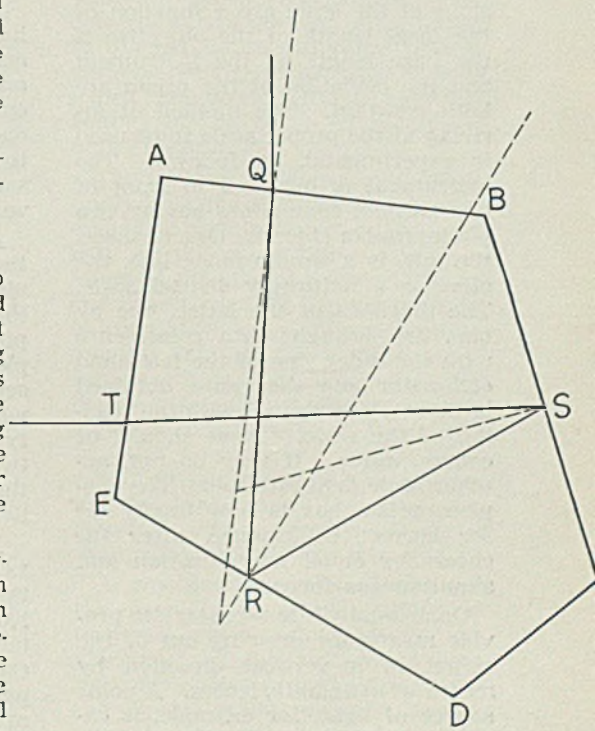
It should be noted, however, as explained in a previous section that rotation of the pentagonal about an axis perpendicular to its horizontal plane of symmetry produces no effect on the image, as may be observed from the diagrammatic trace of the path of a ray entering the inclined face of the pentagonal, see Fig. 3. On entry the ray is refracted at the face AB; then reflected from the silvered face ED; again reflected from the silvered face CB; and finally refracted at the surface EA separating glass and air. Consideration of the geometry of the path of the ray will show that the ray on emergence is at 90 degrees to its original position, just as it would have been had it entered the surface AB normally.

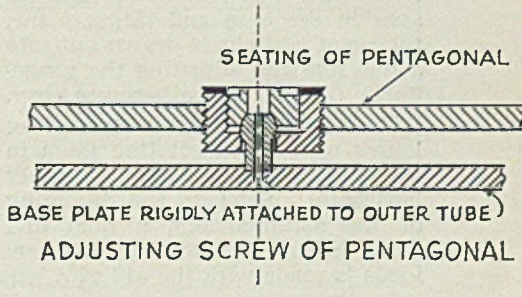
These adjustments (with the exception of that for base length) are carried out in front of a pair of parallel collimators, base length apart, the pentagonals being free to move across their seatings and also to rotate, by means of POI and "halving" screws, about two axes at right angles, these axes being parallel respectively to the two axes of symmetry of the pentagonal. The design of the pentagonal adjusting screw is shown in Fig. 4. The spherical seating enables the upper plate to tilt without bending the pillar.

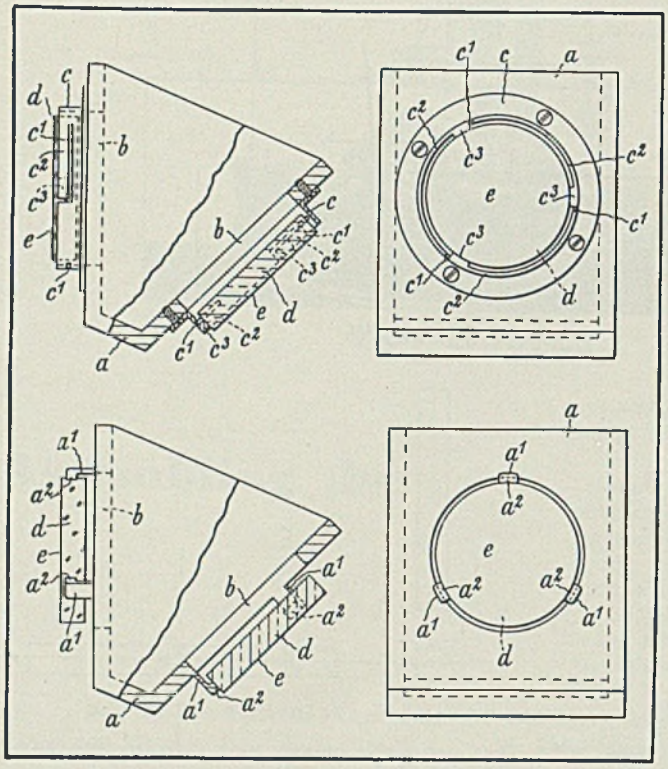
The adjustment of the pentagonals for base length is done in front of two upright plates with vertical slits illuminated from behind. When coincidence of the images is attained, the distance apart of the slits ought to be equal to the base length. A special eyepiece has to be provided for viewing the images of the slits owing to their short distance from the objectives, and care must be taken to see that the deflecting prism is at the infinity end of the range.

The scale suited to the particular instrument being assembled is now selected and fitted. It should be explained that no two instruments are exactly alike and hence a series of different scales must be provided. As already shown in a previous section dealing with design and opera-









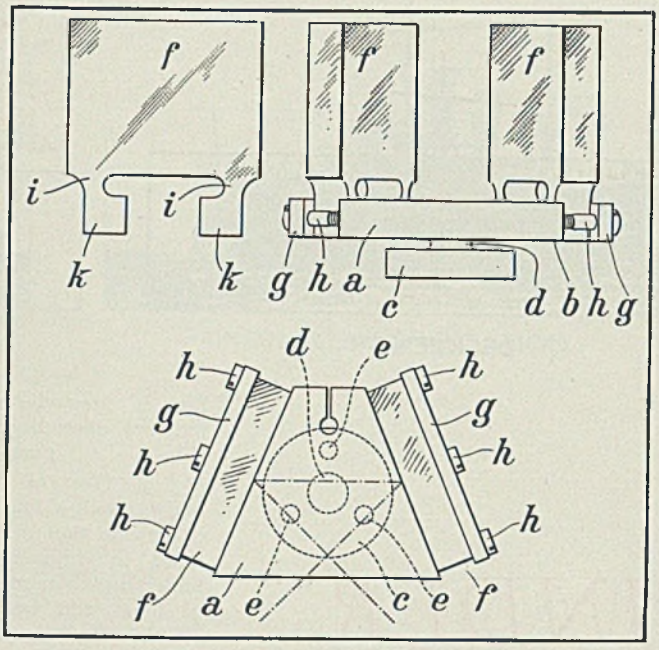


Fig. 5—Optical square, above, left, designed by P. Nichterlein, assignor to the firm of Carl Zeiss, Jena, Germany; Patent No. 1,430,316

Fig. 6—Optical square, above right, designed by Franz Schnabl, Jena, Germany, assignor to Bausch & Lomb Optical Co., Rochester, N. Y.; Patent No. 1,869,512

tion of the rangefinder, the dimensions of the scale are a function of the focal length of the objective if the base length of the instrument and the deviation of the prism are both constant. The method of arriving at the proper scale to be used is experimental, as follows: The instrument is mounted in front of two parallel collimators having two photographic objects. One of these, the left, is a simple index line, the other is a uniformly divided scale. The divisions of the latter, one by one, are brought into coincidence with the index line of the left hand collimator and the range obtained in this way compared with the reading of the scale. These should, of course, agree. If they do not, another scale is substituted. The eyepiece prism box is now finally set for correct coincidence, after the check for equal magnification and simultaneous focus.

Occasionally it is necessary to provide means for drawing out of the target in a vertical direction by means of astigmatic lenses. A point source of light, for example, is extremely difficult, if not impossible to split in order to determine coincidence. But by placing two astigmatizers with their negative cylindrical axes in the base and target plane, the point of light is drawn out into a fine line and adjusting the rangefinder to coincidence becomes easy.

The setting of these astigmatizing lenses consists in rotating them in the holders until the axes are truly horizontal. Prior to the mounting of the astigmatizers, a final and more delicate test for simultaneous focus is made with the aid of a bar having two slits about a quarter of an inch wide. This bar is moved to and fro in front of the collimators cutting off light alternately from one side of the objectives and then the other. If the images are in the same plane, no relative movement will be observed.

At this point also the eyepiece of the instrument is set for correct vision, with the focussing lever in the middle of the range. For this purpose a small telescope is employed to bring the images at the separator into the plane of the cross wires of the telescope. For any one type of instrument the distance between the cross wires and the optical center of the telescope objective is a fixed quantity.

Among the developments in rangefinder design which have taken place since 1914-18 is Patent No. 1,430,316 granted to Paul Nichterlein of Jena, assignor to the firm Carl Zeiss of Jena, Germany. This patent is concerned with the design of an optical square in such fashion that the changes in the shape of the device due to temperature variations have only a negligible effect on the accuracy of the part. The substitution of a hollow pentagonal for a solid reflector of the kind we have described, especially in the larger instruments, has great advantages —if not actually dictated by necessity. It is extremely difficult to secure a block of optical glass of the size and perfection required even for a rangefinder of moderate size, let alone meet the demands of the largest instruments. Hence the practice of using a hollow square (i.e. optical square) for the largest instruments has become well established.

Note in the upper diagrams of Fig. 5 that the metal casing "a" is provided with two openings "b". Behind each of these openings, a metal ring "c" is screwed to the casing. This ring is provided with three L-shaped incisions "c'" (best seen in the upper left hand diagram) giving rise to three spring tongues "c'". Each of these tongues is reinforced at the end by an extension "c²" to which the glass plate "d" is cemented. This glass disk is silvered on the back.

The purpose is clear. The arrangement of the spring tongues is intended to permit complete freedom of differential expansion between glass and metal, and at the same time to offer considerable resistance to bending in a direction which would do harm. In other words the arrangement is calculated to permit adjustment in the plane of the glass reflector, but to discourage movement about any axis lying in that plane.

In the second example in the two lower diagrams of Fig. 5, the three spring tongues "a'" project at right angles to the ring. These tongues, as in the first case, are reinforced at the ends with the extensions "a²" to which the flat glass disk is cemented. Obviously relative expansion of the glass and metal can take place without producing racking strains in the mount.

One of the hardest problems

rangefinder manufacturers face is the manner of mounting the end reflectors. Rigidity will not answer. The writer is aware of attempts in years gone by to place the pentagonal in a heavy bronze casting and cement it in. The difference between the coefficient of expansion of glass and metal plus cement caused conchoidal "gobs" of glass to be pulled out from the main mass of the reflector. The comparatively simple answer is to cement thin sheets of cork to the parallel faces of the pentagonal. The pentagonal being placed on a knurled base, a light knurled strap is run across the top and held with just sufficient force to maintain the position of the pentagonal, but not tightly enough to produce strain in the glass. Mountings of this type can take quite a severe "beating".

Another patent concerned with improvements in the design of the end reflectors was granted to Franz Schnabl of Jena, Germany, in March, 1930, and assigned to the Bausch & Lomb Optical Co. of Rochester, N. Y. Here is a trapeziform support "a", Fig. 6, of which the lower surface "b" is provided with a slender connection to the pedestal "c" intended to be screwed to the frame. On the 45-degree edges of the plate "a", silvered glass reflectors are mounted by the tails "k" with straps passing across these tails and fastened by the screws "h". The intention in this case is the same as in the last; the means employed, however, are different. Neither the stresses arising from screwing the plate to the base, nor those occasioned by temperature differences or variations in the coefficients of expansion, are readily transmitted to the reflector itself. Further, the slender stem upon which the arrangement sits offers a very fair guarantee of freedom from temperature strains.

A third rangefinder patent of possible interest and importance was granted to Otto Eppenstein of Jena, Germany, and assigned to Carl Zeiss in 1923. In the Barr & Stroud design of rangefinder, the frame carrying the optical parts lies co-axially with the outer tube. The Eppenstein proposal places these in a squat tube extending outward at right angles from the base of the instrument by adding a reflecting system which deflects the pencils from both ends of the instrument into this right-angled extension. See Fig. 7.

Thus the tube carrying the optical parts need be no longer than the focal length of either objective, instead of about twice this length. Further, this produces a certain degree of insensitiveness to relative movement of the optical parts because both pencils lie in a plane perpendicular to the base of the instrument. With proper selection of the reflecting system and of the separating system, no relative movement of the two images takes place in the direction of the base line even when the separating system suffers slight changes of position relative to the objectives and to the additional reflecting system.

Another patent granted to the same party in 1925 and assigned to Carl Zeiss was concerned with an arrangement which could be used to check the accuracy of the existing rangefinder. This proposal is based on the optical development of the original "lath" adjuster, in which the infinity adjustment was effected by ranging upon two vertical lines drawn upon a "lath" or board and set at a distance apart equal to the base length of the instrument. (See United States Patent No. 1,564,769.)

This account would hardly be complete without some reference to the stereoscopic rangefinder which found so much favor in Germany under the compelling personality of Carl Zeiss, while the British remained wedded to the Barr & Stroud coincidence type. The battle of Jutland (1916) was fought with these two types. In brief, the following considerations apply to this type of instrument. Suppose two pins are stuck in a table close together. We find that one of the pins can be moved forward along the line of sight a certain distance before the observer can determine with certainty that they are no longer the same distance away. This, being interpreted, means that a certain change in the angle of convergence of the optic axes of the eyes is necessary in order that two objects can be seen at different distances.

Original investigations appeared to point to the conclusion that in free vision a difference between the convergence angles of one minute of arc was the least difference necessary for differentiation of distance in the line of sight. More recent work has reduced this limit—at least in a certain percentage of cases. We might contrast the coincidence and stereoscopic types by remarking that in the former case the accuracy is related to the greatest angular parallactic displacement in the field of view which can occur without loss of coincidence being detected and in the case of the latter, to the maximum difference of convergence angles in the field of view which can occur without apparent change of the range of the object under observation.

The typical stereoscopic rangefinder invented by Carl Zeiss in 1907 embodied certain features characteristic of the coincidence type inasmuch as the optical system included end reflectors of the pentagonal type, object glasses and a deflecting prism, moving axially. (The same result can be achieved by using a double prism and rotating the elements in opposite directions.) At the center of the instrument right-angled "roof" prisms direct the beams into the focal planes of the eyepieces, between whose double elements rhomboidal prisms are mounted.

A ray passing outward through the eyepiece therefore suffers reflections which cause lateral displacement. By simultaneous rotation in opposite directions, these rhomboidal prisms are able to produce separation of the beams to

(*Please turn to Page* 92)

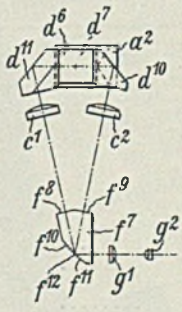
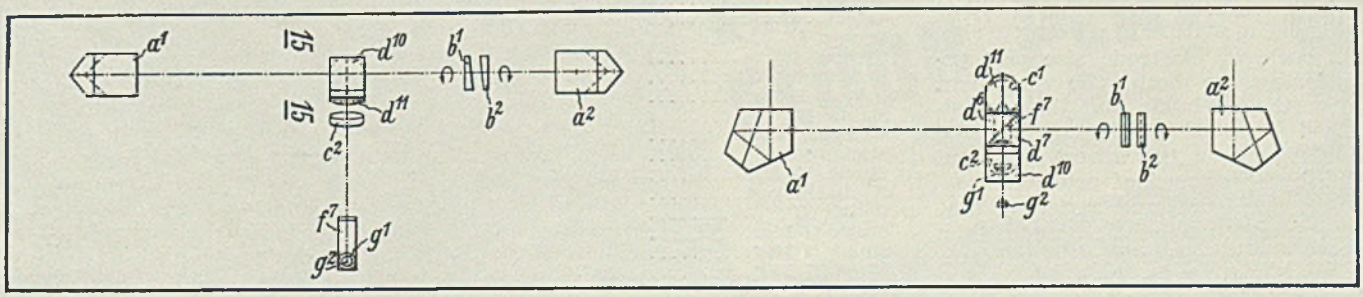


Fig. 7—Patent No. 1,477,112 granted to Otto Eppenstein, Jena, Germany, assignor to the firm of Carl Zeiss, on an improved arrangement of the optical parts. Here is shown the application of the idea to the coincidence type rangefinder



How To Get the Most From

ARC WELDING

—Part V—

By E. W. P. SMITH
Consulting Engineer
The Lincoln Electric Co.
Cleveland

■ IT IS evident from the preceding discussions in this series that the type of joint, the electrode and position during welding are extremely important factors to be considered in any study of how to increase welding speed and reduce welding costs. Probably even more important is the selection of the correct size of electrode, for upon this factor will depend whether or not you will obtain the maximum speed at the lowest cost.

Table I shows deposit rates and other data for various sizes of electrodes. It indicates the importance of electrode size in speed of production and costs about as well as possible because it affords a direct comparison of all the essential factors—for each of six different electrode sizes. Reference to this table will indicate very definitely that as the size of the electrode is increased, the cost per pound of material deposited—that is, the usable metal in the bead—decreases. Equally important, note how the cost of labor and time out to change electrodes decreases.

In general, the problem consists of how to deposit a certain size and shape most efficiently. It is not usually possible to change this size and shape unless the design is changed, which is a factor that is not here under consideration.

It might be shown that for a given load capacity the interchange of certain sizes would result in higher speed or lower costs. This cannot generally be done because of the fact that plate structural sizes and shapes are fixed by the design and that means that the size and shape of the welded joint is fixed.

Therefore, it is evident that the one to use is the largest electrode which conditions permit. Whether this be a matter of electrode size, as such, or electrode size *plus positioning*, or both, the statement nevertheless holds that the largest-sized electrode which may be used will result in the lowest cost and the highest speed of production.

On this basis, and assuming that the selection will be so made, then comes the matter of the selection of the type of electrode.

A comparison of two electrodes on the curve, Fig. 1, shows the results with the deep-groove electrode as compared with a general purpose electrode for a flat position grooved butt joint.

For a lap joint, there is not much difference in the various types of electrode, at least it is not as noticeable. There is, however, a difference insofar as positioning is concerned for types of electrode as indicated in the article on position (see Part III of this series, STEEL, Sept. 1, 1941, p. 74) for the type

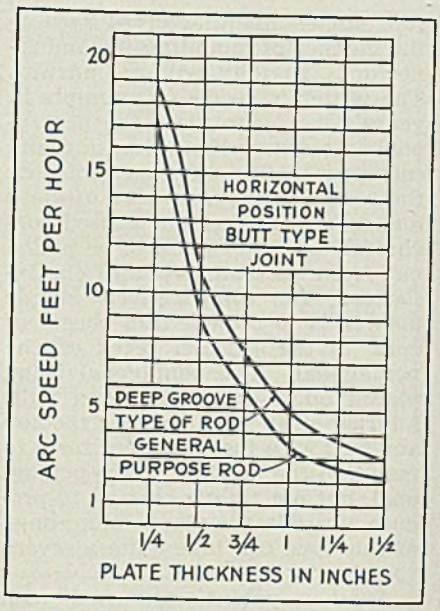


Fig. 1—Arc speeds versus plate thickness for two types of electrodes

TABLE I—Data on Electrodes of Different Sizes

Electrode size, inches	1/8	5/32	3/16	1/4	5/16	3/8
Amperes (arc)	110	130	150	250	325	425
Arc volts	24	25	26	30	34	38
K.W. at arc	2.64	3.25	3.9	7.5	11.1	16.1
Consumption rate, lbs. per hr.	2.6	3.3	3.95	7.5	10.7	16.2
Deposit, lbs. per hr. (50 per cent operating factor)	0.87	1.1	1.32	2.5	3.57	5.4
Efficiency of set (per cent) at arc voltage	47	50	51	55	59	59
Kilowatt input at arc voltage	5.6	6.5	7.65	13.65	18.8	27.3
Interruptions per lb. consumed	18	12	8	5	3	2
Cost per Pound of Metal Deposited						
Labor	$1.150	$0.909	$0.758	$0.400	$0.280	$0.185
Overhead	1.150	.909	.758	.400	.280	.185
Power	.064	.059	.058	.055	.053	.051
Electrode	.150	.135	.127	.127	.127	.127
Cost of interruption (including overhead)	.050	.033	.022	.014	.008	.005
	$2.564	$2.045	$1.723	$0.996	$0.748	$0.553

Notes: K.W. at arc $= \frac{\text{Volts} \times \text{Amperes}}{1000}$

Consumption rate obtained by test or from procedure data.
Deposition per hour = Consumption rate × deposition efficiency × operating factor.
Efficiency obtained by test.
Interruptions = number electrodes per pound. Based on 2-inch stub ends. This is minimum interruptions.
The values for 1/8-inch and 5/32-inch sizes are calculated on the basis of somewhat greater stub end losses than 3/16-inch and larger.

TABLE II—Electrodes for Butt Joints—Flat Position

Thickness	Electrode Size (Inches)	Arc Speeds—Feet per Hour—Electrode A	Electrode B	Electrode C	Electrode D
16 gage	1/8	110	...	...	...
	5/32	...	120	...	...
	1/8	...	140	...	...
14 gage	1/8	110	...	...	...
	1/8	...	114	...	...
1/4"	5.32	80	...	...	...
5/16"	5/16	55	...	...	...
Single V 1/4"	5/32 and 1/4	19	...	...	...
No Backing 1/4"	5/32 and 5/16	...	...	17.5	...
3/8"	5/32-1/4	15	...	...	...
3/8"	5/32-1/4	...	...	13	...
1/2"	5/32-1/4-5/16	11	...	...	...
1/2"	.....	...	...	9	...
Square 5/16"	1/4	...	...	45	...
Groove 1/4"	5/16	...	...	45	...
3/8"	1/8	...	...	37.5	...
1/2"	5/16	...	...	25	...
Single 1/4"	1/16-3/8	...	...	33.5	...
V Type 3/8"	5/16-3/8	...	...	27.5	...
Backing	.....	...	...	...	...
Single U 3/4"	1/4	...	...	6	...
No Backing 3/4"	1/4	...	...	...	7.5
Double U 1"	1/4	...	...	3.8	...
Single U 1"	1/4	...	...	...	4.75
Single U 1 1/2"	1/4	...	...	2.5	...
Single U 1 1/2"	1/4	...	...	...	3.25

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TABLE III—Procedure, Speeds, Butt Welds with V—NO BACKING
Requirements of weld: 100% Penetration; 100% Strength—welded from one side—no backing

Type of Joint Plate Thickness	Passes	Wire Size	Current	Min. Arc Volts	Speed in Inches 1 Min.	Lbs. of Electrode per Foot of Weld	Actual Welding Speed Feet, 1 Hour
Fig. 2	First	5/32	130	25	9	.11	....
¼" plate	Second	5/16	175	28	5	.25	....
	Weave last bead only					.36	17.5
Fig. 3	First	5/32	130	25	6.5	.15	....
⅜" plate	Second	¼	225	30	4	.43	....
	Weave last bead only					.58	13.
Fig. 4	First	5/32	130	25	6	.16	....
½" plate	Second	¼	225	30	7	.24	....
	Third	¼	275	30	8	.26	....
	Fourth	5/16	325	34	7.5	.35	....
	Weave last bead only					1.01	9.

TABLE IV—Procedure, Speeds, Butt Welds with V—WITH BACKING
Requirements: Welding from one side into steel backing strip for 100 per cent strength

Type of Joint Plate Thickness	Passes	Wire Size	Current	Min. Arc Volts	Speed in Inches 1 Min.	Lbs. of Electrode per Foot of Weld	Actual Welding Speed Feet, 1 Hour
Fig. 5	First	5/32	325	34	15	.172	....
¼" plate	Second	⅜	425	38	12	.325	33.5
						.497	
Fig. 6	First	5/32	325	34	13	.198	....
⅜" plate	Second	⅜	425	38	9	.44	27.5
						.638	

Requirements: Approximately 50 per cent penetration welding from one side. The structure in this type of weld varies with the analysis of the plate.

See Fig. 7 3/16" plate	1	¼	190	30	18	.078	90
See Fig. 7 ¼" plate	1	5/16	300	34	18	.133	90
See Fig. 7 ⅜" plate	1	5/16	425	38	15	.226	75
See Fig. 7 ½" plate	1	⅜	500	40	10	.46	50

Requirements: Approximately full penetration welding from two sides. The structure in this type of weld varies with the analysis of the plate.

See Fig. 8 3/16" plate	2	¼	190	30	9	.16	45
See Fig. 8 ¼" plate	2	5/16	300	34	9	.27	45
See Fig. 8 ⅜" plate	2	5/16	425	38	7½	.45	37½
See Fig. 8 ½" plate	2	⅜	500	40	5	.92	25

TABLE V—Procedure Speeds, Butt Welds with V—WITH BACKING
Requirements: Approximately full penetration welding from two sides. The structure in this type of weld varies with analysis of the plate.

Type of Joint Plate Thickness	Passes	Wire Size	Current	Min. Arc Volts	Speed in Inches 1 Min.	Lbs. of Electrode per Foot of Weld	Actual Welding Speed Feet, 1 Hour
See Fig. 9	1	⅜	500	40	10		
1/16" gap	1a	⅜	500	40	10		
	2	⅜	500	40	5 weave		
	2a	⅜	500	40	5 weave		
						2.80	8.3
See Fig. 10	1	⅜	500	40	10		
1/16" gap	1a	⅜	500	40	10		
	2	⅜	500	40	5 weave		
	2a	⅜	500	40	5 weave		
						2.80	8.3
See Fig. 11	1	⅜	500	40	10		
1/16" gap	1a	⅜	500	40	10		
	2	⅜	500	40	5 weave		
	2a	⅜	500	40	5 weave		
	3	⅜	500	40	5 weave		
	3a	⅜	500	40	5 weave		
						4.60	5.0

TABLE VI—Procedure, Speeds, Butt Welds—Heavy Plate

Type of Joint Plate Thickness	Passes	Wire Size	Current	Min. Arc Volts	Lbs. of Electrode per Foot of Weld	Actual Welding Speed Feet, 1 Hour
See Fig. 12	1	5/32	130	25	...	...
¾" plate	2	¼	275	30	...	...
	3	¼	275	30	...	...
	4	¼	275	30	...	...
	5	5/16	325	34	...	...
	6	¼	275	30	...	...
	..	..	...	..	1.90	6

Wherever possible welding from both sides is an advantage—scarf and fit work similar to Fig. 13.

Fig. No. 13	1	5/32	130	25	...	...
1" plate	1a	¼	275	30	...	...
	2	¼	275	30	...	...
	2a	¼	275	30	...	...
	3	¼	275	30	...	...
	3a	¼	275	30	...	...
	4	5/16	325	34	...	...
	4a	5/16	325	34	...	...
	..	...	...	..	2.28	3.8
See Fig. 14	1	5/32	130	25	...	...
1½" plate	2	¼	275	30	...	...
	3	¼	275	30	...	...
	4	¼	275	30	...	...
	5	¼	275	30	...	...

No. 5 and type No. 8 electrode.

It would be well to review Parts I and II of this series also (see STEEL, Aug. 4, 1941, p. 60, and Aug. 18, 1941, p. 86) with reference to positioning discussions because positioning permits the use of a faster electrode by what amounts to changing the type of joint so that it may be made by a certain type of electrode, such as is indicated in the deep groove as compared to the general purpose electrode in Fig. 1.

Reference to the tabulations giving electrode sizes for various types of joints will show the highest speed electrode for a given type of joint. The electrodes A, B, C, D are applied in each case so as to obtain the highest speed. A study of the ¾-inch, 1-inch and 1½-inch joints indicates very clearly how important this selection is. Changing electrode type in 1½-inch joint increases speed in ratio of 3.25 to 2.5, or 30 per cent.

Type of Electrode Important

In referring to the tables and sketches, Figs. 1 to 20 inclusive, it will be seen that the selection of the electrode and the effect of that selection upon the speed is rather important.

It is assumed, of course, that the type of joint is being selected on the basis of the required performance, and after that has been obtained, then the matter of position and type of electrode can be worked out.

Where the type of joint is optional, it is seldom that the selection of the joint is recognized as an item in the construction of the fabricated parts.

The tabulations indicate that for single V or U-butt joint, made with one type of electrode as compared to another, there is a notable difference in speed.

If this same idea is developed for other cases, specific or special, and comparisons made, these comparisons would be indicative of cost. While other factors enter into it, nevertheless the main factor is that of speed, and for this reason the tabulations give interesting comparisons.

There is still a further type of butt joint which may be desirable and which may lend itself readily to certain applications. See Figs. 9, 10 and 11.

In Table VIII, the electrode is held in the position shown in Fig. 17—the angle between the electrode and the horizontal plate being 30 degrees — pointing backward to make an angle of 60 degrees between electrode and the vertical plate.

In making the ½-inch weld in Table VIII where such a fillet weld can be tilted as per Fig. 19, much

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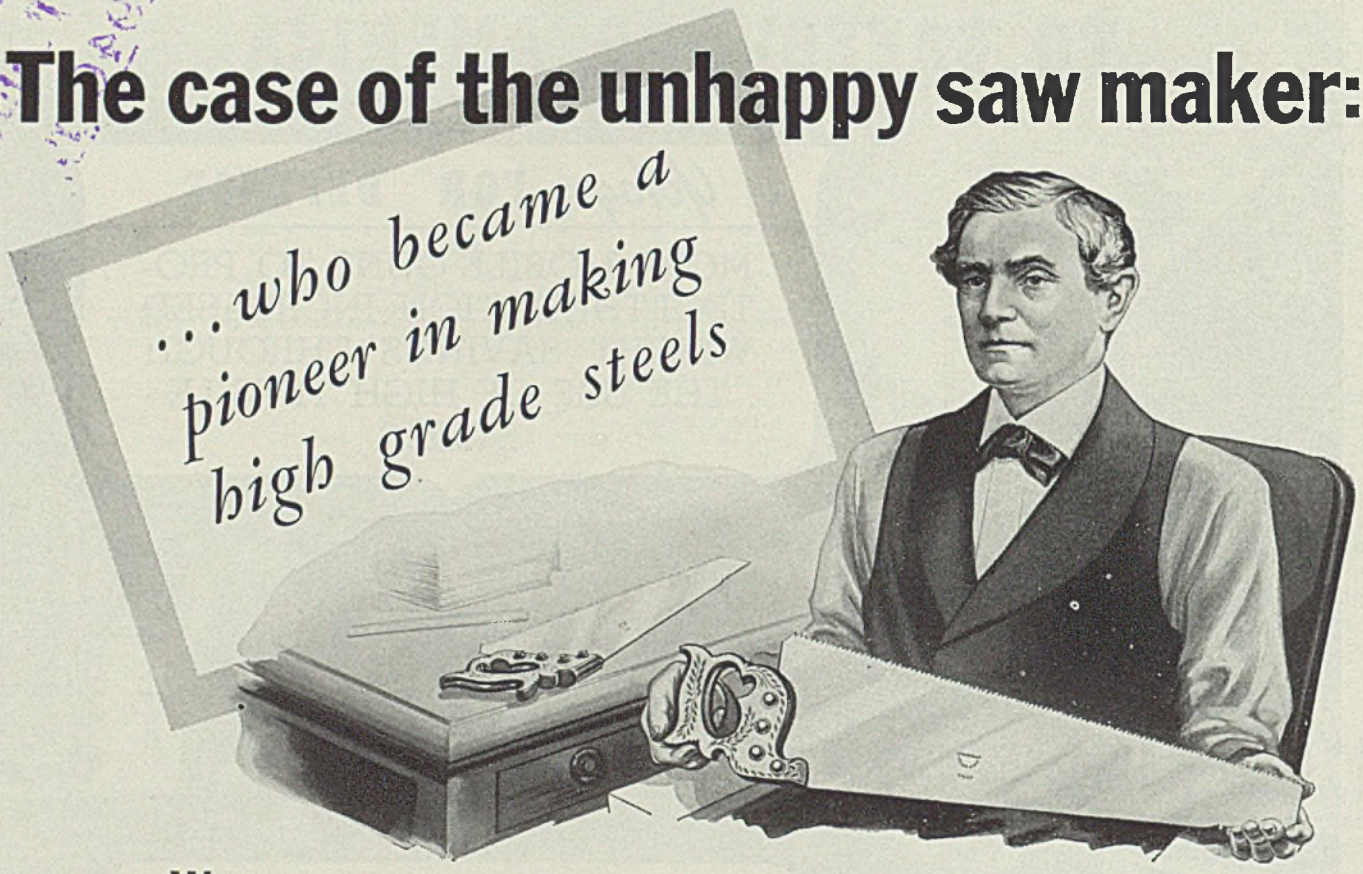

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Help for troubled tool makers: Disston engineers and metallurgists will be glad to help you in selecting the best tool steels for each job . . . to get more "mileage" per tool. Also, there's valuable information in the illustrated 73-page catalog, "Disston Tool Steels." If you haven't received your copy of this useful book, write for one today to Henry Disston & Sons, Inc., 926 Tacony, Philadelphia, Pa.

6-N-6 High Speed Steel passes a tough test

Disston Tool Steels have to win their "service stripes" right in the Disston plants. For two years, 6-N-6 High Speed Steel was used for chisels to cut 1.60% carbon file steels at speeds up to 420 cuts per minute. The extreme toughness, fatigue and wear resistance of 6-N-6 in this long production test . . . and in general machine shop applications . . . proved that 6-N-6 is a match for the best 18-4-1 steels in most high speed work.

ESTABLISHED 1840

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926 Tacony, Philadelphia, Pa.

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Company _____

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DISSTON TOOL STEELS

higher currents and increased speeds can be obtained: See last line Table VIII. Tilting should be such that the molten pool is horizontal.

Fig. 2—Butt joint, 1/4-inch plate, 2 beads

Fig. 3—Butt joint, 3/8-inch plate, 2 beads

Fig. 4—Butt joint, 1/2-inch plate, 4 beads

Fig. 5—Butt joint, 1/4-inch plate, with backing, 2 beads

Fig. 6—Butt joint, 3/8-inch plate, with backing, 2 beads

Fig. 7—Butt joint, 3/16-inch plate. Also for 1/4, 3/8, and 1/2-inch plate, 1 bead

Fig. 8—Butt joint, 2 beads, for 3/16, 1/4, 3/8, 1/2-inch plate

Fig. 9—Special butt joint, 1/16-inch gap, 4 beads, 3/4-inch plate

Fig. 10—Butt joint, 1/16-inch gap, 4 beads; bead numbers show welding sequence

Fig. 11—Butt joint, 1/16-inch gap, 6 beads, for 1-inch plate

Fig. 12—Butt joint, 3/4-inch plate, 6 beads

Fig. 13—Butt joint, 1-inch plate, 8 beads

Fig. 14—Butt joint, 1 1/2-inch plate, 11 beads, single-U joint

Fig. 15—Double-U butt joint, 2-inch plate, 16 beads

Fig. 16—Plan and front views to show position of electrode for welding lap joints

Fig. 17—Plan and front view of electrode position for welding fillet joints

Fig. 18—Fillet joint, 1/2-inch plate, 3 beads

Fig. 19—Fastest joint design, tilted fillet, in 1/2-inch plate, 1 bead

Fig. 20—Edge sealing joint, when continuous; tack for positioning only; can be made without filler metal by melting base metal to make weld

	6	1/4	275	30	...	...
	7	1/4	275	30	...	...
	8	1/4	275	30	...	...
	9	1/4	275	30	...	...
	10	5/16	325	34	...	...
	11	5/16	325	34	...	...
	..	..	...	..	3.70	2.5
See Fig. 15	1	5/32	130	25	...	...
2" plate	1a	1/4	275	30	...	...
	2	1/4	275	30	...	...
	2a	1/4	275	30	...	...
	3	1/4	275	30	...	...
	3a	1/4	275	30	...	...
	4	1/4	275	30	...	...
	4a	1/4	275	30	...	...
	5	1/4	275	30	...	...
	5a	1/4	275	30	...	...
	6	1/4	275	30	...	...
	6a	1/4	275	30	...	...
	7	1/4	275	30	...	...
	7a	1/4	275	30	...	...
	8	5/16	325	34	...	...
	8a	5/16	325	34	...	...
	..	..	...	..	4.35	1.80

Whenever possible, welding from both sides is an advantage, scarf and fit work similar to Fig. 15.

TABLE VII—Procedure, Speeds, Lap Welds—Horizontal Work

Plate Thickness	Wire Size	Current	Min. Arc Volts	Pounds Electrode per Foot of Weld	Actual Welding Speed Feet, 1 Hour
1/8	1/4	250	30	.097	100
3/16	1/4	275	30	.120	90
1/4	1/4	250	30	.138	70
5/16	1/4	250	30	.19	50
3/8	1/4	250	30	.237	40
		Lap Welds—Tilted			
3/16	5/16	375	34	.12	125
1/4	5/16	375	34	.160	95
3/8	3/8	425	38	.280	70
		Lap Welds—High Speed			
3/16	1/4	500	30	.097	200
1/4	5/16	525	32	.130	160
1/8	5/16	550	36	.160	140
3/8	3/8	550	36	.25	100

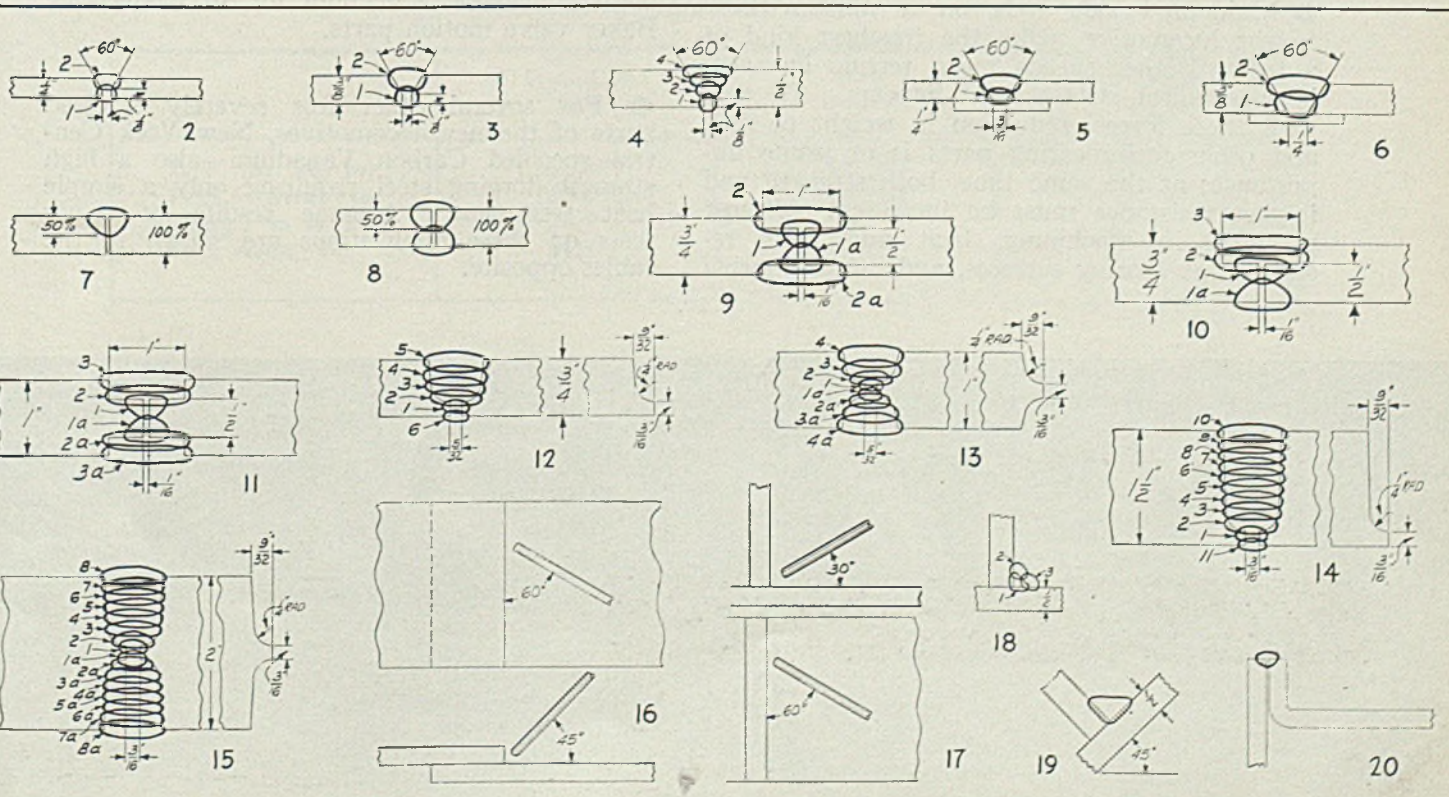
Position of electrode should be as indicated, Fig. 16.

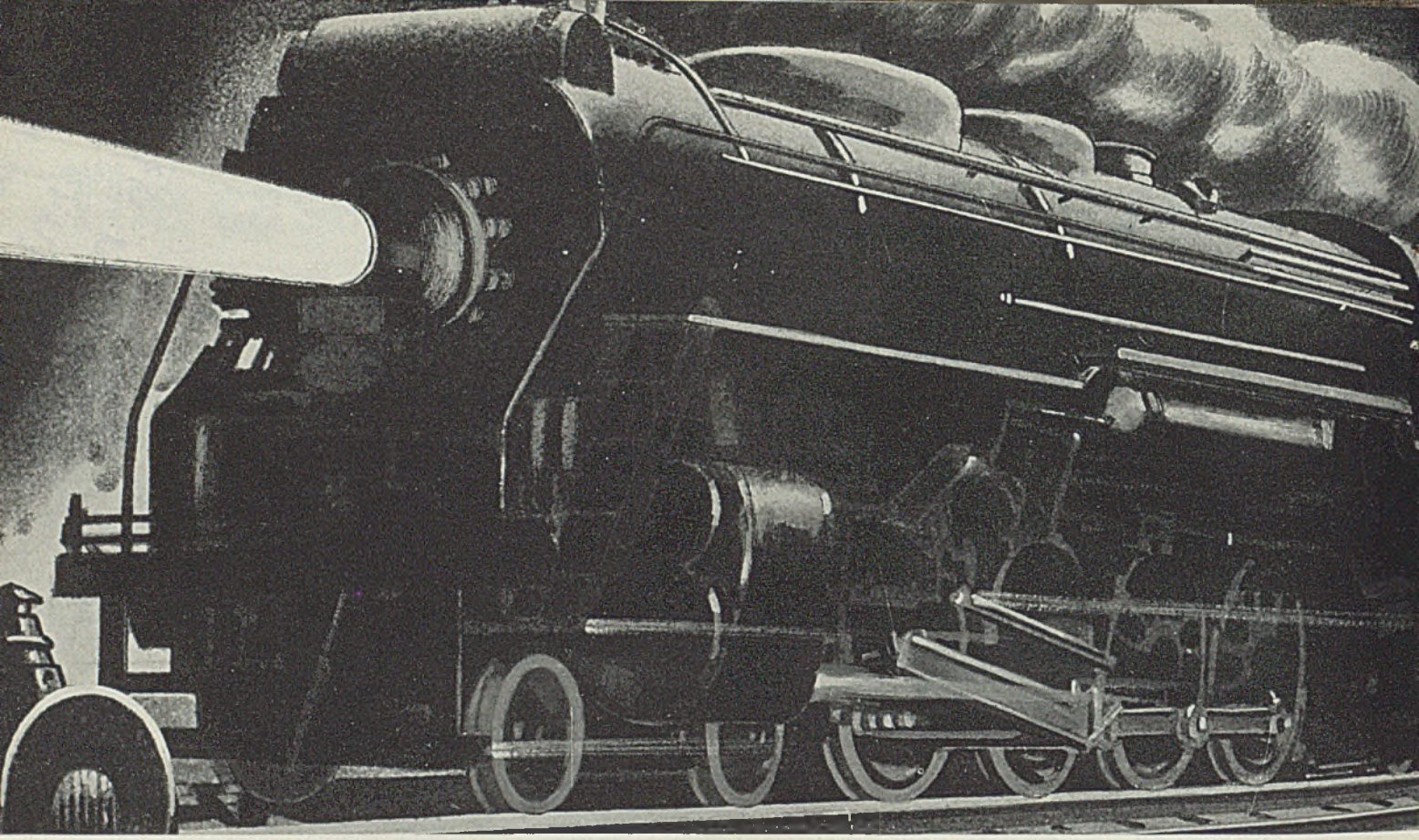
TABLE VIII—Procedure, Speeds, Fillet Welds—Horizontal Work

Plate Thickness	Passes	Wire Size	Current	Volts	Speed in 1 Min.	Lbs. of Electrode per Foot of Weld	Actual Welding Speed Feet, 1 Hour
3/16	1	1/4	190	30	8	.186	40
1/4	1	1/4	190	30	7	.20	35
3/8	1	1/4	190	30	5	.29	25
1/2 (Fig. 18)	3	1/4	190	30	2.2	.60	11
1/2 (Fig. 19)	1	5/16	350	36	5.2	.63	26

TABLE IX—Procedure, Speeds, Edge Welds

Plate Thickness Fig. 20	Wire Size	Current	Volts	Lbs. of Electrode per Foot of Weld	Actual Welding Speed Feet, 1 Hour
14 gage	5/32	130	25	.027	185
1/8	1/4	170	30	.030	165
3/16	1/4	225	30	.062	140
1/4	5/16	325	34	.097	135





Mn V— a great forging steel — simple composition — simple heat treatment. In light or heavy sections, only single normalize and temper—within the means of any heat treatment shop—develops an exceptional combination of high yield point, high ductility, high fatigue value, and unusual resistance to impact throughout a range that extends well below 0° F.

● Main and side rods on a modern fast-freight locomotive make the toughest kind of a test. Higher speeds mean terrific increases in mechanical stresses and impacts. To deal with these forces, reduction in weight of rods and other reciprocating parts is of prime importance; at the same time, both strength and impact resistance must be increased. Utmost precision in machining, heat and wear resistance at bearing surfaces, and sound internal structure must be assured. And *then*—simple heat treatment — plus easy, accurate, economical handling in railroad repair shops.

● The New York Central solved this complex engineering problem on 50 Mohawk type locomotives purchased last year and on 15 more now on order, by using Manganese Vanadium—single normalized and tempered. And for light sections, the Pilliod Company uses Manganese Vanadium for all modernized Baker valve motion parts.

● For several other less severely stressed parts of the new locomotives, New York Central specified Carbon Vanadium—also a high strength forging steel requiring only a simple heat treatment. Average results of many tests on these applications are shown in the tables opposite.

VANADIUM

CORPORATION OF AMERICA • NEW YORK, N. Y.

MANGANESE VANADIUM STEEL

	Main Rods	Side Rods	Baker Valve Motion Parts	
			Radius Arms	Bell Cranks
Y. P. lbs. sq. in.	76,110	75,100	81,000	78,500
Tens. Strength	103,410	103,100	106,500	99,400
Elong., % in 2″	26.9	28.2	26.5	27.5
Red. Area, %	63.0	60.1	64.1	65.9

CARBON VANADIUM STEEL

	Engine Truck Axles	Main Crank Pins	Transverse and Trailer Truck Equalizers
Y. P. lbs. sq. in.	63,870	62,320	63,440
Tens. Strength	100,990	99,830	102,000
Elong., % in 2″	26.9	24.9	25.5
Red. Area, %	51.8	47.8	51.7

BETWEEN HEATS

WITH *Shorty*

Say Fellers:

I was passin' through the cast house of No. 3 blast furnace yesterday 'n jus' as I was goin' to turn up the ramp Snoopy Williams lets go with a whistle and beckons me to join 'im 'n Bill Watson. So I did. Snoopy sez, "Boss, I was jus' goin' to tell Bill here 'bout a thing that happened at a plant where I used to put in some licks 'fore I came here 'n I thought you'd like to hear 'bout it. So if y' gotta a minute, sit down 'n rest your weary bones."

"Sure thing," I sez. "Shoot."

"The plant had a couple of bessemers, a bar mill and four blast furnaces. Three of the stacks were located near the steel plant, and the fourth about one-half mile away. A feller by the name of John Cartright was super at the furnaces. Ol' John, as the boys called 'im, had some trouble with 'is stomach 'n he could not sleep long at a stretch. Y' could expect to see 'im comin' 'round the furnaces most any time durin' the day and night turns. Sometimes he'd be outta sorts; other times he'd be on the up and up. Good furnaceman, y' understand, but grouchy most of the time," sez Snoopy.

"Got outta 'is bed on the wrong side, huh?" Bill spouts.

"Naw, sometimes he never saw 'is bed. Anyway, ol' John had a feller by the name of Mat Adams takin' care of the No. 4 stack, one-half mile from the plant. Mat's uncle was vice president of the company with offices in the big city. Well anyway, this particular morning ol' John couldn't sleep. He tossed 'n he turned but the ol' winkin' lids wouldn't stay put so he gets 'imself outta bed, put on 'is workin' clothes 'n heads for No. 4 furnace. She was jus' startin' to make 'er last cast on the night turn—the 4 a. m. cast—when ol' John walks 'round and stops in front of the clay gun. He had the brim of 'is hat turned up 'n whenever y' saw 'im wearin' it this way, y'd know somethin' was up."

" 'Where 's Mat'?, ol' John snapped at the keeper."

" 'Dunno, mister Boss,' he sez. 'Me no see 'im fer long time.' "

" 'Go find 'im,' ol' John snorted."

"The keeper made the rounds of the stoves, the blower's shanty 'n the stockhouse but no Mat could he find."

" 'Keep your eyes on the furnace,' ol' John sez to the keeper. 'I'll find 'im,' 'n with that he started up the stairway leadin' to the trestle.

"Ol' John walks down the trestle to where men were unloadin' a car of ore and inquired for Mat. 'No see 'im,' they yelled back 'n then they began poundin' the side of the car with their sledges to loosen the ore. Ol' John strikes up a right smart pace toward the trestle shanty not far from the furnace stairway. Nearing the door he heard a voice say, 'Come on, little seben, roll up yo' face so yo' uncle Sam can see y.' Yo a nice pair of dice but no bones I ever did see kept uncle Sam waitin' so long.'

"Ol' John put his hand on the latch but she wouldn't budge. Open the door,' he yelled. No answer. Out went the light. 'Open the door or I'll bust 'er in,' the ol' man snorted. No reply. 'N ol' John took a sledge 'n crashed 'is way inside. There was Mat and some colored boys. 'Clear outta here y' bunch of crap shooters,' ol' John shouted, "n as fer you, Mat, you're fired.'

" 'Is that so,' Mat replied as he walked across the trestle.

"That morning ol' John told the story to the big boss and tried to persuade him to write a letter to Mat's uncle 'n tell 'm 'bout the crap game but the big boss sez, 'You'd better forget the whole thing.' "

" 'Ferget nothin,' ol' John retorted. 'If y' don't care to write 'is uncle down in the big city, I'll drop 'im a line 'n tell 'im how 'is dear nephew is runnin' the furnace.' And he did.

"A few days later a reply came from Mat's uncle, the vice president of the company, suggesting that Mat be moved over to the main plant as assistant to ol' John so as they could watch over 'im a little closer."

"Wouldn't that make the old boy feel good," sez Bill. "What did he do about it?"

"Well the first thing he did was to get hold of the carpenters. He told them what he wanted, 'n in a few days there was a partition in ol' John's office with separate entrances to each room. When Mat showed up the ol' man called 'im in 'is office 'n he sez to 'im: 'Mat, you're now assistant blast furnace superintendent. Next door is your office; it's made especially for you. Never come in my office unless you have a question to ask. Now get out and stay out.' "

"How'd the ol' man run the furnaces all by 'imself?" inquired Bill.

"He didn't," replied Snoopy. "Wasn't long 'fore he hired a clerk, as he called 'im, 'n he turned over all the details to 'im. Mat either sat in 'is office or traveled 'round the plant chinnin' to the fellers and havin' a good time in general. One day Mat was up on the trestle leanin' on the railing watchin' the boys change a tuyere on No. 2 furnace. The furnace was on backdraft, the new tuyere was inserted, the blowpipe was up and the boys started to drive the keys in place to force the gooseneck tight against its seat. One guy wasn't swingin' his sledge hammer fast enough to suit ol' John who was standin' nearby directin' the operation."

"He must 'ave been a wiry feller," I sez.

"Yeh, he was but this time he wasn't so hot. He grabs the sledge from the guy, makes a swing at the overhead key on the gooseneck 'n misses it, jus' as though there wasn't any key at all. Mat up on the trestle starts laughin', ol' John hears 'im and right away he starts up the stairway for 'im. Mat starts movin 'is legs toward No. 3 furnace 'n seein' the ol' man after 'im, he starts up the stairway that wound 'round the chimney to the platform on top of the stoves. He made 'er to the top but ol' John gave up the chase after he made a couple of turns."

"How long did the management put up with that kinda stuff?" Bill inquired.

"Not very long, Bill, cuz ol' John was drowned in the Niagara river shortly afterward and eventually Mat got his job as superintendent."

"How'd Mat feel 'bout ol' John?" I asked.

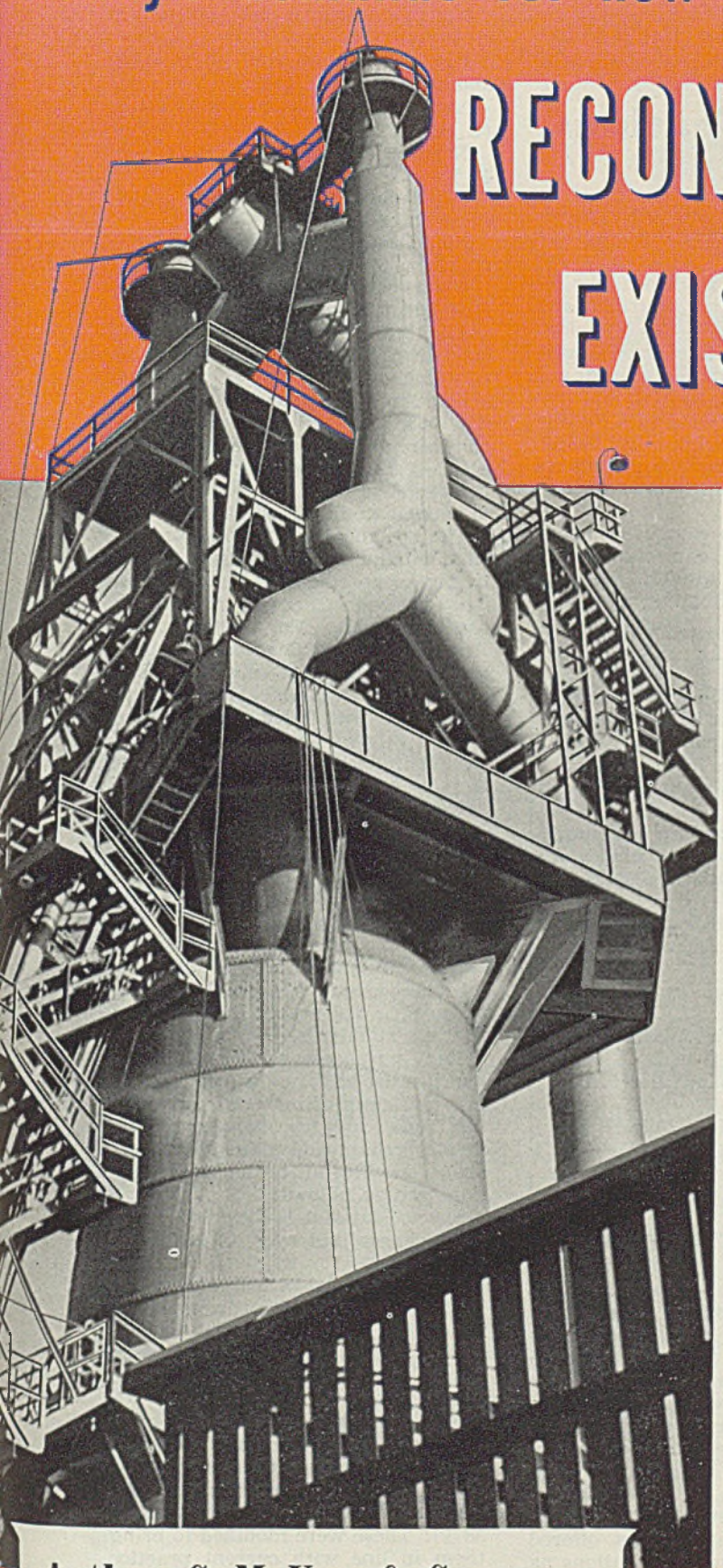
"Alright. He sez to me, 'Snoopy, a guy can't thrive in the throng and the grime of toil holdin' grudges. Long ago I forgot it all—there often are green meadows and quiet waters to discover on stoney roadsides if we look for 'em,' he sez. 'N I guess he's right."

So long, fellers. I'll be seein' ya.

"Shorty" Long

Today's demands for new capacity need not delay

RECONSTRUCTION OF EXISTING UNITS



REGARDLESS of the many new projects being developed and executed by McKee engineers, Arthur G. McKee & Company are prepared, as always, to handle the modernization and enlargement of your existing units.

To insure maximum iron and steel production present plants must be maintained at peak efficiency.

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A.S.T.M.

Approves 34 New Specifications

MANY OF the new specifications and tests have been under development in the technical committees for several months—in a few cases much longer because the needed technical data were not available and had to be developed by co-operative test and research programs in the respective groups. In addition to approving the 34 new specifications and tests, committee E-10 also reviewed and approved a procedure by which the society can develop emergency alternate specifications and modifications of standards through expedited committee action. This procedure involves the approval by a duly constituted technical committee, confirmation of the action by the A.S.T.M. standing committee's chairman, and subsequent approval by committee E-10. Publication and notification of emergency revisions can be in the form of a sticker or sheet which can be affixed to the specification in question. This procedure is, of course, tied in directly with anticipated national defense needs.

The American Society for Testing Materials' committee E-10 on standards on Aug. 25 approved 34 new specifications and tests, then acted favorably on 15 revisions of tentative specifications, and approved the publication of 11 tentative revisions of standards. This important committee in the intervals between meetings of the society acts for it in reviewing recommendations on standards coming from the various technical committees.

Committee E-10 elected J. R. Townsend, materials standards engineer, Bell Telephone Laboratories Inc., 463 West street, New York, chairman for a term of one year. The personnel of this committee consists of the following:

Chairman: J. R. Townsend.

Ex-officio Secretary: C. L. Warwick, secretary-treasurer, American Society for Testing Materials, 260 South Broad street, Philadelphia.

R. D. Bonney, assistant manager of manufacturing, Congoleum-Nairn Inc., Kearny, N. J.

F. H. Jackson, senior engineer of tests, Public Roads Administration, Federal Works Agency, Washington.

N. L. Mochel, manager, metallurgical engineering, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

F. E. Richart, research professor of engineering materials, University of Illinois, Urbana, Ill.

H. S. Vassar (past-president, ASTM), laboratory engineer, Public Service Electric & Gas Co., Camden, N. J.

Steel: Two new specifications developed in committee A-1 on steel were approved covering boiler and superheater tubes. One specification covers carbon-molybdenum material fabricated by electric resistance welding (A 250-41 T), the other covers four grades of austenitic steel fabricated either by electric resistance or the atomic-hydrogen arc welding process (A 249-41 T).

Each of the specifications sets up recognized flattening, flaring, and hardness tests, and also standard hydrostatic tests. The three grades of carbon molybdenum material are differentiated by chemical and mechanical requirements, tensile strength, for instance, being 53,000, 55,000, and 60,000 pounds per square inch with hardness values of 137 and 143 brinell.

Five grades are covered in specifications A 249, chromium-nickel, chromium-nickel-titanium, chromium - nickel - columbium, and two types of chromium-nickel-molybdenum. Minimum tensile requirement is 75,000 pounds per square inch; yield point, 30,000 pounds per square inch with minimum elongation in 2 inches of 35 per cent.

Nonferrous Metals and Alloys: Based on intensive work in its subcommittee VII on refined nickel and high-nickel alloys, O. B. J. Fraser, chairman, committee B-2 on nonferrous metals and alloys offered nine new tentative specifications as follows:

Nickel, nickel-copper alloy and nickel-chromium-iron alloy seamless condenser tubes and ferrule stock (B 163 — 41 T)

Nickel-chromium-iron alloy cold-drawn pipe and tubing (B 167 — 41 T)

Nickel cold-drawn pipe and tubing (B 161 — 41 T)

Nickel-chromium-iron alloy rods and bars (B 166 — 41 T)

Nickel plate, sheet and strip (B 162 — 41 T)

Nickel rods and bars (B 160 — 41 T)

Nickel-chromium-iron alloy plate, sheet and strip (B 168 — 41 T)

Nickel-copper alloy rods and bars (B 164 — 41 T)

Nickel-copper alloy cold-drawn pipe and tubing (B 165—41 T).

All of these materials have been used in pressure vessels, for naval equipment and related categories and in the development of the specifications both the government and commercial interests have co-operated. A number of users of high-nickel alloys were asked specifically to participate in this work.

The specifications follow a somewhat similar outline stating clearly in the scope clause the exact products covered. Chemical limitations are presented. For instance, the first named specification has three grades of material—nickel, nickel-copper alloy, and nickel-chromium-iron alloy with nickel composition respectively of 99, 63 to 70 and 75 per cent; other elements—copper, iron, manganese, chromium, carbon, silicon and sulphur—are covered. Mechanical requirements are clearly set forth in each, covering tensile strength, hardness values, yield strength (0.20 per cent offset), and elongation. In the case of pipe and tubing, expanding and hydrostatic test requirements are given and permissible variations in weight, dimensions, etc., are provided in each of the new standards.

For purposes of classification which must be exact, the committee lists the sizes of material constituting rods, squares, hexagons, and flats. In the nickel plate, sheet, and strip specifications the classifications are as follows:

Sheet: Material ¼-inch and under in thickness and over 18 inches in width.

Strip: Material ¼-inch and under in thickness and not over 18 inches in width.

Plate: Hot-rolled material over ¼-inch in thickness and over 10 inches in width.

Revisions were approved in two specifications covering nickel-copper alloy plate, sheet, and strip (B 127 — 39 T) and in the specification for electrolytic cathode copper (B 115 — 38 T). These were modified to bring them in line with current practice and to meet the requirements of certain government agencies. Changes were made in B 127 physical properties involving upping the tensile strength of quarter-hard sheet and

(*Please turn to Page* 91)

WE RENEW OUR PLEDGE

Two years ago, at the beginning of the present war with its uncertainties and threats to the future of all industry, this Company publicly pledged itself not to increase its selling prices.

On this, the second anniversary, we again publicly renew that pledge.

During the last two years we have not only kept the pledge previously made, but *we have actually reduced our selling prices by more than 6%* because of more efficient operation made possible by the marvelous cooperation and ability of our organization. This was accomplished in the face of rising labor and material costs, both of which have been increased by considerable amounts.

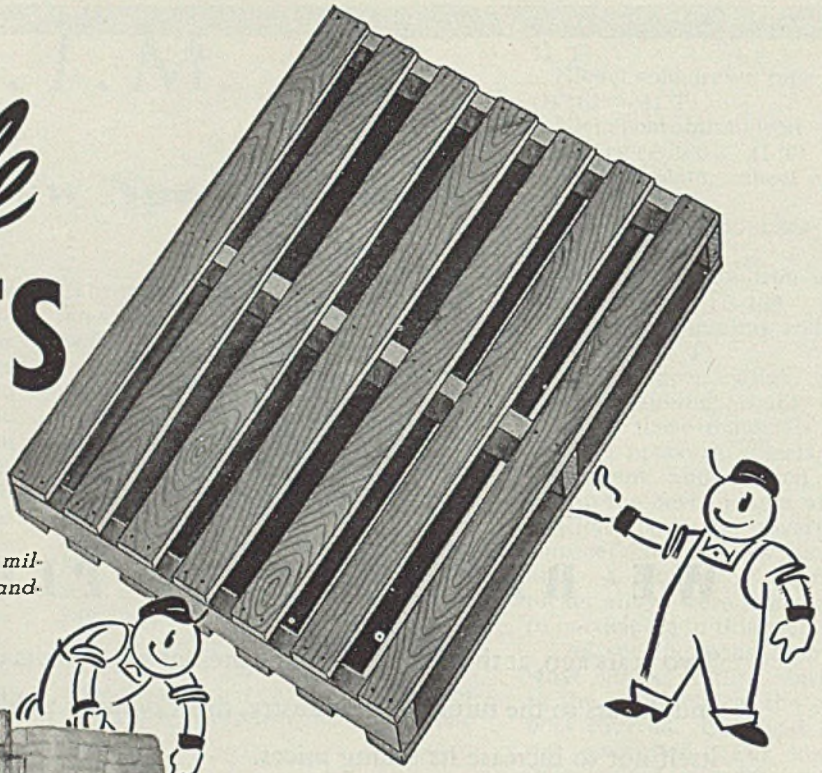
It is our belief that the only hope for the continuance of the present industrial system now threatened from within and without is in its ability to give more and more to the consumer for less and less of his dollar. This is the strength of American individual initiative. This is the hope of our country's future. If American industry can accomplish this universally, we need not fear dictators either at home or abroad.

THE LINCOLN ELECTRIC COMPANY

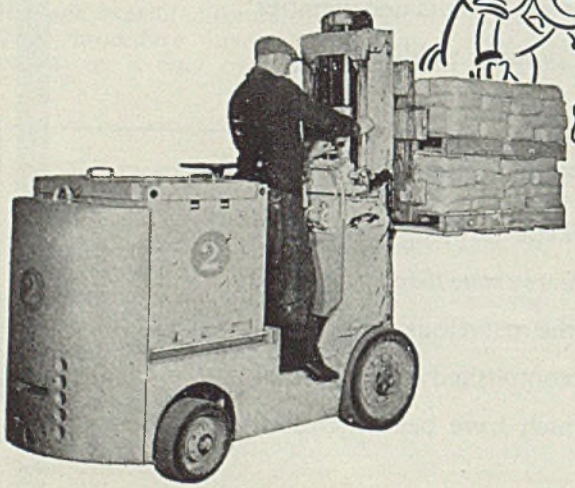
Cleveland, Ohio
October 2, 1941

J. F. Lincoln
President

Simple PALLETS



Two wooden floors separated by 2 x 2's make a pallet any fork truck can pick up readily. This simple invention will save industry millions of dollars in handling and rehandling costs during 1941.



...earn millions of dollars!

Handling and rehandling materials is one of the costliest items in manufacture. But costs decline wherever modern material-handling methods are introduced. The modern fork truck powered by a modern industrial battery keeps materials on the move within plants—makes loading and unloading freight cars cheaper—permits use of storage space from floor to ceiling. But the *method alone* isn't enough . . . it calls for a power source in the truck that gives quiet, smooth, trouble-free *dependable* operation.

That's why, probably, the Edison Alkaline Storage Battery powers more of the battery industrial trucks in the United States than all other kinds of batteries combined. With *steel* cell construction and a solution that is a natural preservative of steel, it is the lightest, most durable, most trouble-free of all storage batteries. Has two to five times longer life—assures lowest annual operating cost.

For more detailed information send for our bulletin *Modern Material Handling.* New edition, just off the press, describes the various industrial-truck handling systems; illustrates the latest methods; gives detailed data on alkaline batteries. Edison Storage Battery Division of Thomas A. Edison, Inc., West Orange, New Jersey, U. S. A.

Edison

STEEL Alkaline BATTERIES

FULLY MECHANIZED HANDLING

Now Provided in

ELECTRIC SALT-BATH FURNACES

. . . . . to assure more accurate control of time-temperature cycle, to provide continuous processing, and to tie in with other continuous or conveyorized operations

■ EVIDENCE continues to accumulate to show that manufacturers of processing machines and equipment are coming more and more to realize the advantages of mechanized handling through the equipment itself. This is a logical development resulting from the increased emphasis being placed on efficient materials handling as a means not only of increasing the output of a plant by permitting machine and process operators to spend a greater portion of their time in actual production work but also of more effectively utilizing available floor space and production facilities by keeping work moving continuously through the plant.

An excellent example of what mechanical handling facilities are doing to increase plant capacity was described in STEEL, Aug. 11, 1941, p. 62, in which a plant manufacturing steel furniture actually doubled its output merely by mechanizing the handling facilities.

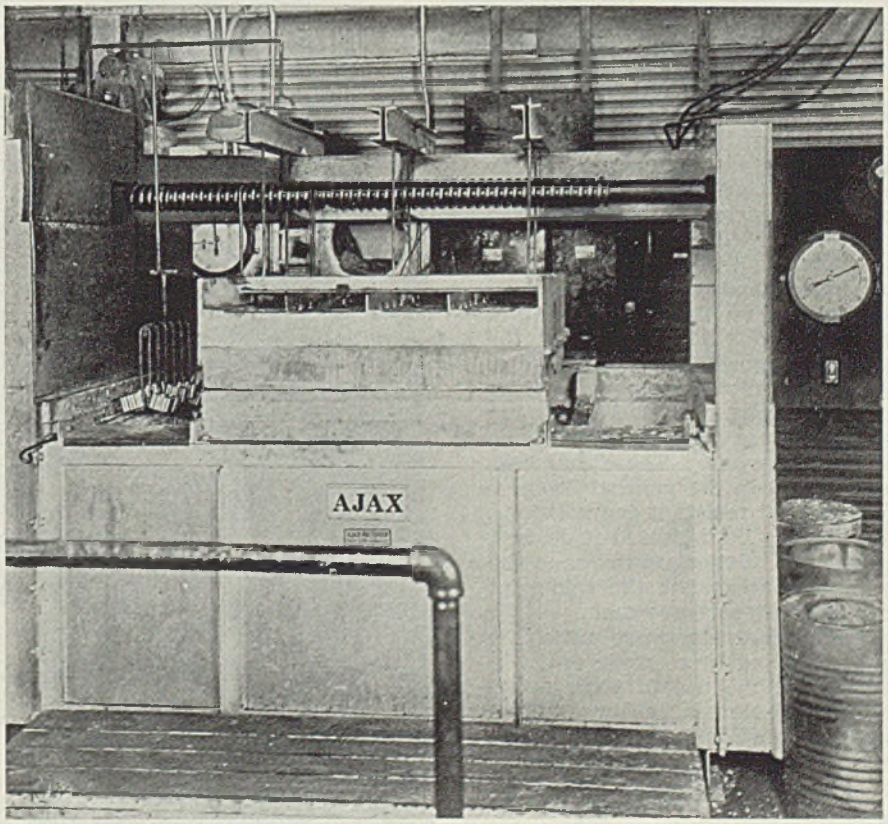
One of the latest examples of mechanized handling to be incorporated into processing equipment is the completely conveyorized salt-bath furnace shown in the accompanying illustration. Units of this type are now being furnished by Ajax Electric Co. Inc., Frankford avenue at Delaware, Philadelphia, the Philadelphia Division of Ajax Metal Co. A number of these units already are installed in key defense industries.

As the illustration shows, a slot-type cover is employed over the salt bath, this cover being suspended from an overhead structural steel support. The slot in the cover provides a space through which suspension arms reach to support the work immersed in the salt bath. The work, which consists largely of small parts such as gears shown at extreme left, is hung on racks in turn suspended from a hook hung on a screw-type conveyor extending lengthwise above the salt bath and directly above and in line with the slot in the cover. Guided by the overhead convevor, screw parts submerged in the bath travel from one end of the bath to the other as the screw rotates at a constant speed to provide a definite heat treating cycle since the speed of the screw determines the time that will elapse while the work travels the length of the bath.

The slotted cover helps to keep down the loss of heat by radiation from the bath. It is an easy matter to hold the temperature of the bath virtually constant to within a few degrees. Since the conveyor screw operates at a constant speed, set according to the heating cycle desired, both the time in the bath and temperature are under exact control, so the heating cycle itself is exceptionally uniform.

Of course the speed of travel of the work through the bath is controllable since the screw can be set to give travel rates resulting in periods from 15 to 90 minutes in the bath—the time required to traverse the 6-foot working length of the bath.

Obviously, the advantages of such a system not only include those of an automatic time-temperature cycle to which the work is subjected, but also the continuous motion of the screw allows the work to be loaded in at



Conveyorized salt bath furnace in which work is hung on racks, as at left, while racks in turn are suspended from overhead screw type conveyor which is directly above and in line with slot in furnace cover. Alarm bell can be installed to signal operator when a rack has reached end of 6-foot travel in bath and should be removed. Part of control board can be seen at extreme right. Pyrometer can be set to hold automatically temperature of bath at any point from about 300 to 2400 degrees Fahr.

one end and removed from the other on practically a continuous basis. It is easy to see how this mechanization could be utilized to tie in with the feeding and end processes to make a most efficient setup. While the particular installation shown here has the work hung and removed from the screw suspension manually, it is entirely within the realm of possibility to have these handling operations mechanized also and thus to fit the heating or heat treating operations into a continuous processing line along with other fabricating work.

The particular installation shown is utilized by a midwest automotive plant for case hardening alloy steel parts. The unit is a 90-kilowatt furnace heating an activated cyanide solution to produce case depths from 0.001 to 0.050-inch. Similar units of this same type employing the same mechanized handling feature are available for all heating and heat-treating operations throughout the range from 300 to 2400 degrees Fahr. Such processing work includes simultaneous brazing and carburizing; tempering; hardening; heat-treating the new molybdenum high-speed steel tools; annealing; brazing; and heating for forging.

Furnaces of the type shown here utilize the electrical resistance of the salt bath itself as the source of heat since the only heating element is that salt within the small area between a pair of electrodes. A step-down transformer near the control panel supplies a high amperage alternating current at from 5 to 25 volts.

Current flowing between the two electrodes produces a powerful localized heating effect that results in a continuous stirring action characteristic of these furnaces. Since any variation in temperature changes the specific gravity of the salt solution, localized treating produces powerful convection currents in the solution which agitate the bath strongly. This in turn results in the heat being rapidly and evenly dispersed throughout the molten bath, so aiding uniformity of temperature. Automatic pyrometer control operates to hold the bath accurately at any temperature desired throughout the operating range.

In the installation shown the working dimensions of the bath are 72 inches long, 20 inches wide and 20 inches deep.

Even though preceding and subsequent steps in the processing of the work may not adapt themselves to mechanized handling in a particular installation, it is still possible to obtain the important advantage of accurately controlled time-temperature cycles by means of the continuous traveling motion feature of the screw conveyor built into the bath. Where final finishing processes must be done by hand multiplied manpower is usually the answer to the demand for increased production.

Devises System To Aid Buyers of Alloys

■ Alloy Casting Institute, 39 Broadway, New York, recently adopted a standard system of designation for high nickel-chromium and straight chromium alloys. The designations cover the particular composition ranges most suitable for castings and were chosen to distinguish these alloys from those customarily used in wrought form.

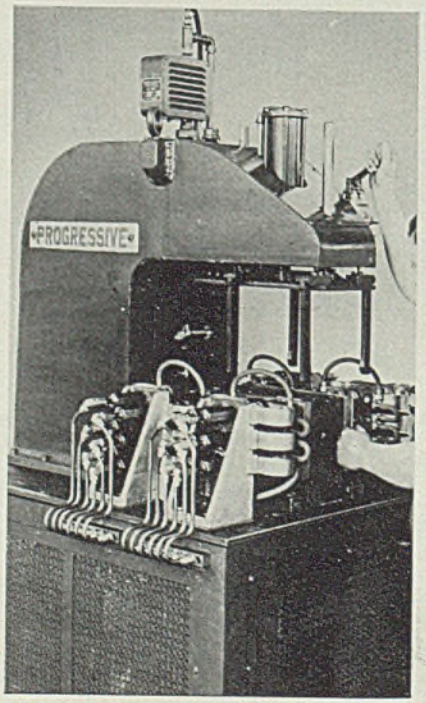
The system of designation provides a method for concise description of a specific alloy composition, and at the same time is sufficiently flexible to allow for future additions to the present list. All designations begin either with the letter "C" or "H", indicating that the alloy is corrosion resistant or heat resistant respectively. The second letter of the symbol arbitrarily represents the nickel and chromium ranges, the nickel percentages increasing in amount from "A" to "Z". In the case of corrosion resistant alloys, a number follows the first two letters and represents the maximum carbon content in hundredths of one per cent carbon. These numbers are omitted in the general designations of heat resistant compositions. Carbon may be indicated if desired, however, by adding a number to the symbol to represent the mid-point of a 10-point carbon range.

The institute does not anticipate that alloy casting producers will discontinue the use of their established trade names for these alloys, but the new designations can be used by purchasers in specifying the alloys they desire. Copies of the list of designations may be obtained from the members of the Alloy Casting Institute or from the office of the institute's headquarters in New York.

Welder Completes 180 Shell Cases per Hour

■ Shell cases for transporting loaded 25-pound shell are now being completed at one plant at rate of 180 per hour with the use of a specially designed Progressive Hydromatic welder shown in the accompanying illustration. With each case requiring 24 welds, the machine is thus producing 4320 welds per hour.

Four thousand three hundred and twenty welds, in other words, 180 shell cases per hour are completed by this hydromatic welder below



The unit is equipped with power-clamping fixture to facilitate loading and unloading. Parts for the case are dropped over and into the locating fixture, which also forms one of the electrodes. A lever is pulled down and plates come against the work under power, clamping parts securely in the fixture and against the inner electrodes. The 24 welding gun units then move in against the work, and the welding cycle starts. Operation is completely automatic from the moment the clamping action is started until the case is ready for removal.

Revised NEMA Standard Now Available

■ A revised standard entitled "NEMA Motor and Generator Standards", publication No. 41-64 which supersedes publication No. 38-49 released in 1938 is announced by the National Electrical Manufacturers Association, 155 East Forty-fourth street, New York.

This revision, according to the announcement, contains all standards which have been approved to date, covering motors and generators, including such information as standard dimensions, ratings and tests. Copies of the standard may be obtained from association headquarters for $3.50 each.

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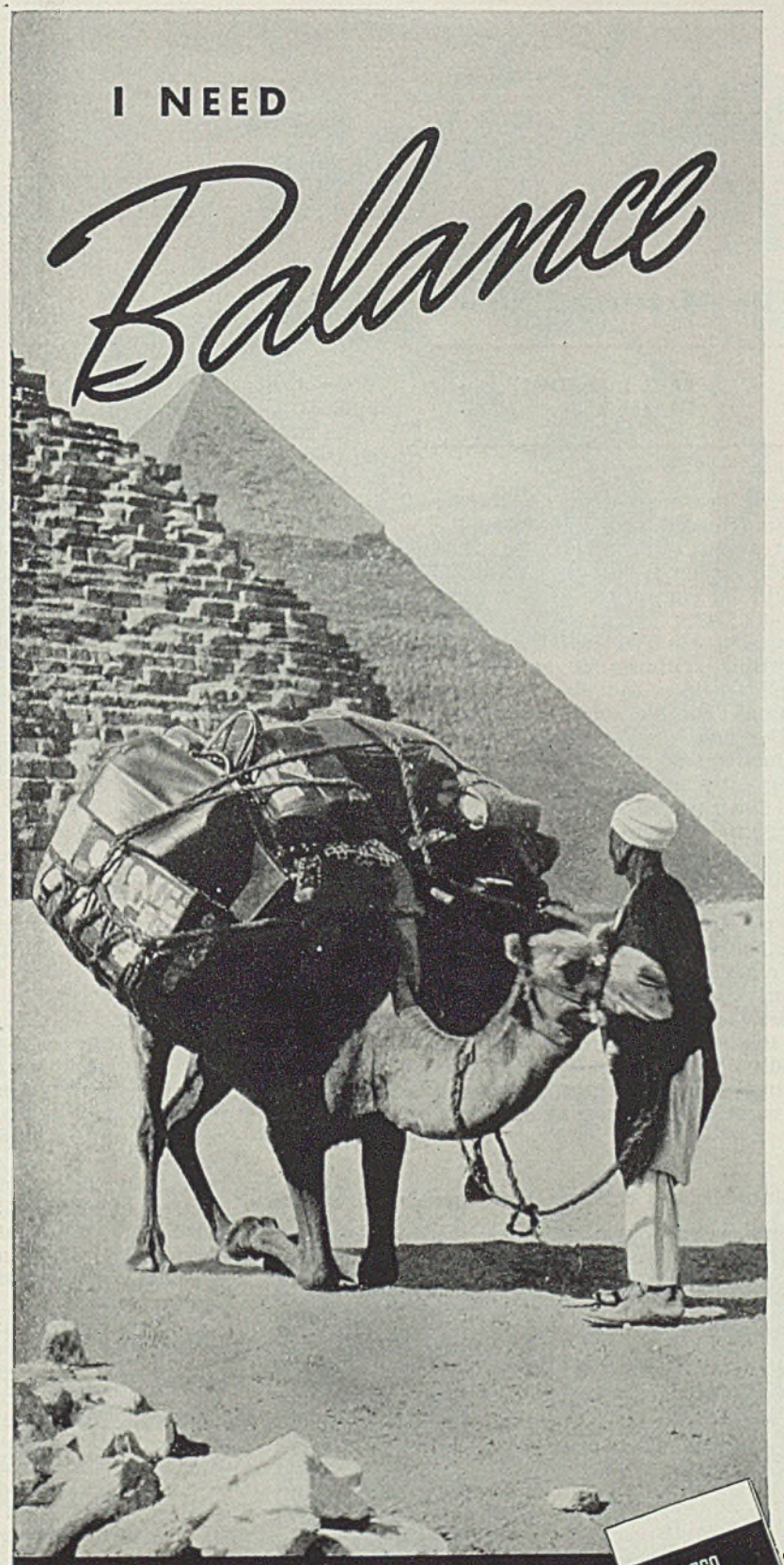
Balance



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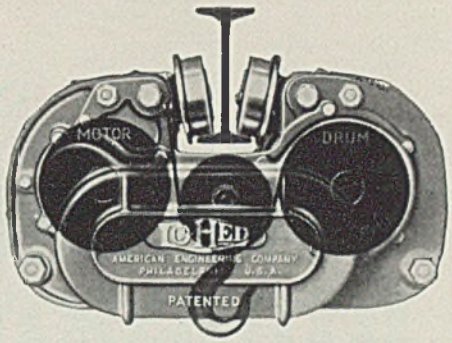

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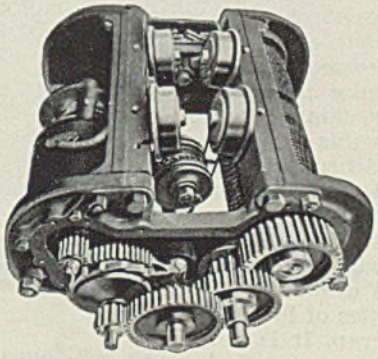

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The Melting Phase

By PAUL J. McKIMM
Cleveland, O.

REDUCTION in the time required for charging open-hearth furnaces is possible only by suitable mixing and preparation of the scrap. Charging molten iron is simple and speedy; scrap must be properly selected in order to secure the most economical charging cost. The relation between the cost of scrap per ton of ingots and the cost of charging per ton of ingots should be studied.

The charging operation should take place on a sufficiently hot hearth. If the hearth is too cold, the meltdown period and the vigorous action of the bath are prolonged and hence the bath arrives at a quiet, normal and uniform boil at a retarded stage. Then again the proper slag formation is greatly delayed, thus hindering the removal of phosphorus and also sulphur. It is further advisable to maintain a high temperature during charging. An intense flame can be maintained without damage to the furnace roof during this period because of the heat of fusion of the scrap charge. The lower the carbon content of the scrap the higher the heat required for fusion and this is far more evident today than ever before because of the use of large quantities of low-carbon scrap. It is not uncommon to find the scrap portion of the charge averaging from 0.03 to 0.06 per cent carbon.

The most usual method of charging is to place a layer of light scrap on the bottom of the hearth, say about four boxes, then all of the limestone necessary to attain a predetermined slag volume. This should be followed by the remainder of the light scrap and then the heavier grades, such as slabs and blooming mill crops. Finally the last constituent of the mix should be pig iron if used. This mode of charging is most desirable for several reasons; with an intense flame temperature the fusion of the light weight scrap takes place more rapidly which means that the total weight of scrap can be charged without interruption. A continual increasing pool of metal develops and this continues at an ever-increasing rate so that the total mass contains considerable temperature by the time the heat is ready for the molten iron charge; hence, there is a greatly accelerated speed of the melt-down period. The cold pig iron charge melts more rapidly than the scrap especially the low-carbon scrap and hence, the sooner the bath is increased in volume the sooner will the other charged materials be distributed throughout the liquifying mass.

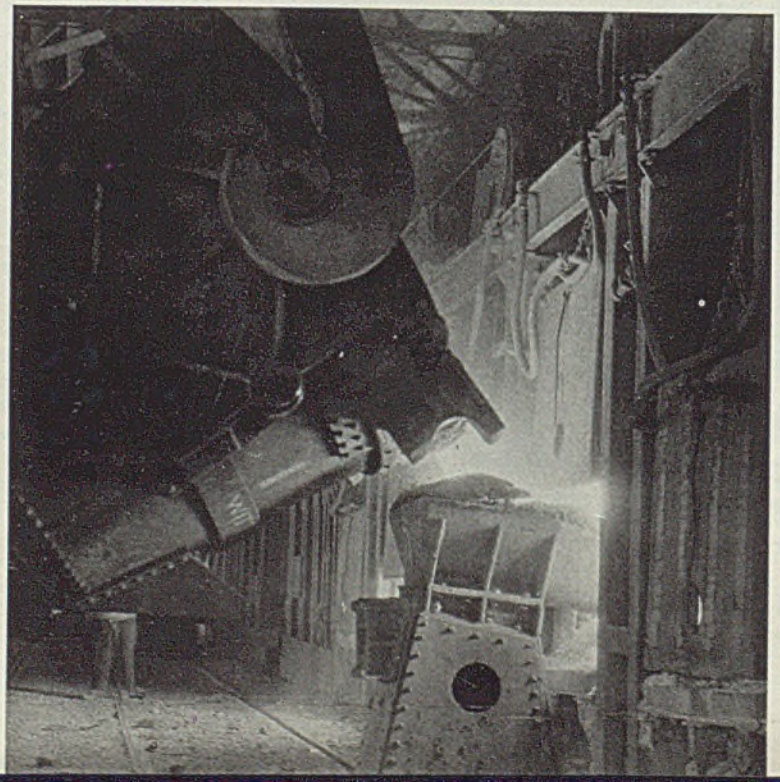
This is, by far, the most fruitful method for increasing furnace time and the bath will not decarburize so rapidly as to cause soft heats. Thus steelmaking costs are minimized at the outset rather than at the finish of the heat when the returns are small.

The art of steelmaking involves the co-ordination of the several departments and personnel such as the metallurgical, combustion and open-hearth operators. The fuel or combustion department is of vital importance inasmuch as the process and its success is primarily one of combustion. The application of given fuels, their treatment and atomization, as well as firing equipment require considerable study if a low cost is to be realized.

Influence of iron scrap ratios on the manufacture of quality steels have been evaluated by long time production of all grades of rimming, killed and alloy steels and if the practice is aligned to the respective charge of iron or scrap, identical ingot quality will result. In the manufacture of basic open-hearth ingots, pig iron and steel scrap charges vary from either 100 per cent iron to 100 per cent scrap. The usual charge, however, involves about 45 per cent iron either in pig or molten form. The quantity of iron in the charge is dependent on the availability of iron and scrap, relation of iron and scrap prices as they reflect in the ingot cost, and effect on the rate of ingot production or on special specification requirements.

General practice where hot metal is available is to charge from 30 to 70 per cent iron. The availability and market price of melting scrap balanced against the availability and cost of pig or molten iron determines the relative proportions of these two materials for open-hearth charges. The fundamental factor influencing the type of charge is that which yields the lowest cost ingot and still produces the desired quality which

Fig. 1—Charging molten iron into a 135-ton basic open-hearth furnace



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can be maintained consistently by suitable supervision and control.

Open-hearth shops are divided into two groups: Those using a charge up to 70 per cent hot metal with runoff or flush-off slag and those using a charge up to 40 per cent iron with or without the runoff slags. Few plants maintain as high as 55 per cent iron charges without a flush-off slag. The most accepted high-iron practice is to have a flush-off since the normal irons or those of varying silicon content are used. Runoff slags eliminate much of the acid constiuents, principally silica and phosphorus; this

practice also reduces slag volume in the furnace and thereby tends to establish a working condition similar to that obtained with the lower iron charges.

Different grades of scrap should be stored in such quantities that all furnaces have identical charges. By this arrangement fluxes and the general working of the heats will be more uniform, and the individual furnace operators will become more familiar with a desired procedure.

Open-hearth heats of identical quality can be produced with different types of charges. Identical factors will be used in discussing the various heats made with 60 to 65 per cent iron, 40 to 45 per cent iron and heats made with all scrap; and the ultimate cold strip that has been annealed, deoxidized and skin-passed or temper rolled, oiled and shipped. The product from these several types of charges were finally formed into the general automotive body sections such as roof panel, quarter panels, fenders, door, hood, etc.

After many years of research and experimentation there still remains the question as to whether it is possible to produce quality steels with the high-iron charge. Many producers of special grades of steel operate their open hearths on a 40 to 45 per cent iron charge when a higher iron charge would be more economical. A few years ago the writer recommended the practice of 60 to 65 per cent iron and it was severely criticized as being impractical. Some operators believed it was impossible to produce extra deep drawing autobody cold stripsheets with such a charge whereas this practice yielded consistently a product that occupied first and second place in performance throughout the industry. The charging procedure includes 60 to 65 per cent iron but in case of the steel for cold strip the following specification maintains:

Element	Per cent
Carbon	0.05 to 0.08
Manganese	0.34 to 0.42
Phosphorus	0.010
Sulphur	0.030
Nickel	0.10
Chromium	0.07
Copper	0.10

Total nickel, chromium and copper not to exceed 0.16 per cent.

Charge includes clean selected scrap and the ratio in the approximate proportion of 40 per cent hot metal and 60 per cent scrap. The sulphur in the metal does not exceed 0.35 per cent. No light or rusty scrap and no cold pig are charged.

The aim is to melt at 0.70 per cent carbon but if the heat melts under 60 per cent carbon sufficient extra hot metal or grade "A" pig iron is added to bring the carbon content of the metallic bath to 0.70 per cent, theoretically.

Enough spiegeleisen is added with initial charge to bring the manganese content of the hot metal to 1.80 per cent minimum. Limestone is added to the extent of 200 pounds per ton of ingot. No ore is charged.

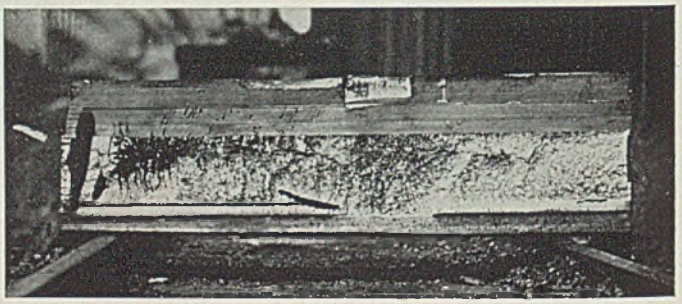
The furnace should be hot and the charge melted as rapid as possible. The time of hot metal additions is checked closely in order to avoid oxidation loss caused by adding too late or chilling the bath caused by adding too early. At the meltdown, tests are taken for carbon, manganese, phosphorus, sulphur, nickel, chromium and copper.

Manganese at the melt should be 0.30 per cent or more; if it is less then a sufficient amount of 80 per cent high-carbon manganese is added to bring the content up to 0.35 per cent.

The heat should be fairly hot during the oreing period but it should be cooled off by cutting the gas but not the air about 30 minutes before tap. The reboil should be done with 10 pounds of spiegeleisen per ton of ingots, the spiegel to be added before the carbon has dropped under 0.08 per cent. Six to eight minutes before the tap 5 pounds of low-carbon manganese per ton of ingot is added. The aim should be for a creamy slag before tap with an iron oxide content of 16 to 20 per cent.

Fig. 2—Tapping a heat of open-hearth steel showing the hot metal ladle in foreground and the slag thimble at the right. View at left

Fig. 3—Split ingot taken from a heat reboiled with 10 per cent silicon pig. Ingot fairly free of blowholes. View at right



Ladle additions should include 80 per cent ferromanganese to aim for 0.34 to 0.45 per cent manganese, and 2 pounds of bar aluminum for each per cent of iron oxide in the slag plus an arbitrary amount of 20 pounds aluminum per 120-ton heat.

The heat is poured at a temperature between 2840 and 2880 degrees Fahr. using a 1¾-inch nozzle. Aluminum is added as required for the desired rimming action and for a 2-inch drop of the ingot. The aluminum is fed as soon as a pool is formed to prevent foaming. Scum from the tops of the ingots is removed.

The foregoing practice is representative of the system which has been established by one of the largest steelmakers and the forming results of its strip are highly satisfactory. Irrespective of the cost of the charge or steelmaking procedure the steel must be made correctly and consistently with the most economical charge yielding a higher quality, lower cost steel. In fact for a number of years ingots of such quality have been made without any breaks or tears occurring during the blooming or slabbing process. The resultant slabs have been of such quality that no conditioning, chip-

ping or scarifying have been necessary.

This system is suitable for such grades of steel as open-hearth iron; low, medium and high carbons both rimming, silicon killed, and aluminum killed heats; grain controlled; and, the S. A. E. grades of alloy steels.

High-iron heats produce the highest quality of extra deep drawing cold reduced strip. Heats have an approximate charge of:

Material	Per cent
Iron	60
Scrap	32
Charge-ore	6
Alloys	2

The accompanying table shows the charges in per cent and the working of high-iron heats with several variable factors, such as heats reboiled with silicon pig and spiegeleisen, with spiegel only, with pig iron only, a group charged with approximately half limestone and half burned lime, and finally split ingots and their segregation analyses. The limestone in this series of high-iron heats incidentally was Martinsburg limestone.

The ten heats in this table are selected from a large group produced over a 5-year period using high-iron charges. A large number of heats were made according to each practice. For example, 50 heats were made using part limestone and part burned lime, several thousand with the silicon reboiled, and over 100 with the special iron-silicon-aluminum deoxidizer.

The iron taken from a 1500-ton mixer, was produced in two blast furnaces burdened with virgin ores, open-hearth slag, mill scale, and cinder but not scrap. The iron analysis was carbon, 4.00 to 4.50; manganese, 1.90 to 2.25; phosphorus, 0.350; sulphur, 0.028 to 0.078; and silicon from 0.60 to 2.00 per cent. The extreme percentage of silicon is indicative of poor iron. No effort, however, was made to improve the iron quality because the metal went to the mixer where it was mixed with more uniform metal.

Heats reboiled with silicon pig generally were inferior to those reboiled with either spiegel or pig iron because at this time the heats have little action and this addition retards it further. Heats reboiled with spiegel were generally better but it tended to retard the action somewhat because of the manganese and silicon of approximately 1.00 to 1.25 per cent. The best results for rimming action, low segregation, high yields and low rejections in all the processes were attained with the pig boil. The desired purpose was to have considerable action toward the finish of the heat. These low-carbon heats usually average in the bath around 0.03 or 0.04 per cent carbon. The aim was for an action similar to a 0.07 to 0.09 per cent carbon and apparently this condition yielded the best quality steel.

Carbon reduction other than that of the ore was accomplished in some heats with ordinary steel rods and in others by the use of poles (green saplings). The latter appeared to be more effective and created a better reaction.

Soda ash was employed for about 50 per cent of the heats and it was conclusively demonstrated that its use in the open hearth either with the charge, during the working of the heat or in the ladle had no effect either on quality or sulphur reduction. This material, however, has some value when used in the iron after it is tapped from the blast furnace and also in the mixer metal.

Rimming Action Controlled

Rimming action in the molds was controlled so that as soon as a mold was filled and the nozzle shut-off the rimming action started immediately. It is certain that any delay of this action has an ill effect on the ingot quality. If not controlled it may be retarded until after the second or even part of a third ingot is poured. If the steel is properly refined in the furnace with a suitable slag and is completely deoxidized by the addition of a few pellets to a few ounces of aluminum during the pouring of the ingots, the rimming action can be controlled. If the rimming action starts immediately the ingot top will remain about where it takes its pressure drop. After the action commences further rising or dropping ceases.

A large number of low-carbon heats were produced using the identical charge but replacing the aluminum addition to the ladle with 10 to 25 pounds of 50 per cent silicon crushed to small size. No difference between the two deoxidizers could be noted; in fact, the silicon has many possibilities as a substitute for aluminum.

As noted, the iron contained about 2 per cent manganese and it was thought that a higher percentage of this element in the charge would affect the residual manganese and also influence the cleanliness of the resultant steel. Consequently, ferromanganese was added with the charge and also at the time of the hot metal addition. The amount varied from 300 to 15,000 pounds per heat, but its use neither affected the residual manganese nor improved the cleanliness of the steel, nor had any effect on the inclusions. The residual manganese content drops rapidly during melting and

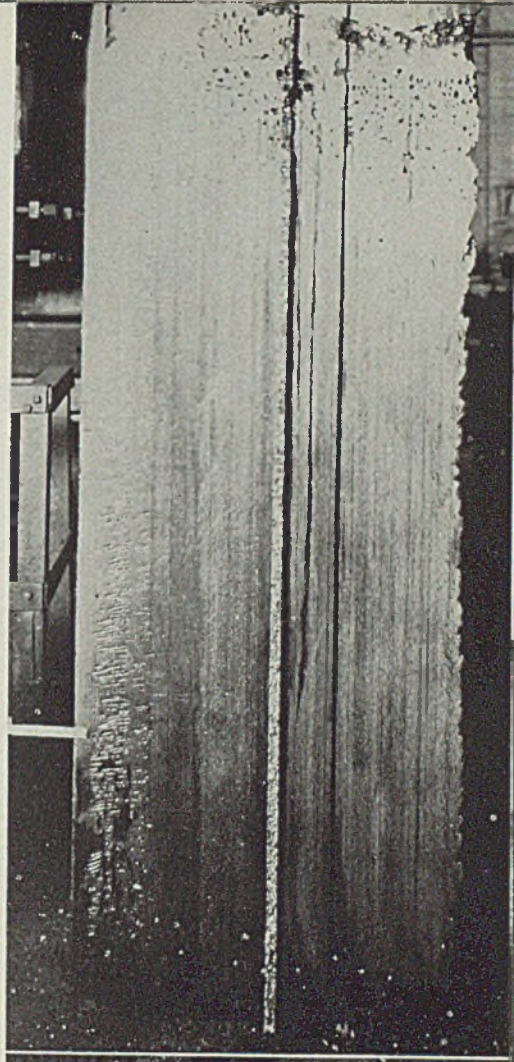


Fig. 4—Split ingot, top view, from heat, No. 9 in table. It had a rise in the mold of about 3 inches

Fig. 5—Quarter section of ingot, lower view, from heat No. 9 in table

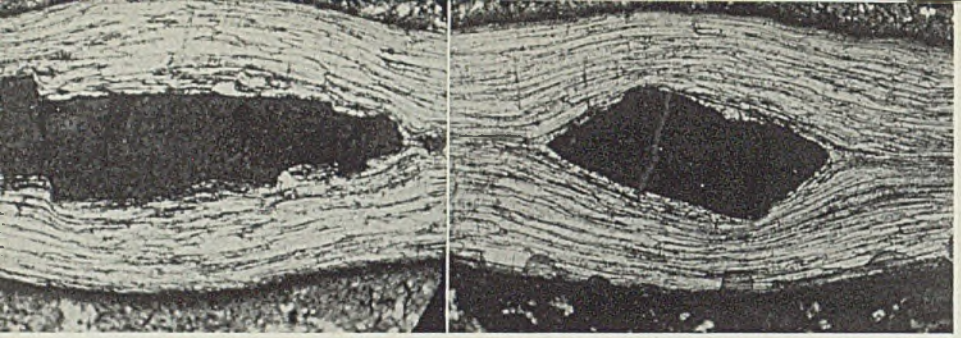


Fig. 6—Two views of blisters which contain a nonmetallic substance

then slowly, depending on conditions in the furnace, and during the last several hours of the heat it either remains constant or drops slowly a point or so. If a large decrease is incurred the heat is left in a bad condition during the finishing period; any increase in manganese in the charge is valueless. With a given manganese content in a charge where the process of steelmaking is satisfactory, the residual manganese will always be the same and the ultimate steel will be clean, practically free from inclusions and lack the usual defects such as seams, snakes, etc.

Because of the extensive increase in the past 12 years of slab ingots pouring practice has received much consideration. Scabs are attributed to splashing and many operators contend that a faster pour in the mold remelts the splash material and causes it to become a part of the ingot proper. Therefore, at several plants experiments were conducted with different size nozzles. An oval nozzle about 1¾ inches wide and 2½ inches in the long direction was employed in the hope that faster pouring would reduce scabs. It failed to do so and plants again resorted to the use of 1¾-inch nozzle. With the larger nozzle the splash was much thicker and heavier, it extended higher on the mold wall and even with a faster rise of metal in the mold the splashings did not remelt but became welded to the ingot wall. Thus rejections for scabs were far greater.

Molds formerly were coated with tar but many shops now use

(*Please turn to Page* 90)

Charging Data on Ten High-Iron Heats

(Specification: Carbon, 0.08; manganese, 0.35 to 0.45; phosphorus, 0.010; and sulphur, 0.035 per cent)

Heat number:—	1	2	3	4	5	6	7	8	9	10
CHARGE:										
Limestone, %	12.20	12.00	12.60	12.60	13.20	15.30	3.80	10.20	10.40	11.70
Burnt lime, %	.....	.....	.....	.....	.....	.....	5.30	2.60	.....	.....
Charge-ore, %	9.70	10.00	9.61	10.30	10.20	11.20	11.40	10.20	10.60	10.50
Pit scrap, %	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Skulls, %	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Crops and butts, %	56.30	62.50	74.30	.....	26.00*	.....	41.50	100.00	.....	25.60
Pressed sheets, %	.....	21.20	17.50	10.00	14.30*	.....	53.70	.....	28.50	58.90
Pipe, etc., %	.....	.....	8.00	8.70	47.40	12.90	.....	.....	.....	6.40
Loose sheets, %	3.20	.....	.....	8.50	12.10	.....	.....	.....	.....	.....
Miscellaneous, %	1.10	16.20	.....	.....	.....	42.30	4.60	.....	71.40	8.90
Plates, etc., %	.....	.....	.....	62.60	.....	44.70	.....	.....	.....	.....
Total scrap, %	41.20	37.30	38.60	38.30	36.60	37.40	42.60	39.00	34.60	36.80
Total scrap, pounds	87,000	80,000	80,700	79,800	75,200	69,700	85,600	78,900	70,000	78,000
Iron, %	57.70	62.60	61.30	61.60	63.30	62.50	57.30	60.90	65.30	63.10
Iron, pounds	24,100	134,300	128,300	128,500	129,900	116,200	115,000	123,000	132,100	133,800
Iron, silicon, %	1.13	1.15	1.30	1.50	1.22	1.33	1.04	0.94	1.10	1.42
Iron, sulphur, %	0.036	0.036	0.030	0.033	0.042	0.045	0.033	0.046	0.040	0.034
Total metallic mix, pounds	11,100	214,300	209,000	208,300	205,100	185,900	200,600	201,900	202,100	211,800
Soda ash, pounds	200	none	200	none	200	none	200	none	none	none
FURNACE PRACTICE:										
Hot iron, drink, pounds	16,000	.....	.....	.....	9,600	.....	.....	.....	.....	.....
Cold pig, pounds	.....	.....	.....	.....	.....	.....	.....	.....	2,000	.....
Ore, feed, pounds	.....	3,500	14,000	12,000	3,300	1,000	7,000	8,500	7,500	3,500
Burnt lime, pounds	.....	.....	2,000	4,000	2,000	2,000	2,000	.....	.....	4,000
Fluorspar, pounds	300	600	200	200	600	800	400	600	600	250
Rods, number	.....	1	.....	.....	5	.....	4	.....	3	.....
Poles, number	.....	.....	4	4	.....	6	.....	3	.....	8
Pig reboil, pounds	.....	.....	.....	.....	4,500	4,500	.....	.....	4,500	4,500
Spiegel, reboil, pounds	.....	1,000	1,000	1,000	.....	.....	.....	1,000	.....	.....
Silicon, 10%, reboil, pounds	300	300	.....	300	.....	.....	300	.....	.....	.....
Manganese, 85% H.C., pounds	300	600	500	.....	300	.....	500	300	.....	500
Soda ash, pounds	100	.....	.....	100	.....	100	100	.....	.....	.....
Time of heat, hours-minutes	12-10	10-45	11-05	12-40	11-20	9-45	10-30	10-55	10-10	11-45
LADLE PRACTICE:										
Manganese, 85%, H.C., pounds	600	750	150	800	500	.....	700	600	350	.....
Manganese, low carbon, pounds	.....	.....	850	.....	.....	750	.....	.....	.....	900
Soda ash, pounds	50	.....	50	.....	50	.....	50	.....	.....	.....
Aluminum, pounds	5	10	3	10	10	.....	15	22	450†	375†
Silicon, 50%, pounds	.....	.....	.....	.....	.....	10	.....	.....	.....	.....
POURING PRACTICE:										
Aluminum per mold, ounces	2	4	.....	1	.....	1	3	4	.....	1†
Mold size, inches	24 x 30	24 x 42	24 x 54	24 x 48	20 x 48	24 x 42	24 x 54	24 x 48	24 x 48	24 x 48
Nozzle, inches	2¼	1¾	2¼	1¾	2¼	1¾	2¼	1¾	2¼	1¾
Residual manganese, %	13.00	10.00	23.00	21.00	16.00	17.00	15.00	14.00	14.00	15.00
Mold action, down, inches	2	3	3	3	3	2	3	4	2	2
Mold action, up, inches	0	1	0	1	0	1	0	1	1	0
ANALYSES:										
Carbon, %	0.08	0.06	0.06	0.09	0.07	0.09	0.07	0.08	0.08	0.06
Manganese, %	0.34	0.41	0.42	0.41	0.42	0.34	0.29	0.34	0.38	0.33
Phosphorus, %	0.008	0.007	0.013	0.010	0.009	0.009	0.015	0.012	0.015	0.010
Sulphur, %	0.034	0.031	0.038	0.040	0.030	0.037	0.034	0.031	0.040	0.034
Silicon, %	0.008	0.005	0.007	0.005	0.008	0.005	0.008	.....	.....	.....
Copper, %	0.08	0.05	trace	0.03	0.04	0.05	0.06	.....	.....	.....
Chromium, %	0.04	trace	trace	trace	trace	0.03	trace	.....	.....	.....
Nickel, %	0.05	trace	trace	trace	trace	0.03	trace	.....	.....	.....
Tin, %	trace	trace	trace	trace	.024	0.013	trace	.....	.....	.....
SLAG:										
FeO, %	12.50	15.00	17.50	14.70	16.50	14.00	14.80	16.90	.....	.....
SiO_2, %	14.70	13.56	11.49	11.42	15.06	14.52	14.06	14.95	.....	.....
P_2O_5, %	1.628	1.22	1.410	1.424	1.116	1.132	1.432	1.588	.....	.....
Al_2O_3, %	2.56	2.81	2.94	2.73	2.95	2.10	3.27	2.36	.....	.....
CaO, %	46.89	46.75	44.08	48.73	44.04	46.59	43.28	42.43	.....	.....
MnO, %	7.64	5.28	6.88	5.96	5.38	5.12	7.16	6.60	.....	.....
S, %	0.247	0.254	0.322	0.281	0.213	0.282	0.233	0.240	.....	.....
MgO, %	5.76	6.88	6.24	6.32	6.88	8.83	7.20	6.08	.....	.....

*Detinned scrap. †Heats Nos. 9 and 10 were treated with special deoxidizer composed of 40 per cent iron, 40 per cent silicon and 20 per cent aluminum. To No. 9 heat there was added 450 pounds to the ladle and none to the molds; No. 10 heat received 375 pounds in the ladle and 1 pound to each ingot.

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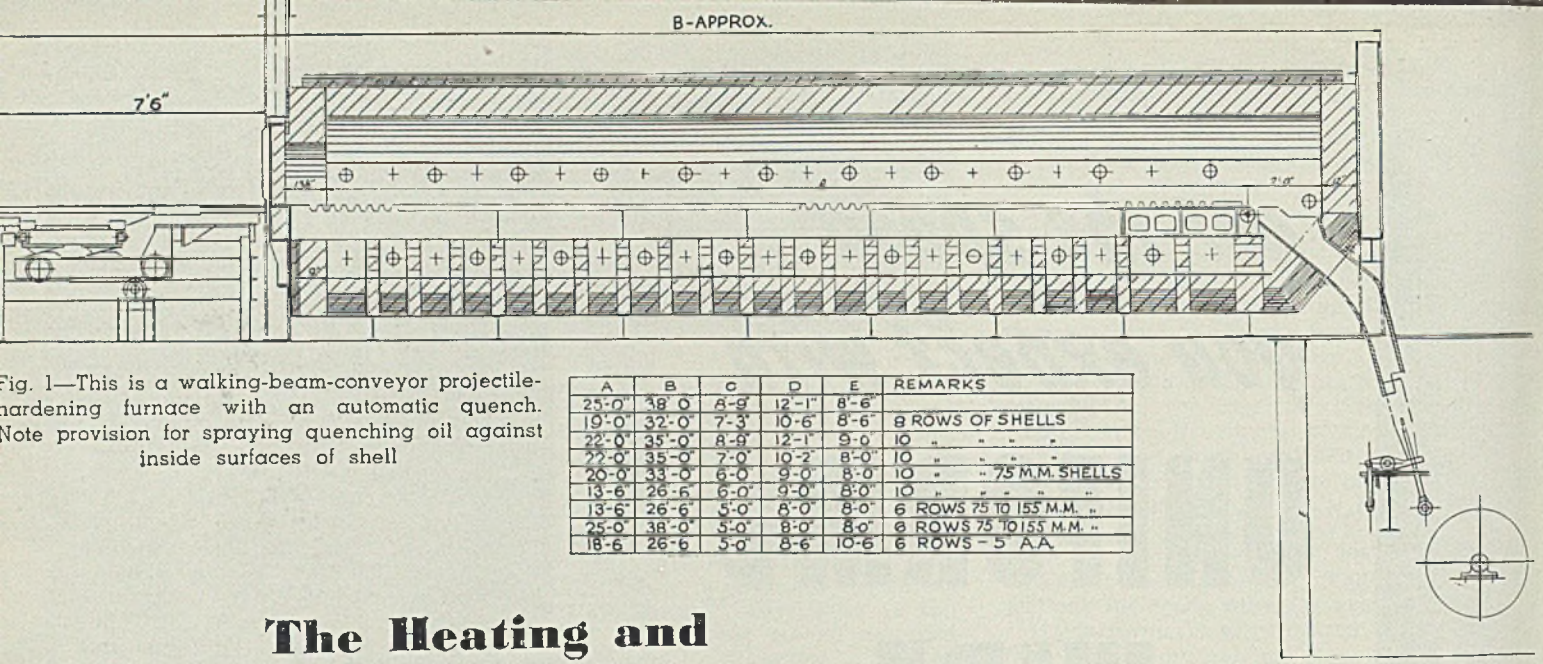


Fig. 1—This is a walking-beam-conveyor projectile-hardening furnace with an automatic quench. Note provision for spraying quenching oil against inside surfaces of shell

A	B	C	D	E	REMARKS
25-0"	38-0	8-9"	12-1"	8'-6"	
19'-0"	32'-0"	7'-3"	10-6"	8'-6"	8 ROWS OF SHELLS
22'-0"	35'-0"	8'-9"	12'-1"	9'-0	10 " " " "
22'-0"	35'-0"	7'-0"	10'-2"	8'-0"	10 " " " "
20'-0"	33'-0"	6'-0	9'-0"	8'-0	10 " " 75 M.M. SHELLS
13'-6"	26'-6"	6'-0"	9'-0"	8'-0"	10 " " " " "
13'-6"	26'-6"	5'-0"	8'-0"	8'-0"	6 ROWS 75 TO 155 M.M. "
25'-0"	38'-0"	5'-0"	8'-0"	8'-0"	6 ROWS 75 TO 155 M.M. "
18'-6	26'-6	5'-0"	8'-6	10'-6	6 ROWS - 5" A.A.

The Heating and HEAT TREATMENT of ORDNANCE

Section II—Projectile Normalizing, Hardening and Drawing

Here Mr. Hepburn continues his discussion on practices and equipment for heat treating projectiles. First article in this series, STEEL, Sept. 15, 1941, p. 72, was devoted to forging, nosing and tapering projectiles. Third in the series will be on operations involved in making shell and cartridge cases

By W. M. HEPBURN
Vice President in Charge of Engineering
Surface Combustion Corp.
Toledo, O.

AFTER being formed, the projectile is frequently given a heat treatment of some kind. Sometimes this is simply a normalizing operation in which it is heated to a temperature in the neighborhood of 1800 degrees Fahr. and then allowed to cool in air. Usually this operation does not involve an air quench—cooling the work rapidly by playing a blast of air on it. On the other hand, often steps are taken to retard the cooling rate, and sometimes in special cases parts are cooled very slowly.

Normalizing: Some of the steels used will respond to such a procedure and will require no further treatment to render them fit for service. However, certain other steels will not meet the required physical specifications when given this treatment. In these cases it becomes necessary to employ a more elaborate heat treatment which usually involves a hardening, quenching and drawing sequence. The furnaces for normalizing are common pusher or car-type furnaces of simple design.

Hardening consists in heating the projectiles to a temperature of approximately 1600 degrees Fahr. and quenching in oil. By means of an internal spray, the cavity is quenched as well as the outer surface. Furnaces for this purpose include walking beam, pusher, rotary and conveyor types.

Walking Beam: A popular furnace for hardening projectiles is a walking-beam type in which a number of rows of projectiles are stepped along progressively through the furnace to the discharge chute. From here they drop onto a mechanism which catches them and automatically quenches them by spraying oil against the inside and outside surfaces of the projectiles, after which the piece is dropped to a conveyor which elevates it out of the quench tank. By quenching projectiles from the inside, they are made to attain maximum hardness at this point.

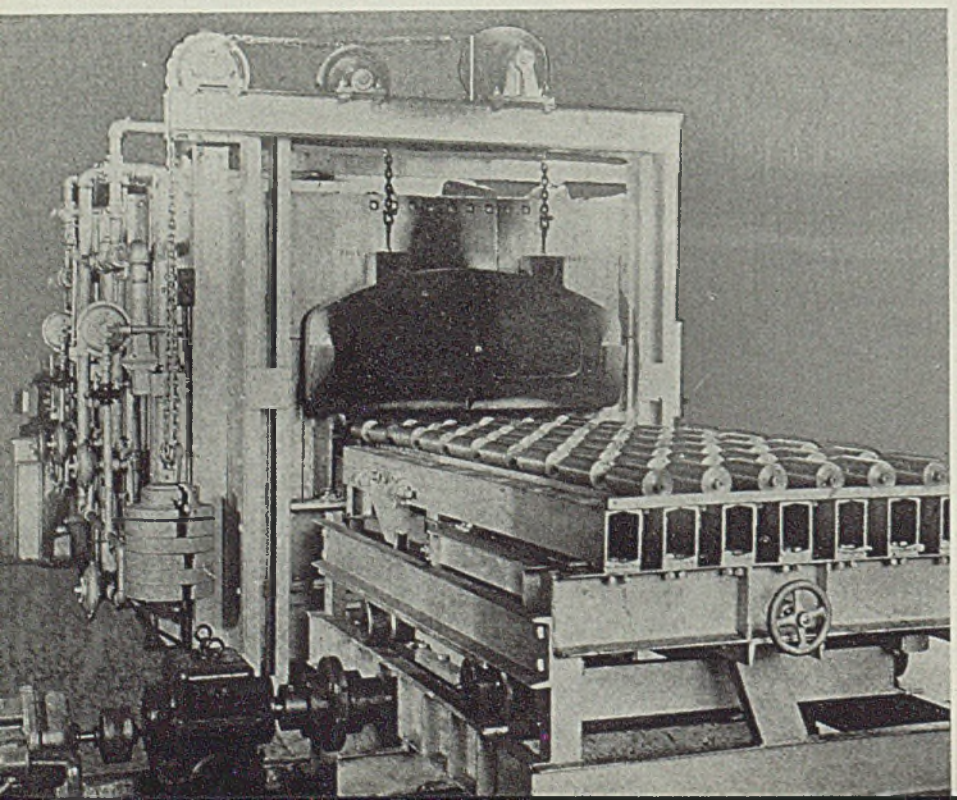
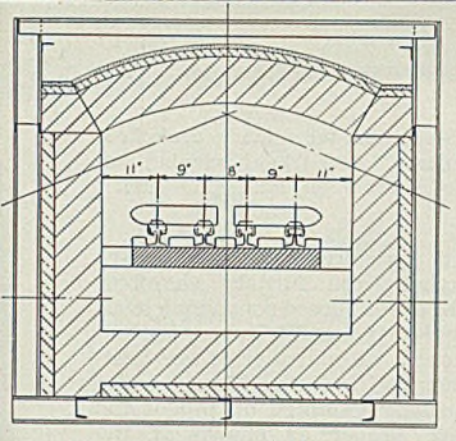
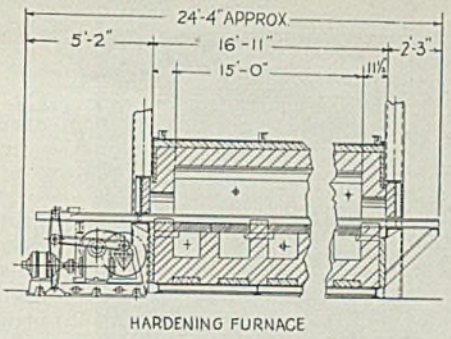


Fig. 2—Loading end of walking-beam projectile-hardening unit shown diagrammatically in Fig. 1





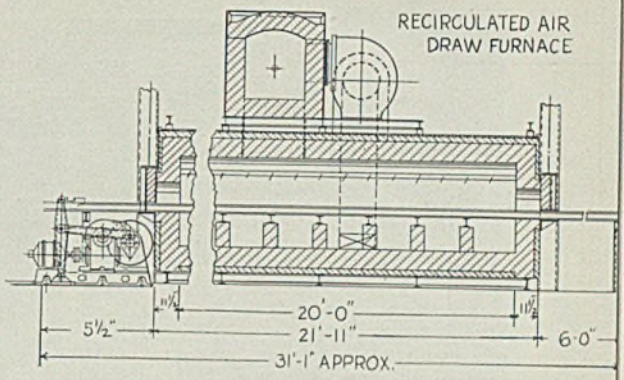


Fig. 3—Left, above, is pusher-type hardening furnace; burners over and underfire the work. Projectiles rest on racks which are pushed through the furnace on rails as shown in cross section view. After being hand quenched, work is loaded into recirculated-air draw furnace at right, being handled here on racks pushed on rails as in hardening unit

This has been found to be a desirable practice.

The walking-beam mechanism consists of a series of heat-resisting alloy rails, usually six, eight or ten in number, which extend longitudinally through the furnace and convey the projectiles with the open end forward. The furnace is fully automatic, the different operations being controlled electrically. The unit is direct-fired by burners mounted above and below the work. These are adjusted in such a way as to maintain within the furnace chamber a kind of atmosphere that will hold scaling of the work to a minimum. The inside of the projectiles remains reasonably clean and much of the scale formed on the outside is removed by the quenching operation.

Fig. 1 is a drawing of a furnace of this type for handling ten rows of projectiles through the furnace simultaneously. Fig. 2 shows one of these furnaces installed. Note how projectiles are placed on hearth in rows. Fig. 2, of course, shows loading end. Discharge is directly into quench.

Pusher Type: Various types of pusher furnaces are used also for work of this kind. Fig. 3 shows one type. Here the projectiles are loaded on trays which ride on rails that extend throughout the furnace length. The projectiles are removed by hand at the discharge end of the furnace and quenched individually.

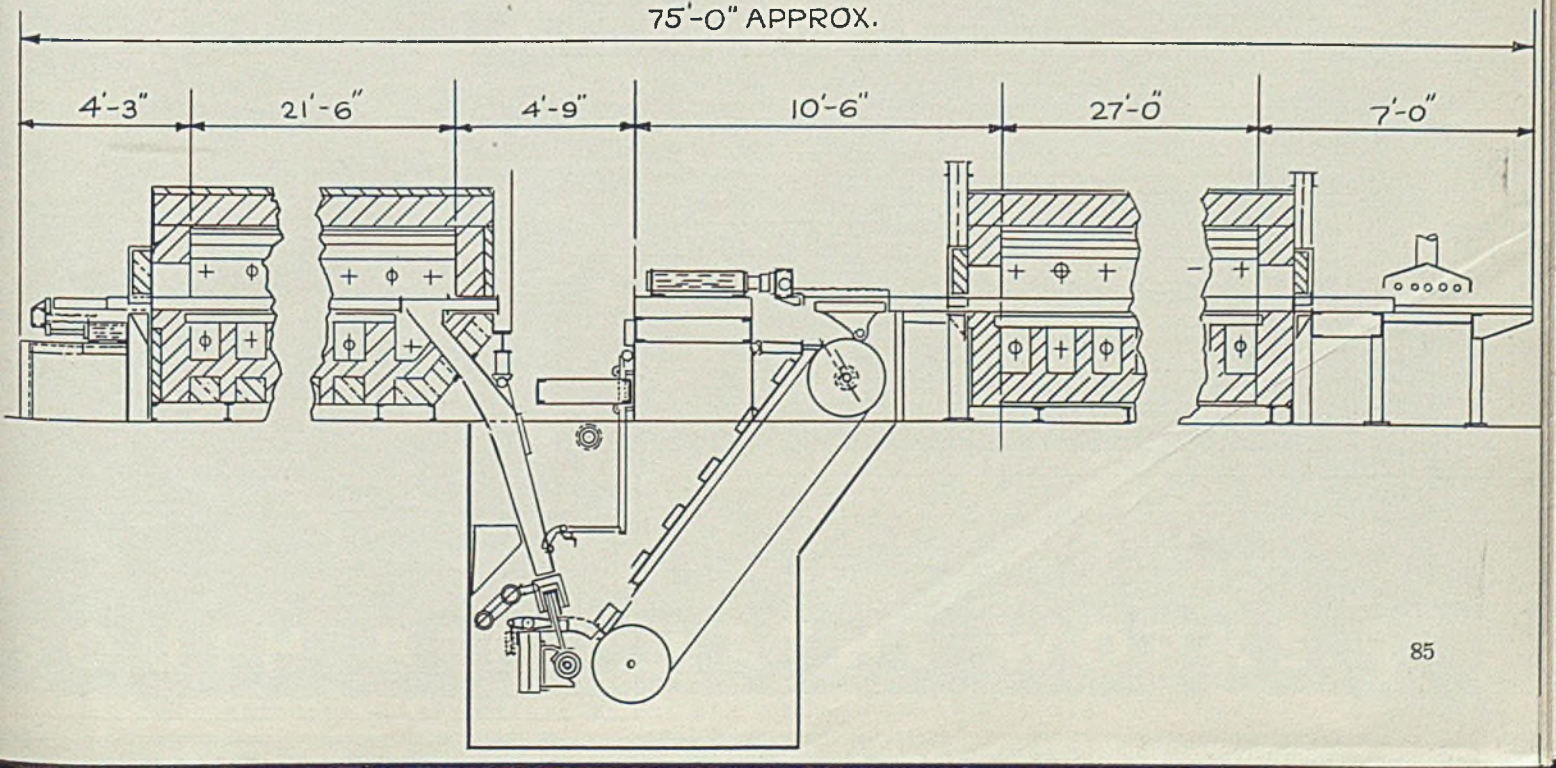
Fig. 4 shows another type of pusher furnace for projectiles. This illustration shows the draw furnace also. In this type of hardening furnace the projectiles are pushed through alloy tubes which also serve as muffles and thus permit the use of a protective nonscaling atmosphere, if desired. Like the walking-beam furnace shown in Figs. 1 and 2, this furnace can also be equipped with an entirely automatic quench. The 10-tube unit as shown has a capacity of approximately 200 three-inch anti-aircraft shell per hour.

Rotary Furnaces: Some manufacturers prefer the rotary-hearth furnace for hardening projectiles. These may be either direct-fired or heated by means of radiant tubes for use with a prepared atmosphere. Compared with straight through continuous furnaces, rotary hearth furnaces possess two distinct advantages. First, the projectiles are loaded directly on the revolving hearth and hence, no special moving metallic conveyor is required. However, the pusher-type furnace has this same advantage. Second, rotary furnaces generally require only one operator compared with two for most other types of continuous furnaces.

On the other hand, the projectiles must be transferred manually from the furnace to the quench tank and then to the draw furnace.

Depending on the diameter and, therefore, the capacity, these furnaces are built either in the shape of a "pancake" or "doughnut", the larger furnaces being doughnut shaped. There are usually two doors, one for loading the projec-

Fig. 4—Here the projectiles are pushed through alloy tubes which not only guide the work but also serve as muffles to protect the work from furnace gases during treatment. This unit handles 200 three-inch anti-aircraft shell per hour. These are hardened in unit at left, discharged into automatic quench, lifted out by conveyor and fed into draw furnace at right



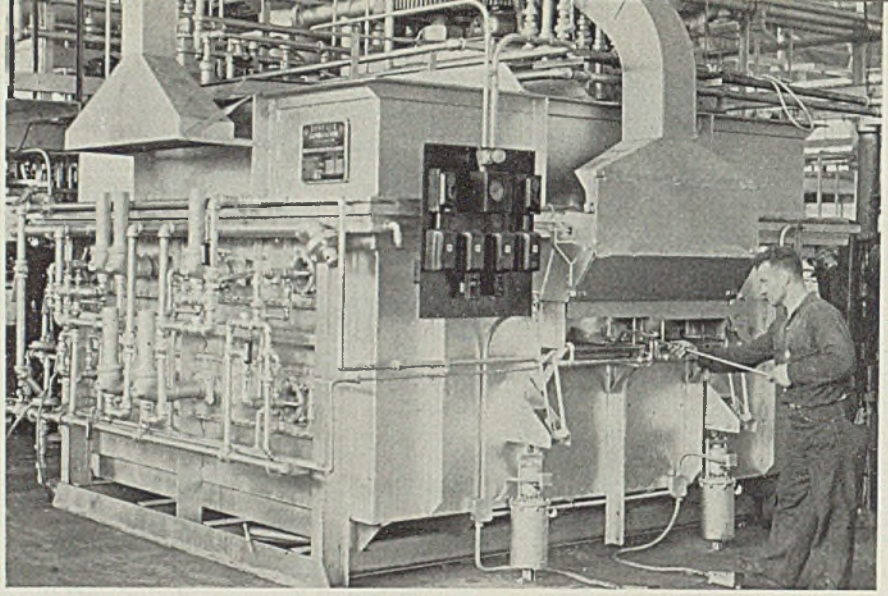


Fig. 5—Radiant-tube fired, controlled-atmosphere rotary-type hardening furnace suitable for hardening shell

tiles and the other for unloading. Fig. 5 shows a radiant-tube controlled-atmosphere rotary furnace.

In some cases, it is desirable to prevent scale formation during the hardening operation. In order to do this and to obtain work that is clean, it is necessary to employ a special atmosphere which is impossible to obtain by means of burner regulation. Consequently this steel must be heated out of contact with combustion products in an atmosphere especially prepared to prevent scale formation and to protect the steel from decarburization. The tube muffle furnace shown in Fig. 4 or the radiant-tube type furnace, Fig. 5, is well suited for work of this kind. In this way, the special atmosphere may be used to full advantage without danger of contamination by the products of combustion.

Conveyor Type: Fig. 6 shows a radiant-tube furnace especially designed for clean hardening projectiles. This is a continuous belt-type furnace with the belt completely enclosed within the furnace chamber. In this way, it is kept hot at all times and consequently does not retard the heating rate of the projectiles which it serves to convey through the furnace. The work is loaded onto the conveyor by a pusher mechanism. As shown in Fig. 6, the projectiles discharge directly into the oil quench without contacting the air. A conveyor lifts the projectiles out of the quench tank. Any one of several atmospheres may be used to protect the projectiles within the heating chamber, the choice depending upon the degree of protection required. As a rule, some kind of atmosphere prepared from charcoal and containing a high percentage of carbon monoxide is best suited for this purpose.

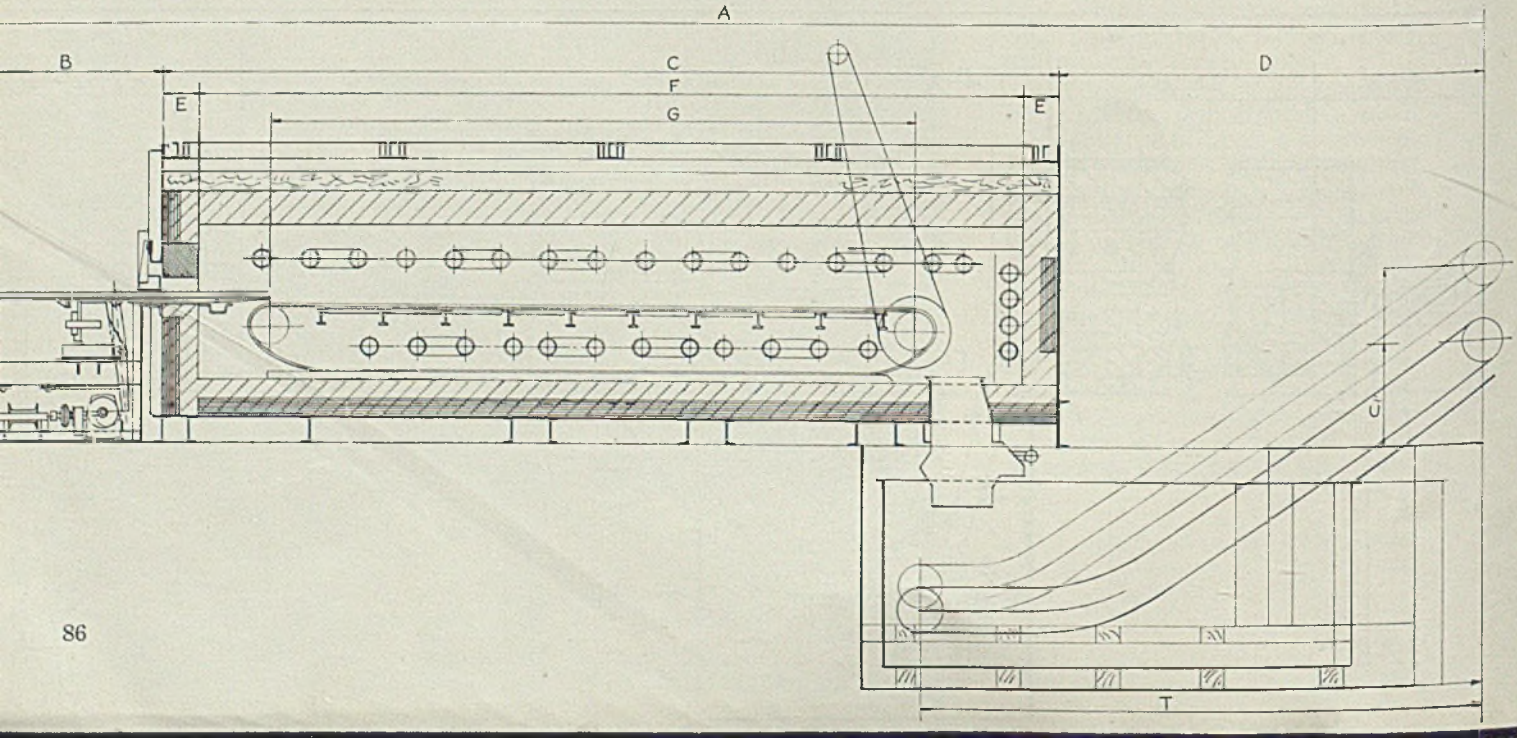
Draw Furnaces: After hardening, it is necessary to temper the projectiles by drawing in another furnace that is heated usually to a temperature of approximately 1100 degrees Fahr. A walking-beam type of furnace is frequently used for this work. This is similar in design to that shown in Fig. 1 with the important difference that the work is heated by circulating hot gases throughout the furnace chamber. This so-called forced-convection heating makes it possible to temper the projectiles without fear of overheating them. The fan and heater units are usually mounted on top of the furnace proper as shown at the right in Fig. 3, which represents a pusher-type air-draw furnace.

It is frequently desirable to combine the hardening and drawing operation in two units whose movements are synchronized with each other so that the whole operation becomes fully automatic. Such a scheme is shown in Fig. 4 where the projectiles are pushed through the muffle tubes, automatically discharged into the quench tank where they are individually quenched and placed on a conveyor which raises them from the quench tank and deposits them on the feed table where another pusher carries them through the draw furnace where they are raised to the desired temperature for drawing. If desirable, the tubes can be extended on beyond the draw furnace to permit cooling of the projectiles beyond the oxidation temperature. Of course, walking-beam forced-convection draw furnace can also be utilized for the draw. In this way, the entire operation is fully automatic, the projectiles are subjected to a very precise heat treatment and a high degree of uniformity is maintained in the resulting product.

The combination of walking-beam hardening and draw furnaces with

(*Please turn to Page* 91)

Fig. 6—Continuous belt-type furnace, lower view, for hardening projectiles without scaling: Working chamber is fed with protective atmosphere. Heating is by radiant tubes. Belt is completely enclosed in working chamber



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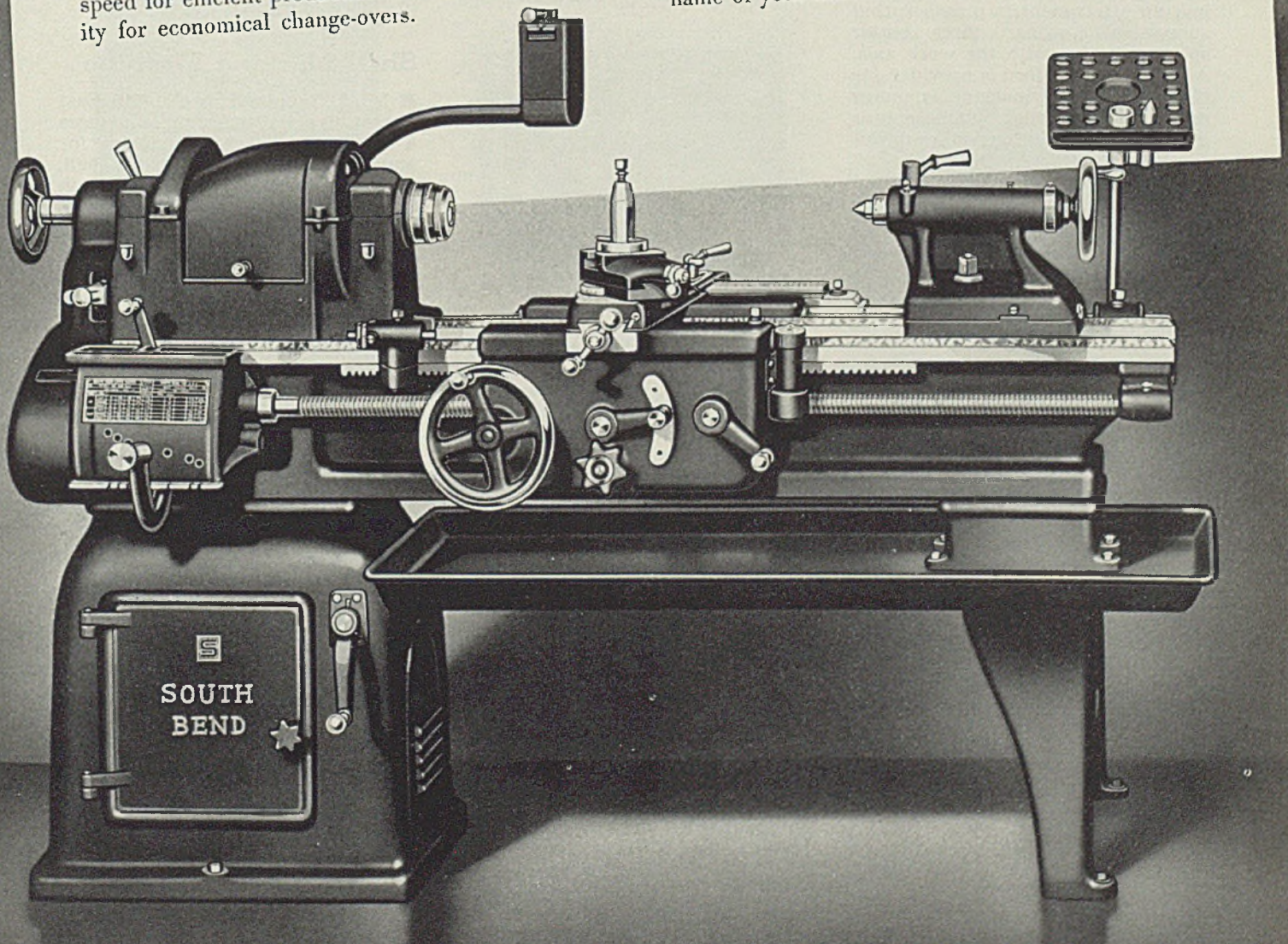

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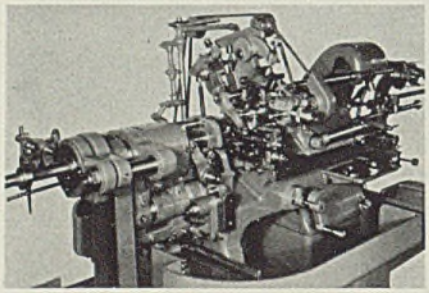
Industrial

Screw Machine

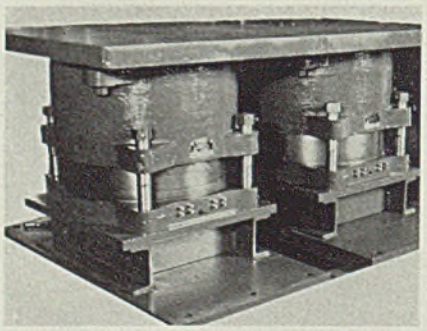
■ Triplex Machine Tool Co., 125 Barclay street, New York, has placed on the market an American built automatic screw machine of Swiss origin. Having a capacity for ⅝-inch round stock, it is of the single spindle type in which stock is fed forward through an adjustable guide bushing while it is being acted upon by radially disposed tools. The machine's four tool-



slides for turning, forming and cutting off are placed immediately ahead of the guide bushing so that accuracy is maintained regardless of the turning length. For spot centering, drilling and right-hand threading, an attachment is provided that successively swings three cutter spindles in line with the work axis. A separate axial feed is provided for these tools. The machine is motor driven, and provides spindle speeds up to 6100 revolutions per minute.

Die Cushions

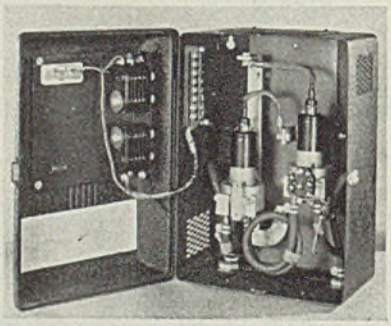
■ Dayton Rogers Mfg. Co., 2830 Thirteenth avenue, South, Minneapolis, has introduced a new heavy-duty model 2C multiple mounting pneumatic die cushion for large, straight side presses for drawing and forming such parts as table tops, stove tops, refrigerator sections and automobile body doors. Self-contained and carrying its own



surge tank, it is made in sizes up to and including 24 inches. The die cushion also can be furnished in multiples of two, four or six, having maximum ring holding pressure up to and including 10 inches. Each cushion installation is supplied with a combination regulating reducing valve and pressure gage to retain the correct draw ring holding pressure and pressure pad control throughout the work cycle. The working pressure is recorded at all times.

Welding Contactor

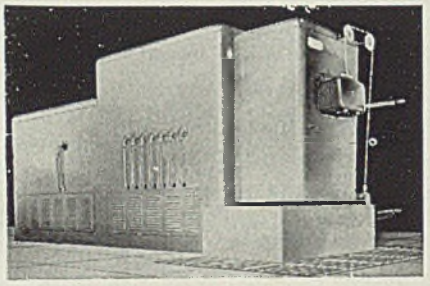
■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., announces a new 150 ampere SW Weld-O-Trol for use with timing facilities as used in spot welders. For spot welding applications it is rated equivalent to a size 2-W mechanical contactor at 220 or 440 volts, 50/60 cycles. It handles welding current at a high rate of interruption by means of two heavy-duty



water-cooled ignitron tubes. These are held by water-cooled clamps made of copper tubing cast in heat conducting alloy. A thermostat mounted on the cooling clamps protects the tubes against high temperatures caused by failure in the water supply. The unit is readily adapted for use with heat control and either synchronous or nonsynchronous weld timers including sequencing equipment.

Atmosphere Furnace

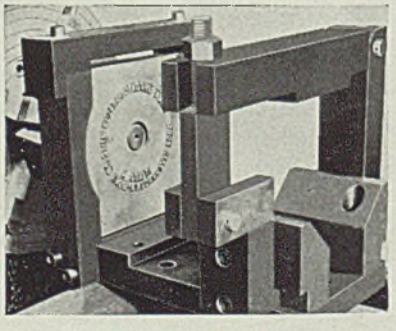
■ Lithium Corp., Raymond-Commerce building, Newark, N. J., announces a new Lithcarb atmosphere furnace, embodying the use of a Lithco compound which neutralizes scaling and decarburizing reactions. Completely automatic, the furnace is said to cut carburizing time to approximately one third the usual time. It has a temperature range of 1200 to 1800 degrees Fahr. Measuring 46 x 70 inches by 10 feet 6 inches, its shell is welded into one piece. No atmosphere adjustments are necessary or provided on the unit. A carrier gas generated within the furnace entrains the vapor evolving continuously from the car-



tridge refill, the work being bathed in this atmosphere.

Shell Marking Machine

■ M. E. Cunningham Co., 115 East Carson street, Pittsburgh, announces a No. 2 shell marking machine for stamping the bases of finished shell. It can be placed into any production line, and can be furnished as a complete motor-driven unit or as a fixture for setting up on any ordinary lathe. The motor-driven machine is constructed with a rotating head similar to a lathe with drive coming direct from a specially set up motor. The shell is held in place by a steel clamp, and pressure to force shell against type is gained



through a tail stock attachment. Each character is driven into the shell separately, therefore there is no great pressure or shock necessary to get a deep, clear impression. The attachment for the lathe is very similar to the complete unit except that the stamping and clamp fixture is set up on the bed of the lathe and the rotating head is fitted into the lathe chuck. The machine

Equipment

is available for any size shell, and the type holder can be made for any required setup.

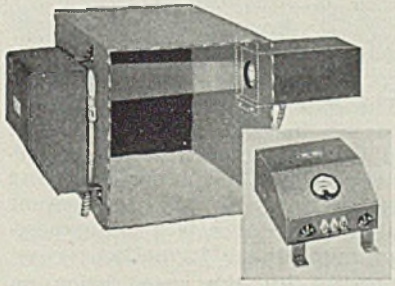
Multi-Breaker

■ Cutler-Hammer Inc., 315 North Twelfth street, Milwaukee, has placed on the market a new 230-volt industrial multi-breaker which affords economical application as a motor circuit or service disconnect switch. It is fuseless, with bi-metallic strip actuation, visible trip in-

dication and trip free lever. Of the quick make and quick break type, it has a rated capacity of 230 volts from 15 to 100 amperes, and is available in 3-pole, 3-pole solid neutral or 4-pole solid neutral types. The breaker is completely enclosed and semidust-tight.

Smoke Indicator

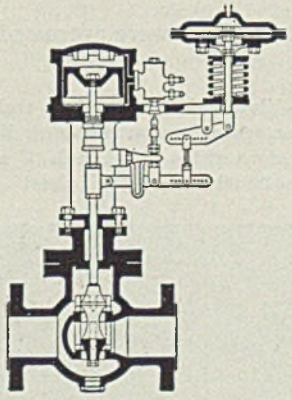
■ Rehtron Corp., 2159 Magnolia avenue, Chicago, has placed on the market two new photoelectric smoke indication and elimination control robots for warning fireman of incomplete combustion. They are easily installed and are applicable to any type and size boiler. Both operate on 115-volt alternating or direct current. One unit, the model SC-301, continuously indicates smoke density in breeching or stack and provides for an immediate bell or light signal when smoke exceeds the maximum allowable density. The other, model SC-302, incorporates all features of model SC-301 plus full automatic control for magnetic solenoid valve or



blower motor supplying steam and air to over-fire jets. Adjustable time-delay on load circuit insures correct amount of steam and air to mix with unburned gases and supply oxygen deficiency which causes smoke to burn in the fire-box. This installation may permit using a cheaper grade fuel without loss of boiler efficiency.

Pressure Reducing Valve

■ Northern Equipment Co., Erie, Pa., announces an improved Copes type R-DSLH pressure reducing valve, a relay-operated unit used for remote control from a master controller where the controlled pressure is to be constant between 15



and 250 pounds per square inch gage. The actuating element is a reinforced rubber diaphragm with a mean effective area of 41 square inches. One side of the diaphragm is open to the atmosphere. The other side is subjected to the operating pressure from the pilot of the master control. This is counterbalanced by a spring selected to maintain the controlled pressure within the specified limits. The spring is quickly and easily adjusted for desired conditions. Any change in the pressure from the master control pilot causes the diaphragm to move. The movement is transmitted through an adjustable shaft extension and floating lever to the pilot valve of the relay operator. This changes the pressure on one side of the operating cylinder, moving the valve in the opposite direction until the pilot is reset by the floating lever, one end of which is attached to the reducing valve stem.

Rubber Micrometer

■ Instrument Specialties Co. Inc., 245 Bergen boulevard, Little Falls, N. J.., announces a Carson rubber micrometer for measuring soft or compressible materials. It consists of a precision micrometer head fitted with a large diameter dial and mounted in a rigid frame. When the micrometer tip is brought into contact with a metallic rider resting upon the work, exact instant of contact is indicated by a green light before any pressure is exerted

on the piece being measured. This is brought about by a special electronic circuit operating on a new "currentless contact" principle, sensitive to displacements as small as five millionths of an inch. The instrument is available with a variety of special fittings and attachments for specific measuring problems on such materials as rubber, paper, plastics, cork, fiber, leather, felt, insulated wire and textile. It is available with either of two standard dials, a 2½-inch diameter dial with divisions for every 0.0010-inch and a 4½-inch diameter dial with divisions for every 0.00005-inch. The complete instrument with attachments is stored in a compartment in the cabinet containing the electronic unit and control panel. The unit is portable and operates from any 110-volt 60-cycle current supply.

High-Quality Steel

(*Continued from Page 82*)

graphite. The graphite is mixed with a small percentage of a binder in order to keep it in solution so that the mold wall actually receives a coating, and also to control the hardness of the coating. Experiments must be made to secure the proper hardness to meet individual plant conditions; if too hard the material will cake onto the mold walls and decrease the life of the mold.

Fig. 3 shows a split ingot taken from a heat reboiled with 10 per cent silicon pig. The ingot had a fairly good wall, and was free of honey-combed blowholes as well as the usual run of blowholes that extend in from the ingot wall.

Fig. 4 shows a split ingot from heat No. 9 in the table. This is far from an ideal ingot because it had a rise in the mold approximately 3 inches. If this extra metal had been in the ingot proper an extremely sound ingot would have resulted. However, it had a full yield into slabs and no loss for rejections occurred. A quarter section of this same ingot is shown in Fig. 5.

Try To Determine Effects

Heats Nos. 9 and 10, which were treated with a material containing 40 per cent silicon, 40 aluminum and 20 iron are representative of 100 heats so treated or deoxidized. The purpose of using an excessive amount of the deoxidizer was to determine the effects of such a compounded material on the steel quality. The specification called for tin mill enamel stock with a content of 0.05 per cent silicon or less and with deoxidation completed with aluminum in the mold. The ultimate results in pickling the formed utensils or during the baking of the enamel on them was disastrous. Rejections were extremely high and efforts to change to a more satisfactory analysis were unsuccessful.

Most of the steel was processed into all grades of hand-mill sheets such as tin mill enamel, tin plate, black sheets, black sheets for galvanizing, milk can stock, etc. The defects were so extensive per sheet that diversion from primes to seconds and to wasters amounted from 20 to 100 per cent per heat. The defects were practically all due to seams and blisters.

The blisters instead of being the usual void area resulting from blowholes or small laminations contained a nonmetallic substance. Fig. 6 shows the grainy material imbedded within the section causing the blisters. An attempt to identify this material by differential etching was not successful. Chemical analyses, however, disclosed some information.

	——Defects in Steel——		
Element	Minimum	Small	Large
Carbon, %	0.08	....	....
Manganese, %..	0.41	0.73	1.35
Phosphorus, %.	0.088	....	....
Sulphur, %.....	0.061	0.066	0.084
Silicon, %.....	0.03	0.23	0.49

The quantity of the sample was so small in each case that carbon and phosphorus could not be determined. Between microscopic and chemical analyses it seems apparent that the substance is a manganese-aluminum-silicate formation.

Incidentally, the specification on the tin mill enamel stock was changed to a higher silicon and no further trouble occurred. A standard processed heat was made by replacing some of the 50 per cent silicon with 100 pounds of the Fe-Si-Al product (40 pounds = 80 pounds of the 50 per cent Si), to determine whether this small amount would produce defective steel and to learn whether it might be employed in small amounts to replace aluminum as a deoxidizer for rimming steels. Only a few ingots were processed for this requirement and the results were not satisfactory. About 40 per cent of the resultant work was lost either after pickling or after baking. The blisters, however, were more minute but in each instance they contain a nonmetallic substance.

Several ingots were processed into

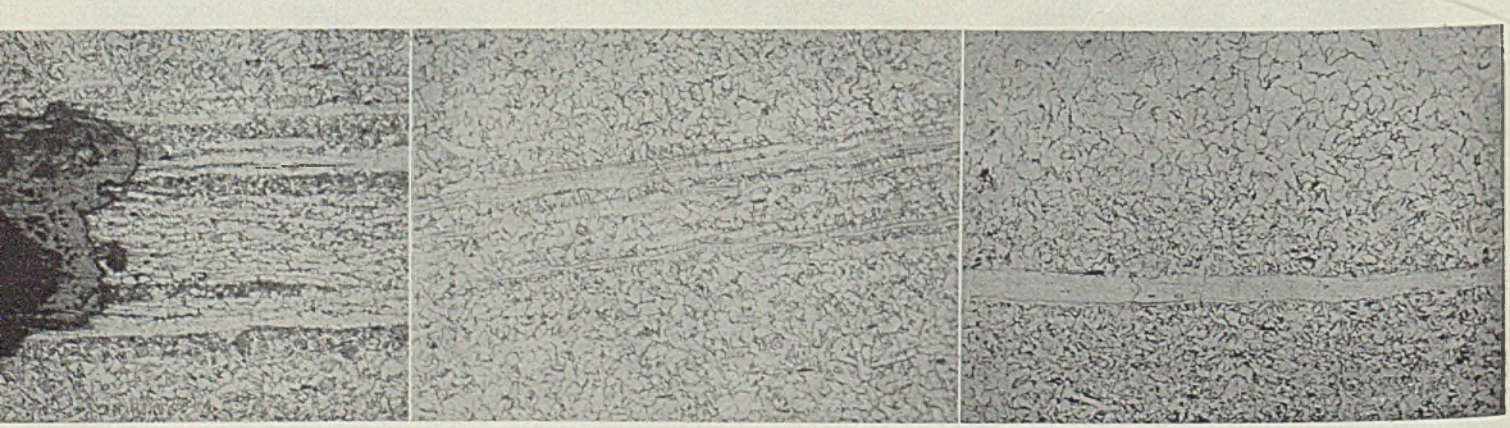


Fig. 8—Views of defect, left to right. A contains some foreign material; B is a continuation of the ghost in A. C shows almost the end of ghost

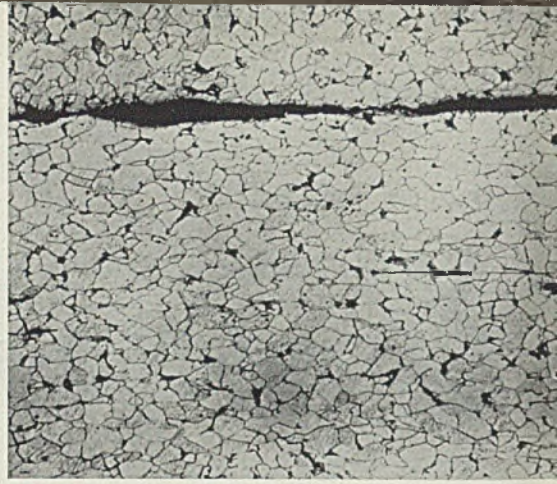


Fig. 7—Cross views of lamination. One lamination and two smaller ones are in different planes, both near the center of cross section

16-gage galvanized culvert stock with a 2-ounce zinc coating. Fig. 7 clearly shows the resultant defectiveness but the substance was polished out. Fig. 8, A, B and C each X-100, are one defect and should be considered as a composite photomicrograph. Section *A* contains some of the foreign material, the balance being polished out; *B* is a continuation of the "ghost" present in *A* while *C* shows almost the end of "ghost."

Since these heats were made the manganese specification has been lowered to 0.30 to 0.35 per cent, over 90 per cent of the heats falling within the range of 0.29 to 0.33 per cent manganese. This change was made for the primary purpose of obtaining a better rimmed ingot and a considerable saving of manganese.

Bibliography

"Normality of Steel." J. D. Gat, American Society for Metals, 1927, vol. 12, No. 3, p. 376.

"The Melting or Molten Stage of Steel Manufacture with Particular Reference to the Deoxidizing, Refining and Contamination Phases." G. A. Dornin, American Society for Metals, 1928, vol. 13, No. 2, Jan., p. 29.

"Deoxidation of Steel with Silicon." C. H. Herty, Jr., and G. R. Fitterer, American Society for Metals, 1927, vol. 15, No. 4, April, p. 569.

"On Oxygen Dissolved in Steel and Its Influence on the Structure." M. A. Grossmann, American Society for Metals, 1929, vol. 16, No. 1, July, p. 1.

"Deoxidation and Mold Conditions on the Tensile Properties of Carbon Steel Castings." J. V. McCrae and R. L. Dowdell, American Society for Metals,

1930, vol. 18, p. 159.
"Factors Affecting the Inherent Hardenability of Steel." E. C. Bain, American Society for Metals, 1932, vol. 20, p. 385.
"Application of Thermodynamics to the Deoxidation of Liquid Steel." John Chipman, American Society for Metals, 1934, vol. 22, p. 385.
"Effect of Deoxidation on Some Properties of Steel." C. H. Herty, Jr. American Society for Metals, 1935, vol. 23, p. 113.
"Importance of Aluminum Additions in Modern Commercial Steels." H. W. McQuaid, American Society for Metals, 1935, vol. 23, p. 797.
"Effects of Deoxidation on the Rate of Formation of Ferrite in Commercial Steels." D. L. McBride, C. H. Herty, Jr., and R. F. Mehl, American Society for Metals, 1936, vol. 24, p. 281.
"Observations on the Deoxidation of Steel." M. Baeyertz, American Society for Metals, 1936, vol. 24, p. 420.
"Influence of Aluminum on the Normality of Steel." G. R. Brophy and E. R. Parker, American Society for Metals, 1937, vol. 25, p. 315.
"A Study of the Effect of the Aluminum Addition on the Structure of a Quenched Carbon Steel." H. W. McQuaid, American Society for Metals, 1937, vol. 25, p. 490.
"Killed and Effervescing Steels." L. Guillet, Revue de Metallurgie, Memoires, 1937, vol. 34, Sept., p. 493; Oct., p. 545; Nov., p. 597; and Dec., p. 657.
"Contribution on the Control of Inclusions in Steel Melted in the Basic Open-Hearth Furnace." E. Maurer and G. Voigt, *Stahl und Eisen*, vol. 60, Mar. 21, p. 241; Apr. 4, p. 295.
"Operations on the Pit Side of a Modern Openhearth." G. T. Tranter, *Metal Progress*, 1940, vol. 38, July, p. 49.

Heating of Ordnance

(*Concluded from Page* 86)

an automatic quench has been operating very successfully for many years on parts similar to projectiles.

The pusher-type hardening furnace shown in Fig. 3 also lends itself to an operation of this kind since it may be connected in series with a draw furnace. In this case, the projectiles are removed from the trays which hold them and are quenched by hand from side doors in the furnace. After quenching, they are placed again on the same trays and the pushing is continued through another furnace which follows in line and which is heated to the required drawing temperature by means of forced convection as previously described. This furnace is exceptionally simple in design and has given satisfactory results in operation. A furnace of this kind has a certain degree of flexibility since it is possible to load the trays with projectiles of various sizes or even with other parts which will fit the trays and can be loaded uniformly.

New Specifications

(*Concluded from Page* 72)

(sheet, strip and plate) must fall in the tensile range of 70,000 to 85,000 pounds per square inch. New tables of tolerances were included.

Copper and Copper Alloys: One of the society's most active committees is committee B-5 on copper and copper alloys. This group has been co-operating very closely with the United States Army Ordnance Department, and other divisions of the government in connection with national defense work. The most recent developments in the committee are two new tentative specifications approved by committee E-10 giving standard requirements for phosphor bronze wire (B 159 — 41 T) and rods, bars and shapes (B 139 — 41 T). Three grades of wire are covered, A with a tin composition of 3.80 to 5.80 with copper the remainder after certain impurities are deducted, covers material from 0.02 to 0.5 per cent in diameter. Grades C and D with tin respectively of 7 to 9 and 9 to 11 per cent cover wire from 0.02 to 0.250-inch. Tensile strength, varying according to the temper runs from 43,000 pounds per square inch; soft, grade A, to 135,000 pounds per square inch, hard, grade D; elongation in 2 inches from 9 per cent minimum.

Classified by Chemical Values

The new rod, bar, and shape standard provides three grades suitable for structural purposes (bolts, gears, etc.) and two grades are set up for free machining, suitable for screw machine products. Grade classifications are by chemistry and physical values, the machining grades having considerably higher lead composition than the structural grades, one of them also including 3½ to 4½ per cent zinc, lead and tin being the same with copper the remainder. Structural grades are marked particularly by differences in the tin composition, this respectively being 3.8 to 5.8, 7 to 9, and 9 to 11 per cent. Physical requirements vary according to the grade and structural shape, classifications ranging from 50,000 to 95,000 pounds per square inch with minimum elongation in 2 inches of 10 to 20 per cent.

After a great deal of discussion the committee was able two years ago to have various interests reach an agreement on specification requirements for beryllium—copper alloy bars, rods, sheet, strip, and wire (B 120 — 41 T). Because users of the material have requested certain changes in composition, committee B-5 approved modifications and has included in the appendix correct heat-treating temperatures. These specifications are being issued as new standards. All material has a beryllium requirement of 1.9 to 2.2 per cent, maximum per cent of additive elements is 0.5, impurities maximum is 0.5, and copper is the remainder. Physical requirements vary according to heat treatment condition and size of the product. Sheet and strip range of tensile strength is from 73,000 to 95,000 pounds per square inch, but the precipitation hardened material ranges from 150,000 to 180,000 pounds per square inch.

Dig for Possibilities

(*Concluded from Page* 57)

where near being able to handle this unusual operation. As a matter of fact, there are few shops in this country which could handle it in their regular gear cutting machines.

This problem was "licked" through the use of a vertical shaper of "walking beam" type, not a machine of recent vintage, but just the thing for the work at hand. The big table casting, after being turned, faced and bored in a vertical boring mill, was pivot-mounted upside down on an auxiliary bed with rotative and in-and-out adjustments. This had been leveled up in front of the vertical shaper in such position that the flange in which the teeth were to be cut came directly under the shaper ram.

A skilled toolmaker, with the help of precision instruments, divided up the big circle according to the number of teeth, "laying out" the work with extreme care and scribing the center lines and maximum depth of each one of the coarse pitch tooth spaces. In the meantime two sets of forming tools were prepared for use in the shaper ram. One set consisted of roughing tools by means of which the bulk of the metal in each tooth space would be removed. The other consisted of finishing cutters by which the spaces would be brought to exact shape and size. All tools were of singlepoint type.

A Job for the Skilled

Indexing of the work to exact angular location was accomplished by lining up the scribed centerline of each tooth space with the hairline in a microscope mounted over the edge of the gear flange. Having thus achieved exact radial location, the cutting was done by feeding the work toward the reciprocating cutter—the latter being mounted facing the gooseneck frame of the shaper.

This process was repeated for every one of the tooth spaces—first with the roughing tools, then with the finishing tools. In this manner the big internal gear was cut with complete success. It was of course a painstaking and somewhat tedious proceeding, calling for a high degree of skill on the part of those who planned and carried it out. Overall accomplishment, however, rather than high speed indexing cutting was what really counted. Instead of looking at this job and saying, "We are not equipped to handle it", these resourceful workmen looked for and found the means right in their own shop. That is the spirit needed to push along the defense program.

The writer recently witnessed convincing demonstrations of what this kind of resourcefulness does mean to the defense program, at the new ordnance plant of Aetna-Standard Engineering Co., Ellwood City, Pa. This plant is devoted to production of 37 millimeter anti-aircraft gun carriages and the mounts for these quick-firing guns. The work involves machining to close limits many parts of unusual character, for which in normal times special machines undoubtedly would be designed and built.

Time was precious, however, so the production experts at Ellwood City got their heads together with ordnance experts and devised many clever ways of handling the peculiar parts on regular machine tools. That ingenuity of that kind does bring results is borne out by the fact that the first completed vehicles rolled off the production line at this Ellwood City plant one full month in advance of schedule. A few of the many clever expedients involved are presented herewith.

Consider Fig. 4, for instance, which depicts the precision turning of a hemispherical member of the "leveling pot" of the gun mount. This is handled in an engine lathe by means of the relatively simple ball turning fixture, the design of which is made quite clear by the illustration. It will be noted that a portion of the regular cross slide of the lathe is used on this fixture, and that power feed is applied to the swinging traverse by linking the fixture to the longitudinal carriage.

Closely related to this hemispherical member is the hollow member into which it is seated. At the beginning of operations a tedious hand process of lapping the mating members together was carried on. This was soon eliminated, however, by the simple expedient of "wabbling them together" in a vertical boring mill, as illustrated in Fig. 2. This setup accomplished in relatively few minutes what had been a long drawn out "handicraft" job—and does it just as well if not better.

The third example of the many which I saw at Aetna-Standard, is the ingenious use of a planer for doing internal machining. This is the subject of Fig. 3, showing machine, work, fixture and tooling. It will be noted that the part—which is the supporting member through which the gun recoils when fired—is of closed yoke design. This makes it impossible to plane its internal slide surfaces conventionally.

To get around this an outboard supported "planing bar" is attached to the head on the cross rail and the work is carried in a set-over fixture on which is the outboard bar support. The tools are mounted on the bar and cut as the work travels past them broaching in reverse action so one might say. Incidentally, this technique should lend itself to many cases where broaching ordinarily would be indicated but where the broaching machine, or the broaches—or both—are not to be had in any reasonable length of time.

These few examples may inspire others likewise to dig for hidden possibilities in their plants, in which case the writer has every reason to expect that he will be able to present another article along this same general line in the near future. This statement is based on a high degree of confidence in the ability of typical American mechanics—both young and old—to rise to emergencies. That is one of America's grandest assets—as certain other countries are destined eventually to discover.

Optical Parts

(*Concluded from Page* 61)

suit the pitch of the eyes of the observer. Lying in the focal plane of the eyepieces are two fixed stereoscopic marks which combine stereoscopically on proper adjustment of the deflecting prism. This arrangement is known as the "wandering mark" type. Later variations of this theme include the use of graticules having a number of range marks, numbered at intervals and arranged along a zig-zag line. These scales being combined visually, a single stereoscopic range-scale is seen which, starting in the foreground of the picture, extends away from the observer indefinitely.

Another arrangement presents to the eye two overhead range-scales, each starting near at hand and receding into the distance, one bearing away to the right and another to the left. In observing with this latter type of instrument, the deflecting prism is adjusted until the object under observation is seen to be at the same distance away as the crossing point of the two scales. Greater accuracy when ranging on isolated objects (such as an airplane) is obtained than when two single marks only are used.

By way of comparing the applications of the stereoscopic and coincidence types of rangefinder, there is little question as to the superiority of the former for aircraft work as anyone who has had experience of the ease with which this instrument can be directed and ranged upon tiny isolated targets will testify. However, experience appears to indicate that while a large percentage of service men can be trained to operate the coincidence type of rangefinder successfully, only about one man in twenty has an optical system of sufficient sensitiveness to use the stereoscopic rangefinder with the required degree of precision.

Priority Plan Helps Defense Deliveries

Civilian consumers may profit later. Scrap situation increasingly threatening. Coke prices frozen. Subcontracting on increase

MARKET IN TABLOID ★

Demand
Heavy, especially for plates.

Prices
Revision expected on scrap.

Production
Steady at 96 per cent.

■ STEEL priorities are working more smoothly as consumers gain familiarity with use of prescribed forms and steelmakers reform schedules in conformity. As a result deliveries for defense work are improving, though civilian consumers have not yet benefited.

In another month mills will have a more orderly picture of the situation in armament requirements and then can determine how much tonnage can be devoted to nondefense purposes. At present top ratings are so numerous that lower A preferences suffer considerable delay. Oct. 14 is the deadline for filing form PD-73, applying to orders placed previous to Sept. 1, which will aid mills in putting books in order for comprehensive scheduling. Tonnage on which this form is not filed will be canceled.

Orders for civilian use continue to dwindle, the recession being noted over the past fortnight. Consumers without priority find prospects for delivery so remote they are discouraged from placing further orders. Meanwhile various efforts to spread subcontracting have been successful in placing a large number of smaller consumers in a position to obtain preference and thus get in line for supply.

A number of factors give promise of a better situation for nondefense users in the near future. Curtailment of automobile production will lift part of the burden on flat-rolled steel, army cantonment and industrial defense building are well along and various other pressing phases of the defense program are nearing or passing their peak. With these facts in view it seems likely present steel capacity will reach a point of supplying war needs, with a margin for civilian requirements remaining.

Pig iron allocations for October are about to be announced and a better distribution is expected after the experience of September. Various representations have been made to Washington which have improved understanding of consumer needs. Output of pig iron is being increased by addition of blast furnaces and other stacks are being prepared to go into production during coming months. Recovery of 8000 tons of pig iron from a vessel beached in the Delaware river lends a small increase of visible supply.

Scrap shortage continues a major factor and much apprehension is felt over prospects for fall and winter. Finishing touches are being put on a priority order at Washington, designed to place supplies where they will do most good for defense. A ruling by OPM on remote scrap was issued last Friday. Producers and dealers in scrap will be called on to report scrap inventories as a basis for priority ratings. Steelmakers in the Pittsburgh district estimate that present reserves and receipts at the current rate will carry them to Oct. 15, with probable curtailment or partial shutdown after that date. Most disquieting feature is that stocks are being depleted at a season when accumulation for winter usually is in process.

Last week automobile builders ran 78,535 units off the assembly lines, compared with 60,560 the preceding week and 95,990 in the corresponding week last year.

Ceiling prices have been placed on by-product coke, at the level prevailing for some time. No action has been taken on beehive coke, excess capacity in that grade making it unnecessary. Freezing prices is part of the effort to control cost of steel production by holding down raw material prices.

Exports of steel and iron products in July were 478,016 gross tons, an increase of 19.9 per cent over 398,667 tons exported in June. For seven months these exports were practically the same as for the comparable period in 1940. Scrap exports in July were 59,905 tons, a heavy loss from 327,129 tons shipped in July, 1940. The largest item in July exports was semifinished steel in various forms.

Production rate remained steady at 96 per cent last week, various changes in operation being well balanced. Chicago advanced 1 point to 101 per cent, Wheeling 5 points to 91 per cent and Cleveland 1 point to 95½. Cincinnati lost 5 points to 83 per cent, Detroit 8 points to 87 per cent and St. Louis 7 points to 91 per cent. Most of these losses will be recouped this week. Rates were unchanged at Birmingham at 95, Eastern Pennsylvania 95, Buffalo 90½, New England 90, Pittsburgh 98 and Youngstown 98.

Composites are unchanged, under OPM price ceilings, finished steel at $56.60, steel and iron at $38.15 and steelworks scrap at $19.16.

COMPOSITE MARKET AVERAGES

	Sept. 27	Sept. 20	Sept. 13	One Month Ago Aug., 1941	Three Months Ago June, 1941	One Year Ago Sept., 1940	Five Years Ago Sept., 1936
Iron and Steel	$38.15	$38.15	$38.15	$38.15	$38.15	$37.93	$34.15
Finished Steel	56.60	56.60	56.60	56.60	56.60	56.60	53.10
Steelworks Scrap..	19.16	19.16	19.16	19.16	19.16	20.05	16.18

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

	Sept. 27, 1941	Aug. 1941	June 1941	Sept. 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
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	2.15	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

	Sept. 27, 1941	Aug. 1941	June 1941	Sept. 1940
Bessemer, del. Pittsburgh	$25.34	$25.34	$25.34	$24.34
Basic, Valley	23.50	23.50	23.50	22.50
Basic, eastern, del. Philadelphia.	25.34	25.34	25.34	24.34
No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	23.69
No. 2 foundry, Chicago	24.00	24.00	24.00	23.00
Southern No. 2, Birmingham	20.38	20.38	20.38	19.38
Southern No. 2, del. Cincinnati	24.06	24.06	24.06	23.06
No. 2X, del. Phila. (differ. av.)	26.215	26.215	26.215	25.215
Malleable, Valley	24.00	24.00	24.00	23.00
Malleable, Chicago	24.00	24.00	24.00	23.00
Lake Sup., charcoal, del. Chicago	31.34	31.34	31.34	30.34
Gray forge, del. Pittsburgh	24.19	24.19	24.19	23.17
Ferromanganese, del. Pittsburgh	125.33	125.33	125.33	125.33

Scrap

Heavy melting steel, Pitts.	$20.00	$20.00	$20.00	$20.15
Heavy melt. steel, No. 2, E. Pa.	17.75	17.75	17.75	19.70
Heavy melting steel, Chicago	18.75	18.75	18.75	19.30
Rails for rolling, Chicago	22.25	22.25	22.25	21.35
No. 1 Cast, Chicago	20.00	21.50	21.50	16.85

Coke

Connellsville, furnace, ovens	$6.25	$6.25	$6.25	$4.75
Connellsville, foundry, ovens	7.25	7.25	7.25	5.75
Chicago, by-product fdry., del.	12.25	12.25	12.25	11.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. mill, carloads.

Sheets, Strip

Hot-Rolled Sheets

Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 2.10c
Granite City base 2.20c
Detroit, del. 2.20c
Pacific ports 2.65c

Cold-Rolled Sheets

Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, B'ham., base .. 3.05c
Granite City, base..... 3.15c
Detroit, del. 3.15c
Other Mich. pts., del. ... 2.25c
Pacific ports 3.70c

Galvanized Sheets, No. 24

Pittsburgh, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c
Granite City, base..... 3.60c
Pacific ports 4.05c

Corrugated Galv. Sheets

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, 29 gage, per square 3.31c
Granite City 3.38c
Pacific Ports 3.73c

Culvert Sheets

Pittsburgh, Gary, Birmingham, 16-gage, not corrugated, copper steel 3.60c, copper iron 3.90c, pure iron 3.95c.
Pittsburgh, 24-gage, zinc-coated, hot-dipped, heat-treated 4.25c.
Granite City, copper steel 3.70c, copper iron 4.00c, pure iron 4.05c.
Pacific ports, copper steel 4.25c, copper iron 4.55c, pure iron 4.60c.

Enameling Sheets

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage, base 2.75c
Granite City, base 2.85c
Pacific ports 3.40c
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c
Granite City, base..... 3.45c
Pacific ports 4.00c

Electrical Sheets, No. 24

	Pittsburgh Base	Pacific Ports	Granite City	Base Deliv. Mahoning Valley Points
Field gr.	3.20c	3.95c	3.30c	3.275c
Armat.	3.55c	4.30c	3.65c	3.625c
Elect.	4.05c	4.80c	4.15c	4.125c
Motor	4.95c	5.70c	5.05c	5.025c
Dynamo	5.65c	6.40c	5.75c	5.725c
Transformer				
72 ...	6.15c	6.90c	.....	6.225c
65 ...	7.15c	7.90c	.....	7.225c
58 ...	7.65c	8.40c	.....	7.725c
52 ...	8.45c	9.20c	.....	.....

Hot-Rolled Strip

Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c
Detroit, del. 2.20c
Other Mich. pts. del. ... 2.25c
Pacific ports 2.75c

Cold-Rolled Strip

Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less..... 2.80c
Chicago, base 2.90c
Worcester, base 3.00c
Detroit, del. 2.90c
Other Mich. pts. del. ... 2.95c

Commodity C.R. Strip

Pittsburgh, Cleveland, Youngstown, base 3 tons and over..... 2.95c
Worcester, base 3.35c
Detroit, del. 3.05c
Other Mich. pts. del. ... 3.10c

Cold-Finished Spring Steel

Pittsburgh, Cleveland, base; add 20 cents for Worcester.
.26-.50 Carbon 2.80c
.51-.75 Carbon 4.30c
.76-1.00 Carbon 6.15c
Over 1.00 Carbon 8.35c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

TYPE	BARS	PLATES	SHEETS	H. R. STRIP	C. R. STRIP
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
304-20% clad	.....	*18.00	19.00	.....	.....
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
311	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
316	40.00	44.00	48.00	40.00	48.00
317	50.00	54.00	58.00	50.00	58.00
347	33.00	38.00	45.00	33.00	42.00
403	21.50	24.50	29.50	21.25	27.00
410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
430F	19.50	22.50	29.50	18.75	24.50
431	19.00	22.00	29.00	17.50	22.50
442	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00

*Includes annealing and pickling.

Tin, Terne Plate

Tin Plate

Pittsburgh, Chicago, Gary, 100-lb. base box..... $5.00
Granite City $5.10

Tin Mill Black Plate

Pittsburgh, Chicago, Gary, base 29 gage and lighter 3.05c
Granite City 3.15c
Pacific ports, boxed..... 4.05c

Long Ternes

Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c
Pacific Ports 4.55c

Special Coated Mfg. Ternes

Pittsburgh, Chicago, Gary, 100-base box..... $4.30
Granite City $4.40

Roofing Ternes

Pittsburgh base per 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

Steel Plate

Pittsburgh, Chicago, Gary, Cleveland, Birmingham,

Youngstown 2.10c
Coatesville, Sparrows Point, Claymont 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, Bethlehem, Chicago, Buffalo, Birmingham 2.10c
St. Louis, del. 2.34c
Pacific Coast ports 2.75c

Bars

Hot-Rolled Carbon Bars

Pittsburgh, Chicago, Gary, Cleve., Birm., base 20 tons one size 2.15c
Detroit, del. 2.25c
New York, del. 2.49c
Duluth, base 2.25c
Philadelphia, del. 2.47c
Gulf ports, dock 2.50c
All-rail, Houston from Birmingham 2.59c
Pac. ports, dock 2.80c
All-rail from Chicago.. 3.25c

Rail Steel Bars

Pitts., Chicago, Gary, Cleveland, Birm., base 5 tons 2.15c
Detroit, del. 2.25c
New York, del. 2.49c
Philadelphia, del. 2.47c
Gulf ports, dock 2.50c
All-rail, Houston from Birmingham 2.59c
Pac. ports, dock 2.80c
All-rail from Chicago.. 3.25c

Hot-Rolled Alloy Bars

Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size 2.70c
Detroit 2.80c

Alloy S.A.E.	Diff.	Alloy S.A.E.	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 .15-25 Mo. 0.55
4600 0.20-0.30 Mo.; 1.50-2.00 Ni. 1.20
5100 80-1.10 Cr. 0.45
5100 Spr. flats 0.15
6100 Bars 1.20
6100 Spr. flats 0.85
Carb., Van. 0.85
9200 Spr. flats 0.15
9200 Spr. rounds, squares 0.40
T 1300, Mn, mean 1.51-2.00 0.10
Do., carbon under 0.20 max. 0.35

Cold-Finished Carbon Bars

Pitts., Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs. 2.65c
Detroit 2.70c

Cold-Finished Alloy Bars

Pitts., Chicago, Gary, Cleveland, Buffalo, base 3.35c
Detroit 3.45c
Galveston, add $0.25; Pacific Coast, $0.50.

Turned, Ground Shafting

Pitts., Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c
Detroit 2.70c

Reinforcing Bars (*New Billet*)

Pitts., Chicago, Gary, Cleveland, Birm., Sparrows Point, Buffalo, Youngstown, base 2.15c
Gulf ports, dock 2.50c
All-rail, Houston from Birmingham 2.59c
Pacific ports, dock 2.80c
Detroit, del. 2.25c

Reinforcing Bars (*Rail Steel*)

Pitts., Chicago, Gary, Cleveland, Birm., base. 2.15c
Gulf ports, dock 2.50c
All-rail, Houston from Birmingham 2.59c
Pacific ports, dock 2.80c
Detroit, del. 2.25c

Iron Bars

Philadelphia, com. del. 3.06-3.50c
Pittsburgh, muck bar ... 5.00c
Pittsburgh, staybolt 8.00c
Terre Haute com., f.o.b. mill 2.15c

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) .. 59
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 at Birmingham)

Bright bess., basic wire. 2.60c
Galvanized wire 2.60c
Spring wire 3.20c
Worcester, Mass., 10c higher on bright basic and spring wire.

Cut Nails

Carload, Pittsburgh, keg. $3.85

Alloy Plates (Hot)

Pitts., Chicago, Coatesville, Pa. 3.50c

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, Bham. $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 4.75c
Do., heat treated 5.00c
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.....65½ off
Do., ⅞ and ⅝ x 6-in. and shorter .....63½ off
Do., ¾ to 1 x 6-in. and shorter .....61 off
1⅛ and larger, all lengths 59 off
All diameters, over 6-in. long .....59 off
Tire bolts .....50 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts .....56 off
Plow bolts .....65 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
½-inch and less.	62	64
⅝-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger.	56	

Hexagon Cap Screws

Upset 1-in., smaller .....60 off

Square Head Set Screws

Upset, 1-in., smaller ....68 off
Headless, ¼-in., larger ..55 off
No. 10, smaller .....60 off

Piling

Pitts., Chgo., Buffalo .. 2.40c

Rivets, Washers

F.o.b. Pitts., Cleve., Chgo., Bham.

Structural 3.75c
⅞-inch and under .....65-5 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. .....$4.00 off

Tool Steels

Pittsburgh, Bethlehem, Syracuse, base, cents per lb.

Carb. Reg. 14.00 Oil-hardening .. 24.00
Carb. Ext. 18.00
Carb. Spec. 22.00 High car.-chr. 43.00

High Speed Tool Steels

Tung.	Chr.	Van.	Moly.	
18.00	4	1	...	67.00
18.00	4	2	1	77.00
18.00	4	3	1	87.00
1.50	4	1	8.50	54.00
....	4	2	8	54.00
5.50	4	1.50	4	57.50
5.50	4.50	4	4.50	70.00

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

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	51
¾	66½	55
1—3	68½	57½

Iron

¾	30	10
1—1¼	34	16
1½	38	18½
2	37½	18

Lap Weld

Steel

2	61	49½
2½—3	64	52½
3½—6	66	54½
7 and 8	65	52½

Iron

2	30½	12
2½—3½	31½	14½
4	33½	18
4½—8	32½	17
9—12	28½	12

Line Pipe, Plain Ends

Steel

1 to 3, butt weld 71½
2, lap weld 64
2½ to 3, lap weld 67
3½ to 6, lap weld 69
7 and 8, lap weld 68
Seamless, 3 pts. lower discount.

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. fltgs., 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 47/64-in. incl. 2.15
Worcester up $0.10, Galveston up $0.25 and Pacific Coast up $0.50 on water shipments.

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... $6.00- 6.25
Connellsville, fdry.. 7.00- 7.50
Connell. prem. fdry. 7.25- 7.60
New River fdry. .. 8.00- 8.25
Wise county fdry. .. 7.50
Wise county fur. .. 6.50

By-Product Foundry

Newark, N. J., del... 12.60-13.05
Chicago, outside del. 11.50
Chicago, delivered .. 12.25
Terre Haute, del. .. 12.00
Milwaukee, ovens... 12.25
New England, del. .. 13.75
St. Louis, del. 12.02
Birmingham, ovens. 8.50
Indianapolis, del. .. 12.00
Cincinnati, del. 11.75
Cleveland, del. 12.30
Buffalo, del. 12.50
Detroit, del. 12.25
Philadelphia, del. .. 12.38

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.) 14.25c
Do. (1000 lbs. or over) 13.25c

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

No. 2 foundry is 1.75-2.25 sil.; 50c diff. for each 0.25 sil. above 2.25 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– 24.50	24.00– 24.50	23.50– 24.50	24.50– 25.00
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– 24.50	24.00– 24.50	23.50– 24.50	24.50– 25.00

§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†	25.61	.....	25.11	.....
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	27.50	28.00	.....	.....
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†	24.12	.....	23.12	.....
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	.....
Milwaukee from Chicago	25.10	25.10	24.60	25.60
Muskegon, Mich., from Chicago, Toledo or Detroit	27.19	27.19	.....	.....
Newark, N. J., from Birmingham†	26.15	.....	.....	.....
Newark, N. J., from Bethlehem	26.53	27.03	.....	.....
Philadelphia from Birmingham†	25.46	.....	24.96	.....
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	.....

Pittsburgh dist.: Add to Neville Island base, North and South Sides, 69c; McKees Rocks, 55c; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, 84c; Monessen, Monongahela City, $1.07; Oakmont, Verona, $1.11; Brackenridge, $1.24.

	No. 2 Fdry.	Malleable	Basic	Bessemer
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	†24.50	.....	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.	$28.00
Pitts. dist. fur.	23.50	do., del. Chicago	31.34
		Lyles, Tenn., high phos.	28.50

Silvery

Jackson county, O., base, 6.00 to 6.50 per cent $29.50. Add 50 cents for each additional 0.25 per cent of silicon. Buffalo base $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

Manganese differentials in silvery iron and ferrosilicon not to exceed 50 cents per 0.50 per cent manganese in excess of 1 per cent.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00

Second Quality

Pa., Ill., Ky., Md., Mo.	46.55
Georgia, Alabama	38.00
New Jersey	49.00

Ohio

First quality	43.00
Intermediate	36.10
Second quality	36.00

Malleable Bung Brick

All bases	$59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	58.90
Birmingham, Ala.	51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$31.00
Wire cut	29.00

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	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Washed gravel, duty pd., tide. net ton	nominal
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$23.00
Do., barge	23.00
No. 2 lump	23.00

Ferroalloy Prices

Ferromanganese, 78-82%, Carlots, duty paid, sbd. $120.00
Carlots, del. Pitts. 125.33
Carlots, f.o.b. Southern furn. 145.00
For ton lots add $10, for less-than-ton lots $13.50, for less than 200-lb. lots $18.

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., 2½ per cent carbon 118.00
1½% carbon 128.00
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., cont. 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

Molybdenum Oxide, lb. Molyb. cont., 5-20-lb. containers, f. o. b., Washington, Pa., and Langeloth, Pa., lb. 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, 98-99 per cent, per lb., depending upon quantity $2.50-2.60

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. 200-lb. kegs, lb. $2.60
Do., 100-200 lb. lots 2.75
Do., under 100-lb. lots 3.00

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	Struc-tural 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	7.28
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	5.26	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	3.52	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	3.40	3.80	8.70	7.05
Omaha	4.10	4.20	4.20	4.15	4.15	5.75	3.85	5.32	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	3.60	3.60	3.55	3.55	5.15	3.25	4.10	4.85	3.30	3.75	8.40	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.50	4.85	5.25	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	4.24	4.99	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	4.15	4.35	4.35	4.20	4.20	5.96	4.35	....	6.00	....	4.56	....	....
Chattanooga	3.80	4.00	4.00	3.85	3.85	5.80	3.75	....	4.50	.	4.39	.	.
Tulsa, Okla.	4.44	4.34	4.34	4.49	4.49	6.09	4.19	....	5.79	..	4.69	....	.
Birmingham	3.50	3.70	3.70	3.55	3.55	5.93	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	4.10	4.10	5.50	4.20	....	5.25	....	7.15	....	....
Seattle	4.00	4.00	5.20	4.75	4.75	6.50	4.75	7.25	6.00	. .	5.75	.	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	5.00	....	5.75	.	.
Los Angeles	4.15	5.45	7.25	4.95	4.95	7.20	5.10	7.30	6.30	..	6.60	11.35	10.35
San Francisco	4.00	5.20	6.80	4.70	4.70	6.40	4.70	7.20	6.45	. .	7.05	11.60	10.60

	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	6.65	.	8.75	8.60	9.40
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	6.05	10.60	9.60	9.45	10.10

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 pounds and over, Portland, Seattle; 400-14,999 Twin Cities; 400-3999 Birmingham; 400 pounds and over in Memphis; Los Angeles, bars over 4-in. wide, 1-in. thick, 4.95c.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Omaha, Kansas City, 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; 1 to 10 bun. in Los Angeles; 300 and over in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 3500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; any quantity 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, 1 to 99 pounds in Los Angeles; 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.

EUROPEAN IRON, STEEL PRICES

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	4.90c	22	5	0
Sheets, galvanized, corrugated, 24 gage	4.61c	21	12	6
Tin plate, base box, 20 x 14, 108 pounds	$ 6.20	1	10	9

British ferromanganese $120.00 gen eral Atlantic se board duty-p...d

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	7.40	1	16	9
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 customer.. ††Rebate 15s on certain conditions.

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	12.00

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.	$24.00-25.00
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	.....

Manganese Ore

Including war risk but not duty, cents per unit cargo lots

Caucasian, 50-52%	.
So. African, 50%	68.00-70.00
Indian, 50%	68.00-70.00
Brazilian, 46%	68.00-70.00
Chilean, 47%	68.00-70.00
Cuban, 50-51%, duty free	.....

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

OTHER THAN RAILROAD GRADES (a) (b)	Pittsburgh, *Wheeling *Johnstown, Weirton, Steubenville	Youngstown, *Warren, Canton, Sharon	Chicago	Kokomo, Ind.	Bethlehem	*East. Pa.	Sparrows Pt.	Cleveland	Buffalo	*Cincinnati Ashland, Ky. Portsmouth, O. Middletown, O.	St. Louis	Detroit	Duluth	Birmingham	Alabama City, Atlanta	*Pacific Coast	Minnequa, Colo.
No. 1 heavy melting	$20.00	$20.00	$18.75	$18.25	$18.25	$18.75	$18.75	$19.50	$19.25	$19.50	$17.50	$17.85	$18.00	$17.00	$17.00(d)	$14.50	$16.50
No. 1 hyd. comp. black sheets	20.00	20.00	18.75	18.25	18.25	18.75	18.75	19.50	19.25	19.50	17.50	17.85	18.00	17.00	17.00(d)	14.50	16.50
No. 2 heavy melting	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.50	18.25	18.50	16.50	16.85	17.00	16.00	16.00(d)	13.50	15.50
Dealer No. 1 bundles	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.50	18.25	18.50	16.50	16.85	17.00	16.00	16.00(d)	13.50	15.50
Dealer No. 2 bundles	18.00	18.00	16.75	16.25	16.25	16.75	16.75	17.50	17.25	17.50	15.50	15.85	16.00	15.00	15.00(d)	12.50	14.50
Mixed borings and turnings	15.25	15.25	14.00	14.25	13.50	14.00	14.00	14.75	14.50	14.75	12.75	13.10	.....	12.25	12.25	9.75	11.75
Machine shop turnings	15.50	15.50	14.25	14.50	13.75	14.25	14.25	15.00	14.75	15.00	13.00	13.35	15.50	15.00	15.00	10.00	12.00
Shovel turnings	16.50	16.50	15.25	15.50	14.75	15.25	15.25	16.00	15.75	16.00	14.00	14.35	16.50	16.00	16.00	11.00	13.00
No. 1 busheling	19.50	19.50	18.25	17.75	17.75	18.25	18.25	19.00	18.75	19.00	17.00	17.35	17.50	16.50	16.50	14.00	16.00
No. 2 busheling	15.50	15.50	14.25	13.75	13.75	14.25	14.25	15.00	14.75	15.00	13.00	13.35	13.50	12.50	12.50	10.00	12.00
Cast iron borings	15.75	15.75	14.50	14.00	14.00	14.50	14.50	15.25	15.00	†15.25	13.25	13.60	13.75	12.75	12.75	10.25	12.25
Uncut structurals and plate	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.50	18.25	18.50	18.50	16.85	17.00	16.00	16.00	13.50	15.50
No. 1 cupola	21.00	21.00	20.00	20.00	22.50	23.00	22.00	22.00	20.00	21.00	20.00	20.35	19.00	20.00	.....	18.00	.....
Heavy breakable cast	19.50	19.50	18.50	18.50	21.00	21.50	21.00	20.50	18.50	19.50	18.50	18.85	17.50	18.50	.....	17.00	.....
Stove plate	19.00	.....	17.00	16.00	18.00	18.50	18.00	18.00	19.00	17.50	17.00	14.10	16.00	17.00	.....	14.00	.....
Low phos. billet, bloom crops	25.00	25.00	23.75	23.75	23.25	23.75	23.75	24.50	24.25	23.50	22.50	22.85	23.00	22.00	.....	19.50	.....
Low phos. bar crops and smaller	23.00	23.00	21.75	21.75	21.25	21.75	21.75	22.50	22.25	21.50	20.50	20.85	21.00	20.00	.....	19.50	.....
Low phos. punch., plate scrap**	23.00(c)	23.00	21.75	21.75	21.25	21.75	21.75	22.50	22.25	21.50	20.50	20.85	21.00	20.00	.....	17.50	.....
Machinery cast cupola size***	22.00	22.00	21.00	21.00	23.50	24.00	23.50	23.00	21.00	22.00	21.00	21.35	20.00	21.00	.....	19.00	.....
No. 1 machine cast, drop broken, 150 pounds and under	22.50	22.50	21.50	21.50	24.00	24.50	24.00	23.50	21.50	22.50	21.50	21.85	20.50	21.50	.....	19.50	.....
Clean auto cast	22.50	22.50	21.50	21.50	24.00	24.50	24.00	23.50	21.50	22.50	21.50	21.85	20.50	21.50	.....	19.50	.....
Punchings and plate scrap††	22.00(c)	22.00	20.75	20.75	20.25	20.75	20.75	21.50	21.25	20.50	19.50	19.85	20.00	19.00	.....	16.50	.....
Punchings and plate scrap§§	21.00(c)	21.00	19.75	19.75	19.25	19.75	19.75	20.50	20.25	19.50	18.50	18.85	19.00	18.00	.....	15.50	.....
Heavy axle and forge turnings	19.50(c)	19.50	18.25	18.25	17.75	18.25	18.25	19.00	18.75	18.00	17.00	17.35	17.50	16.50	.....	14.00	.....
Medium heavy elec. furnace turnings	18.00(c)	18.00	16.75	16.75	16.25	16.75	16.75	17.50	17.25	16.50	15.50	15.85	16.00	15.00	.....	12.50	.....
GRADES ORIGINATING FROM RAILROADS															Kansas City		
No. 1 R.R. heavy melting steel	21.00	21.00	19.75	19.25	.....	19.75	19.75	20.50	20.25	20.50	18.50	18.85	19.00	18.00	17.00	15.50	.....
Scrap rails	22.00	22.00	20.75	20.25	.....	20.75	20.75	21.50	21.25	21.50	19.50	19.85	20.00	19.00	18.00	16.50	.....
††Rerolling quality rails	23.50	23.50	22.25	21.75	.....	22.25	22.25	23.00	22.75	23.00	21.00	21.35	21.50	20.50	19.50	18.00	.....
Scrap rails 3 feet and under	24.00	24.00	22.75	22.25	.....	22.75	22.75	23.50	23.25	23.50	21.50	21.85	22.00	21.00	20.00	18.50	.....
Scrap rails 2 feet and under	24.25	24.25	23.00	22.50	.....	23.00	23.00	23.75	23.50	23.75	21.75	22.10	22.25	21.25	20.25	18.75	.....
Scrap rails 18 inches and under	24.50	24.50	23.25	22.75	.....	23.25	23.25	24.00	23.75	24.00	22.00	22.35	22.50	21.50	20.50	19.00	.....

*Johnstown, Pa., Warren, O., and Cincinnati, O., not bases for railroad grades; Wheeling railroad only. Eastern Pa. includes Coatesville, Claymont, Conshohocken, Phoenixville and Harrisburg as bases only for "other than railroad grades"; Philadelphia and Wilmington are bases only for railroad grades. Pacific Coast bases are Los Angeles, San Francisco, Seattle, Portland. †Base price at Portsmouth; Middletown 25 cents less and Ashland, Ky; ††The term 'rails for rerolling' includes any rails which are sold to be used for rerolling, irrespective of whether or not such rails are usable for re-laying. **⅝-inch and heavier, cut 12 inches and under; ***may include clean agricultural cast; ‡‡under ⅜-inch to ¼-inch, cut 12 inches and under; §§under ¼-inch to No. 12 gage, cut 12 inches and under. (c) add $1.75 at Pittsburgh. (d) Bases at Atlanta only.

OTHER BASE PRICES: Machine shop turnings $17.60, Alloy, W. Va., $13.35 Toledo, O.; **Shoveling turnings,** $14.35 Toledo; **cast iron borings,** $13.60 Toledo; **No. 1 cupola cast,** $19 Minneapolis and St. Paul, $20.50 Chattanooga, $21 Radford, Va. and $22 Phillipsdale, Bridgeport and Worcester; **Heavy breakable cast,** $20.50 Phillipsdale, Bridgeport and Worcester, $17.50 Minneapolis and St. Paul; **Stove plate** $16 Minneapolis and St. Paul, $17.50 Chattanooga, $18 Radford, Va., $15.60 Toledo and $17.50 Phillipsdale, Bridgeport and Worcester; **Machinery cast cupola size** $21.50 Chattanooga, $22 Radford, Va. and $23 Phillipsdale, Bridgeport and Worcester; **No. 1 machinery cast, drop broken** $22 Chattanooga, $22.50 Radford, Va. and $23.50 Phillipsdale, Bridgeport and Worcester; **Clean auto cast** $22 Chattanooga, $22.50 Radford, Va. and $23.50 Phillipsdale, Bridgeport and Worcester.

(a) The grades specified are, except dealers' No. 1 and No. 2 bundles and uncut structural and plate scrap, as named and defined in the simplified recommendations R-58-36 of the Department of Commerce which shall be the governing specifications for iron and steel scrap hereunder (other than railroad grades). Dealers' No. 1 bundles shall consist of new, clean black sheet scrap, hydraulically compressed in the dealer's yard. Dealers' No. 2 bundles shall consist of old fender and body scrap, and shall in no case command a premium. (b) These grades (other than railroad grades) represent the major classifications of iron and steel scrap. The maximum prices of superior or inferior grades shall continue to bear the same comparable relationship to those major grade classifications as heretofore existed between the prices of such superior or inferior grades and the prices of the major grades.

Maximum price at shipping point: A shipping point is the point from which the scrap is to be shipped to a consumer. Maximum price at which a grade of scrap may be sold f.o.b. its point of shipment is the shipping point of such scrap. **For shipping points located within a basing point,** the shipping point price is determined by taking the basing point price and deducting actual transportation costs to the consumer's plant within the basing point. **For shipping points outside a basing point,** the shipping point price is determined by taking the nearest basing point and subtracting the lowest transportation charge. (Example: No. 1 steel shipped from Toledo takes the Detroit base of $17.85 minus transportation of $1.52 or $16.33. This shipping point price is the same to all consumers wherever located.) **Exceptions:** Shipping point of any grade not listed as having a basing point in New England is the Johnstown base minus the all-rail freight from the shipping point to Johnstown. Shipping point prices for New York City, Brooklyn, New York and New Jersey must be computed on the basis of the Bethlehem base although nearer to Buffalo in terms of barge transportation.

Maximum prices to consumers: Maximum price at which any grade (other than railroad) may be delivered to a consumer wherever located is the shipping point price plus actual transportation charges. Where shipment is by water, not more than 75 cents per gross ton may be included for handling charges at dock. Maximum delivered price in no case shall exceed by $1 a ton the nearest maximum base price in terms of transportation charges. (Example: The $1 excess is the so-called "springboard" arrangement. Youngstown consumers can draw on the Cleveland area for No. 1 steel scrap by taking the Cleveland base of $19.50, subtracting the Cleveland switching charge of 65 cents and adding freight to Youngstown of $2.08. The resulting delivered figure of $20.93 is within the "springboard" limit of $1 over the Youngstown base of $20.)

Billet and bloom crops originating in the Pittsburgh district may be sold within or without the district at the Pittsburgh base price plus up to, but not more than $2.50 in transportation charges. Maximum prices for **unprepared scrap** shall be $2.50 a ton less than the maximums for corresponding grade or grades of prepared scrap. **Remote scrap** is material located beyond the zone from which the railroad freight rate to Pittsburgh is $11.20 and a consumer may obtain permission from OPACS to absorb transportation charges necessary to obtain 500 tons or more.

Railroad grades: Where a railroad operates in two or more basing points, the highest base applies to consumers anywhere on the line. (Example: New York Central Railroad uses the $21 Pittsburgh base on No. 1 steel since the P. & L. E. operates there). Exception: Switching charges of 84 cents a ton must be subtracted from prices on scrap originating from railroads operating in Chicago and sold for consumption outside Chicago. Where railroad scrap is shipped to an off-the-line consumer, the highest maximum on-the-line price or the nearest basing point price, whichever is higher, applies.

Commissions: Brokers are allowed a commission up to 50 cents a ton above maximum prices to consumers, including export.

Export prices: Maximum on No. 1 heavy melting steel (other than railroad) is the domestic shipping point price plus lowest transportation charge to point of export. Maximum price to a domestic consumer on line of the originating railroad plus transportation to point of export applies on No. 1 railroad steel. Customary differentials apply on other railroad and non-railroad grades.

Sheets, Strip

Sheet & Strip Prices, Page 94

Gradual shift is taking place in sheet specifications from civilian to defense consumers as subcontracting becomes more widely spread. Orders coming to mills carry higher priorities than in the recent past, indicating a larger proportion of users successful in obtaining preference work.

Some slackening in sheet demand from automotive manufacturers accompanies the period of model change and this is releasing some tonnage for other purposes. Conversion of continuous sheet mills to plate production continues and this is cutting into sheet production to some extent, while relieving pressure for light plates.

Orders for cold-rolled strip also average higher in priority and most producers are taking only part of civilian tonnage offered and make no delivery promise. Considerable tonnage booked several weeks ago has been pushed back three months or more by rescheduling to accommodate preference ratings. Nondefense users meet little success in seeking better delivery and curtailment or shutdown is feared by many. This is based more on prospect of future supplies being cut off than on imminent shortage.

In New England strip specifications by manufacturers of cartridge clips are considerably heavier and about 1200 tons are before mills for early shipment. Prime contracts for clips were placed with many shops which found it necessary to retool and these are now entering production, increasing demand for strip.

Plates

Plate Prices, Page 94

Plate production is at capacity, with orders greater than shipments and backlogs increasing. Heavy pressure is being exerted for even larger production and converted sheet mills are making considerable tonnage of light plates, allowing plate mills to increase output of heavier material.

Shipbuilding and carbuilding are most insistent consumers and tank makers have heavy requirements, all having high priority rating. Car builders are being served better than formerly, though some shops are unable to attain capacity production. Tank builders have large bookings, especially for small tanks, and plate supply is insufficient in some cases to meet needs.

Semifabricated plates, heads, dished and flanged work carrying high priority can be delivered in relatively less time than corresponding ratings for sheared and universal plates. The navy will close on additional tonnages of floor plates and marine boiler stock early in October, for delivery to various yards.

PLATE CONTRACTS PLACED

3325 tons, 25 barges, Pennsylvania railroad, Jersey City, N. J., to American Bridge Co., Pittsburgh.

2500 tons, 60 to 108-inch penstock, Pit river, for Pacific Gas & Electric Co.,

San Francisco, to Western Pipe & Steel Co., San Francisco.

1125 tons, 48-inch welded steel pipe, Bellingham, Wash., to Steel Tank & Pipe Co. of Oregon, Portland, Oreg.

488 tons, two transports, to Seattle-Tacoma Shipbuilding Corp., Tacoma, Wash.

325 tons, 400 250-barrel tanks with top deck, delivery Philadelphia, to Columbian Steel Tank Co., Kansas City, Mo., $302.67 each; bids Sept. 17 to quartermaster, Marine Corps., Washington, sch. 487.

200 tons, 400,000-gallon elevated water tank, Advanced Single Engine Flying school, Dothan, Ala., to R. D. Cole Mfg. Co., Newman, Ga., $49,870, including design and appurtenances; bids Sept. 3, United States Engineer, Mobile, Ala., inv. 115.

175 tons, 300,000-gallon elevated water tank, Craig Field, Advanced Single Engine Flying school, Selma, Ala., to Chicago Bridge & Iron Co., Chicago, $31,800, including design and appurtenances; bids Sept. 4, United States Engineer, Mobile, Ala., inv. 122.

Unstated tonnage, 25 forty-foot lengths high carbon steel pontoon pipe, to Hilyard Company, Norristown, Pa., $180.50 per length; bids Sept. 15 to United States engineer, Philadelphia, inv. 91.

PLATE CONTRACTS PENDING

1200 tons, four tanks, Gulf Refining Co., near Greenville, Miss.

Unstated, 9910 feet, 58-inch coal tar enamel water pipe for Tacoma, Wash.; bids Oct. 1; alternate for lock joint concrete; $230,000 available.

Unstated, Crooked river crossing, Deschutes project, Oregon, 10-inch steel pipe, bids opened by reclamation bureau, Bend, Oreg., Sept. 15; John H. Hansend, Jr., Zillah, Wash., low Sch. I, $23,230; Southwest Welding & Mfg. Co., Alhambra, Calif., low Sch. 2, $158,667, less deductions; C. C. Montag & Son, Portland, low for complete schedule, $175,470.

Bars

Bar Prices, Page 94

Inland Steel Co., Chicago, is low at $75.40 per ton on 10,500 tons of low carbon steel bars for remelting for delivery to the Watertown, Mass., arsenal through first quarter. This shop and the armory at Springfield, Mass., continue to specify heavily against contracts, the latter taking chromium-molybdenum bars for Garrand rifles. Both are placing additional tonnage regularly. Due to heavy forward commitments, private small arms makers are buying less but specifying freely against orders.

Forging shops are operating at capacity with demand heavy for their products. Heavy machinery manufacturers are also turning out full production.

In New England 90 per cent of bar consumption is estimated to be for defense and the remainder is spread thinly among nondefense users and distributors.

Pipe

Pipe Prices, Page 95

Cast iron pipe deliveries are somewhat better on tonnages carrying high priority, due to improved deliveries of pig iron. Pipe foundries have been handicapped for some time by lack of iron, but this situation has improved. Buying by municipalities is slack, due to uncertain deliveries but some inquiries are being received for spring shipment. Utilities have low ratings for routine requirements but on special defense projects in connection with defense are able to obtain better delivery.

New England distributors of merchant steel pipe, through whom most tonnage for that area is handled, find inventories held to a minimum, with steady turnover at more frequent intervals, results from allocation on the basis of a percentage of first quarter shipments. Sales the first three months, while somewhat better than normal with most resellers, were below current volume and indications are little black or galvanized steel pipe will be available beyond immediate requirements. Improved demand is partly seasonal, but shipbuilding needs are steadily growing.

CAST PIPE PLACED

1805 tons, 6 and 8-inch pipe, Los Angeles, specification 3922, to United States Pipe & Foundry Co., Burlington, N. J.

1472 tons, 8 and 12-inch pipe, Los Angeles, specification 3922, to American Cast Iron Pipe Co., Birmingham, Ala.

1068 tons, 4 to 8-inch universal pipe, East Bay municipal utility district, Oakland, Calif., to Central Foundry Co., Holt, Alabama.

400 tons, defense projects mostly in Alaska, to Marckman & Williams, Seattle, for Central Foundry Co.

340 tons, various sizes, facilities, Mid-

dletown Air Depot, Middletown, Pa., to Donaldson Iron Co., Emaus, Pa.

100 tons, San Diego, Calif., to American Cast Iron Pipe Co., Birmingham, Ala.

CAST PIPE PENDING

3500 tons, 6 to 12-inch, Los Angeles; bids opened; United States Pipe & Foundry Co., Burlington, N. J., and American Cast Iron Pipe Co., Birmingham, Ala., low on portions.

423 tons, 4 to 10-inch, Fresno, Calif.; bids rejected, new bids Oct. 2.

Rails, Cars

Track Material Prices, Page 95

Change in the railroad steel picture has been more for the worse than for the better. Orders for rails, cars and track equipment continue to come into the market much faster than they can be produced. Tie-up in the plate market continues to hold down the car builders. The A-3 priorities have not helped much, although there is a definite increase in plate output on continuous sheet mills and it now seems possible that better deliveries are ahead for car builders. Delivery promises have long been passed on orders already under construction.

LOCOMOTIVES PLACED

Army, eight 2-8-0 steam locomotives, to Lima Locomotive Works, Lima, O.

Norton Co., Worcester, Mass., one 75-ton fireless steam locomotive, to H. K. Porter Co., Pittsburgh.

CAR ORDERS PLACED

Army Ordnance, Erie Proving Ground, La Carne, O., three flats and two hoppers to Haffner-Thrall Car Co., Chicago.

Reading, 1000 fifty-five-ton coal cars; to own shops at Reading, Pa.

CAR ORDERS PENDING

Carnegie-Illinois Steel Corp., three 50-ton hoppers; bids asked.

C. D. Hicks & Co., St. Louis, 300 10,000-gallon tank cars; bids asked.

Lehigh Valley, 1000 fifty-ton coal cars; bids soon.

Navy, Bureau of Supplies and Accounts, delivery Oakland, Calif., 23 flats; bids Oct. 7, sch. 8765.

RAIL ORDERS PENDING

Missouri Pacific, 9720 tons; court permission granted.

BUSES BOOKED

A.c.f. Motors Co., New York: Twenty-four motor coaches for Southeastern Greyhound Lines, Lexington, Ky.; ten motor coaches for Memphis Street Railway Co., Memphis, Tenn.

Structural Shapes

Structural Shape Prices, Page 95

Slowing down of fabricated shape inquiries is more pronounced and several fabricators are anxious for orders to keep backlogs from shrinking too abruptly. Civilians become more discouraged, though it is predicted that soon more steel will be available for this class. However, state engineers are still issuing extensive inquiries for bridges and other engineering work.

In one case a New England manufacturer for defense withdrew an inquiry for 1000 tons, having arranged for subcontracting which is speedier than erecting an extension. Offsetting the lag in inquiries for buildings is the increased amount used in defense lines such as tanks and ships. Winter will not slow down fabrication and shipments this year, according to present plans. Chicago notes that backlogs are six to eight weeks. Boston finds plain material deliveries on high priorities improved, a defense depot taking 5000 tons being the largest current inquiry.

SHAPE CONTRACTS PLACED

12,000 tons, midwest air depot, Marion, Okla., for war department, to J. B. Klein Iron & Foundry Co., Oklahoma City, Okla., in co-operation with Capitol Iron & Steel Co., Oklahoma City, Okla., Patterson Steel Co., Tulsa, Okla., Tulsa Boiler & Machinery Co., Tulsa, Okla., and Muskogee Iron Works, Muskogee, Okla.; Dunning-James-Patterson, contractors.

11,000 tons, addition, Douglas Aircraft Co., Santa Monica, Calif., to Bethlehem Steel Co., Los Angeles.

8595 tons, buildings, Georgia Air Depot, Williston, Ga., to Bethlehem Steel Co., Bethlehem, Pa.; Griffin Construction Co., Atlanta, contractor.

8000 tons, addition, Boeing Airplane Co., Seattle, Wash., to Bethlehem Steel Co., San Francisco.

7000 tons, small arms arsenal, Salt Lake City, Utah, to Bethlehem Steel Co., Bethlehem, Pa.

3500 tons, steel sheet piling, U. S. engineer, Memphis, Tenn., to Carnegie-Illinois Steel Corp., Pittsburgh, only bidder, $206,964.74.

3200 tons, two transports, to Seattle-Tacoma Shipbuilding Corp., Tacoma, Wash.

2300 tons, lift bridge, Philadelphia navy

yard, to Phoenix Bridge Co., Phoenixville, Pa.

2200 tons, West Central heating plant, Washington, D. C., to Harris Structural Steel Co., New York.

2000 tons, construction, buildings, Signal Corps Storage Depot, Avon, Ky., secondary contract, to International Steel Co., Evansville, Ind.; Frank Messer & Sons Inc., Cincinnati, contractor.

700 tons, hangar, Pan American Airways, Miami, Fla., to Ingalls Iron Works, Birmingham.

700 tons, addition, New Departure division, General Motors Corp., Bristol, Conn., to R. C. Mahon Co., Detroit, through Albert Kahn Co., Detroit; George A. Fuller Co., New York, contractor.

600 tons, additional buildings, TNT and DNT plant, Elwood, Ill., for war department, to Duffin Iron Co., Chicago.

300 tons, test stands, Wright Field, Dayton, O., to Indiana Bridge Co., Muncie, Ind.; Ferro Concrete Construction Co., Cincinnati, contractor.

150 tons, plant addition, Charles Lenning Co., Philadelphia, to Lehigh Structural Steel Co., Allentown, Pa.

150 tons, underpass FAGH-96-(3), Atchison, Topeka & Santa Fe railway, Ft. Sumner, N. Mex., for state, to American Bridge Co., Pittsburgh.

130 tons, addition, Vickers Corp., Detroit, to R. C. Mahon Co., Detroit, Brown & Matthews Inc., New York, contractor.

120 tons, shapes and bars, border station, Laredo, Tex., to Consolidated Engineering Co., Orange, Tex.; Ludberg-Richter Co., Rome, Ga., contractor.

116 tons, state bridge, contract 2212, Lodoga, Ind., to Bethlehem Steel Co., Bethlehem, Pa.; Robert H. King, Danville, Ind., contractor; bids Aug. 26.

100 tons, elevated steel water tank, Fort Moultrie, S. C., to The Darby Corp., Kansas City, Mo. bids Sept. 16, inv. 7062-8, constructing quartermaster.

Unstated, two 10-ton, 108-ft. span brige cranes and 40-ton, 108 ft. span crane for Puget Sound navy yard, to Harnishfeger Corp., Milwaukee.

Unstated tonnage, addition, Nicholson File Co., Providence, R. I., to Providence Steel & Iron Co., Providence; Jenk & Ballou, Providence, engineers.

Unstated tonnage, addition, James Hunter Machine Co., North Adams, Mass., to Groisser & Shlager Iron Works, Boston; Aberthaw Construction Co., Boston, contractor.

SHAPE CONTRACTS PENDING

10,000 tons, two hangars, Elizabeth City, N. C. and West Weymouth, Mass.; bids opened Sept. 24 by J. A. Jones Construction Co., Charlotte, N. C.

3000 tons, plant, Jacobs Aircraft Engine Co., Pottstown, Pa.

2100 tons, two piers and five warehouses, Scofield Barracks, T. H.; bids being taken by Pacific Bridge Co., San Francisco, contractor.

2000 tons, ordnance machine shop, Mare Island, Calif., navy yard; bids opened.

1750 tons, superstructure, South Canal street bridge, city of Chicago, Mt. Vernon Bridge Co., Mt. Vernon, O., low; bids Sept. 24.

1500 tons, foundry, boiler and service buildings, Long Island City, N. Y., Sperry Gyroscope Co.

1250 tons, apartment house, Ninety-second street and Fifth avenue, New York, for 1111 Fifth Ave. Inc.

1100 tons, buildings 82 and 83, Defense Plant Corp., Burbank, Calif.

925 tons, state bridge SN-F-B-3 of 49-5-12, C-2, Mackinac county, Michigan.

720 tons, gate frames, Central Valley project, Friant, Calif.; American Bridge Co., Pittsburgh, low.

580 tons, hospital addition, Massachusetts General hospital, Boston.

460 tons, turbine pedestals, Boston Edison Co., Everett, Mass.

390 tons, three storehouses, D, E, and F, Portsmouth, N. H., for navy.

365 tons, state highway bridge, Schenectady-Montgomery county, New York; bids Oct. 8, Albany; also 55 tons mesh and bars.

300 tons, fabricating shop, Langley Field, Va.; bids Oct. 3.

300 tons, I-beam bridge, Washington county, Pennsylvania; bids to state highway department, Harrisburg, Pa., Oct. 3.

255 tons, cradles, Rockland Light & Power Co., Nyack, N. Y.

250 tons, state highway project RC-41-43, Orange county, New York; bids Oct. 8, Albany; also 88 tons reinforcing bars.

240 tons, state bridge, Washington county, Pennsylvania; bids Oct. 3.

175 tons, state bridge X-1 of 13-3-6, Ft. Custer Drive, Michigan.

175 tons, state highway project, RC-41-

SHAPE AWARDS COMPARED

	Tons
Week ended Sept. 27	62,861
Week ended Sept. 20	41,332
Week ended Sept. 13	8,772
This week, 1940	91,266
Weekly average, 1941	28,947
Weekly average, 1940	21,326
Weekly average, Aug., 1941	15,793
Total to date, 1940	1,017,674
Total to date, 1941	1,157,860

Includes awards of 100 tons or more.

38, Steuben county, New York; bids Oct. 8, Albany; also 25 tons reinforcing.

170 tons, floor system, trestle FAP-149-A (2), Tetonia, Idaho, for state.

146 tons, addition to plate shop, Richmond Shipbuilding Co., Richmond, Calif.; bids in.

138 tons, army cantonment, Santa Maria, Calif.; bids in.

130 tons, state bridge, section 1-B, TR-335, Lehighton, Carbon county, Pennsylvania.

Unstated, portal gates for Coulee dam; bids at Denver Sept. 18.

Unstated, 27—14 x 17′ bulkhead gates for Coulee powerhouse; bids to Denver, Oct. 9; spec. 989.

Unstated, foundry, shops and other structures, Keyport, Wash., torpedo station; bids to Navy Sept. 24.

Reinforcing Bars

Reinforcing Bar Prices, Page 95

Several centers report business at the lowest ebb of the year. Though aggregate tonnage of orders holds up well, the figures are usually swelled by large individual projects for defense, the number of projects being small. On many jobs contractors decline to bid on the ground that supplies of steel are too uncertain to make firm offers. In the East mesh-making equipment is being taxed to the utmost to make early shipment of thousands of tons for Atlantic army and navy bases. This mesh has high priority rating, pushing back deliveries on less important ratings. A contract for 510 tons for a gun stock shop, Springfield, Mass., armory, Concrete Steel Co. successful bidder, went at 2.74c, extras included.

It is expected that the 100 concrete barges for the government, to be built with reinforcing bars, may take nearer 80,000 tons than 50,000 tons first estimated, bids to be opened Sept. 30.

REINFORCING STEEL AWARDS

22,500 tons, office building, war department, Arlington, Va., divided among five suppliers over eight months' delivery.

5975 tons, San Gabriel River dam, near Azusa, Calif.; divided between Soule Steel Co., Blue Diamond Corp. and Ceco Steel Products Corp., Los Angeles.

4000 tons, shell and bomb loading plant, Crab Orchard Lake, Carbondale, Ill., 2500 tons to Ceco Steel Products Corp., Chicago, 1500 tons to Concrete Steel Co., Chicago; M. J. Boyle & Co., Chicago and S. A. Healey, White Plains, N. Y., contractors.

2200 tons, Union Square garage, San Francisco, to Bethlehem Steel Co., San Francisco.

2000 tons, naval supply depot building No. 32, Bayonne, N. J., to Truscon Steel Co., Youngstown, O.; Wigton-Abbott, Mahony-Troast Co., contractors.

2000 tons, buildings, Georgia Air Depot, Williston, Ga., to Bethlehem Steel Co., Bethlehem, Pa.; Griffin Construction Co., Atlanta, contractor.

1500 to 2000 tons, (reported previously as 1000 tons,) Boeing seaplane plant, Renton, Wash., to Northwest Steel Rolling Mills, Seattle; Austin Co., contractor.

1200 tons, Bartram Gardens housing, Philadelphia, to Jones & Laughlin Steel Corp., Pittsburgh, through Fireproof Products Co.; Knickerbocker Concrete Co., contractor.

1000 tons, army warehouse, quartermaster depot, Seattle, to Northwest Steel Rolling Mills, Seattle.

916 tons, test stands, Wright Field, Dayton, O., to Pollak Steel Co., Cincinnati; Ferro Concrete Construction Co., Cincinnati, contractor.

900 tons, construction, buildings, Signal Corps Storage Depot, Avon, Ky., secondary contract, to Truscon Steel Co., Youngstown, O.; Frank Messer & Sons Inc., Cincinnati, contractor.

750 tons, shell loading plant, Jacksonville, Ark., for war department, to Laclede Steel Co., St. Louis; Ford, Bacon & Davis, contractors.

650 tons, Stephen Elliott Kramer school, Washington, to Bethlehem Steel Co., Bethlehem, Pa.; Ross Engineering Co., Washington, contractor; reported Sept. 22 as 100 tons or more.

550 tons, housing project, Jersey City, N. J., to Bethlehem Steel Co., Bethlehem, Pa. through Auf der Heide-Aragona Co., Jersey City, contractor.

500 tons, Booker T. Washington apartments, Jersey City, N. J., to Bethlehem Steel Co., Bethlehem, Pa.; Auf-der-Heide, contractor.

500 tons, additional storage igloos, El-

CONCRETE BARS COMPARED

	Tons
Week ended Sept. 27	49,269
Week ended Sept. 20	21,105
Week ended Sept. 13	40,640
This week, 1940	18,674
Weekly average, 1941	14,540
Weekly average, 1940	8,814
Weekly average, Aug., 1941	14,732
Total to date, 1940	365,942
Total to date, 1941	581,619

Includes awards of 100 tons or more.

wood ordnance plant, Elwood, Ill., to Truscon Steel Co., Youngstown, O.; Midwest Construction & Asphalt Co., Chicago, contractor.

450 tons, addition, Marquette Portland Cement Co., Des Moines, Iowa, to Concrete Steel Co., Chicago.

400 tons, dike flood control project, Hartford, Conn., to Truscon Steel Co., Youngstown, O.; A. I. Savin Construction Co., Hartford, contractor.

200 tons, government construction, Sandy Hook, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

300 tons, U. S. engineer, Boston, to Joseph T. Ryerson & Son Inc., Cambridge, Mass.

200 tons, army air bases in Alaska, to Northwest Steel Rolling Mills, Seattle.

185 tons, state highway project 169-61-FA-293 A (5), Osawatomie, Kans., to Laclede Steel Co., St. Louis.

176 tons, state highway project 160-11-FA507 B (1), McCune, Kans., to Sheffield Steel Corp., Kansas City, Mo.

157 tons, State street subway, contract T-1, Chicago, for city to Concrete Steel Co., Chicago; Kil-Bar Electric Co., Chicago, contractor; bids July 24.

120 tons, General Motors Co., Aero Products Division, Vandalia, O., to Pollak Steel Co., Cincinnati; F. Messer & Sons, contractor.

125 tons, U. S. engineer, Sewall, Rock Island, Ill., to Bethlehem Steel Co., Bethlehem, Pa.; McCarthy Improvement Co., contractor.

105 tons, wharf, navy department, Newport, R. I., to Concrete Steel Co., Boston.

100 tons, pumping station, flood control project, Hartford, Conn., to Concrete Steel Co., Boston, Frank Westcott, Attleboro, Mass., contractor.

REINFORCING STEEL PENDING

16,000 tons; also 11,000 tons H-piling and 10,000 tons of plates, two drydocks, additional requirements, Brooklyn Drydock Associates Inc., contractor.

15,000 tons, Government terminal, Cravens Point, Jersey City, N. J.; Frederick Snare Corp., contractor.

3500 tons, including 3000 tons bars and 500 tons wire mesh, midwest air depot, Marion, Okla., for war department, Dunning-Jones-Patterson contractors; bids Sept. 26.

3000 tons, ammonia nitrate plant, Baxter Springs, Kans.; Freeto & F. H. McGraw, contractors.

2345 tons, requirements, Republic of Panama, inv. 1409; bids Sept. 25.

2119 tons, C-42,230-A, Mecca, Calif., Bureau of Reclamation; bids in.

2000 tons, pier, quartermaster depot, Seattle; General Construction Co., Seattle, low.

1330 tons, United States engineer, South Pacific Division, San Francisco; no bids received.

1000 tons, Bellevue naval magazine storehouse, Washington, D. C.

1000 tons, addition, Boeing Airplane Co., Seattle; Bethlehem Steel Co., Seattle, low.

875 tons, including 400 tons bars, 175 tons wire mesh and 300 tons steel joists, Francis Cabrini Homes, Illinois 2-2R, Chicago, Chicago Housing Authority; bids extended from Sept. 9 to Oct. 15.

818 tons, B 38091-A, Odair, Wash., Bureau of Reclamation; bids opened.

800 tons, transformer deck at Coulee powerhouse; bids soon to Denver.

800 tons, Brighton dam, Rockville, Md.; Ambursen Engineering Corp., contractor.

600 tons, Pennsylvania railroad mail shed, Washington, for U. S. government; bids Sept. 25.

400 tons, navy yard buildings, Nos. 30 and 31, S. Boston, Mass.; Morton C. Tuttle, contractor.

400 tons, expansion, New Departure division, General Motors Corp., Bristol, Conn.; George A. Fuller, contractor.

350 tons, Toby creek intercepting sewer, Kingston, Pa.; bids Sept. 30.

300 tons, packing plant, Morrell & Co., Ottumwa, Iowa; bids Oct. 1.

300 tons, factory, Eastman Kodak Co., Rochester, N. Y.; A. W. Hopeman, contractor.

250 tons, aircraft laboratory and test building, Wright field, Ohio; bids Sept. 30.

250 tons, packing plant, Morrell & Co., Sioux Falls, S. D.

240 tons, two housing developments, Quincy, Ill.; T. S. Willis, contractor.

200 tons, U. S. engineer, St. Louis, inv. 1103-42-91; bids Sept. 26.

125 tons, two bridges, Indiana and Cambria counties, Pennsylvania; bids to state highway department, Harrisburg, Pa., Oct. 3.

115 tons, mostly mesh, state highway project RC-41-35, Suffolk county, New York; bids Oct. 8, Albany.

113 tons, bars and shapes, highway project RC-41-45, Steuben county, New York; bids Oct. 8, Albany.

103 tons, high school, White Fish Bay, Wis., Robert L. Reisinger Co., Milwaukee, low on general contract; bids Sept. 22.

100 tons, two 80 foot state bridges, Lemhi county, Idaho; Dan J. Cavanaugh, Twin Falls, low, $29,686.

Unstated, St. Lukes school of nursing, Chicago; bids asked.

Unstated, foundry, shops and other buildings, Keyport, Wash., torpedo station; bids in to Navy Sept. 24.

Scrap

Scrap Prices, Page 98

OPM announced amendments Friday to the iron and steel scrap schedule to speed delivery to steel mills and foundries of iron and steel scrap at remote points from consuming centers. The amendment expires Dec. 31, 1941, and sets a maximum shipping point price of $12 per ton for No. 2 heavy melting steel in Florida and all states west of the Mississippi river except California, Oregon and Washington. Price differentials above and below $12 for other grades will be the same as those already established for St. Louis.

The amendment also increases the shipping allowance on remote scrap from the present basis of shipping point prices plus $1 per ton, to shipping point plus $5 per ton, permitting consumers to absorb additional transportation costs.

The amendment defines as remote scrap all kinds and grades other than railroad scrap, having shipping point and point of origin within Florida, Oklahoma, Texas, Arizona, New Mexico, Nevada, Wyoming, Idaho and Montana.

Scrap shortage continues the principal source of concern in the steel and iron market. Flow of material has been considerably less since ceiling prices were reimposed at the beginning of September and mill inventory has been decreasing at a time when reserves should be building up for the winter season when collections normally drop sharply.

Expectation of scrap price revision by OPA is having some effect in holding back supplies, though the extent to which this affects the situation is impossible to determine. Little tonnage is being offered to dealers and proportion of direct transactions from producer to consumer in increasing.

In the Pittsburgh district a survey indicates that present reserves and tonnage expected to be available will last until about Oct. 15, curtailment of output after that date being believed inevitable. This situation is in part responsible for the production rate in that district declining from 102 per cent of capacity to 98 per cent, though some other factors contribute to this situation.

Two changes have been made in the schedule of scrap ceiling prices. One is to remove inequalities to consumers outside the Cincinnati district which have normally bought scrap from that district. It provides a shipping point price within the Cincinnati district basing point of 80 cents per ton below the basing point price, for all grades except six cast iron grades. The other revision provides that scrap and rerolling rails from mines and logging roads may be sold without the formalities required from railroads in similar cases and the maximum shipping point price need in no case be less than $13.50 per gross ton for scrap rails and $15 per gross ton for rails for rerolling.

Tool Steel Scrap

Cents per pound, to consumers f.o.b. shipping point

Tungsten types

For each 1% tungsten contained

Solid scrap containing over 12%	1.80c
Solid scrap containing 5 to 12%	1.60
Turnings, millings containing over 12%	1.40
Turnings, millings, solids under 5%	1.25

Molybdenum Types

Solid scrap, not less than 7% molybdenum, 0.50 vanadium	12.50
Turnings, millings, same basis	10.50
Solid scrap, not less than 3% molybdenum, 4% tungsten, 0.50 vanadium	13.50
Turnings, millings, same basis	11.50

Pig Iron

Pig Iron Prices, Page 96

Outlook for pig iron deliveries in October is believed to be better than in September, although allocations have not been announced. Foundries in general fared better this month than had been expected. While there have been some tight squeezes and occasional curtailment, production in the main has been uninterrupted. Foundries continue to seek defense work as they realize they cannot maintain operations on civilian production alone. An eastern pipe foundry was forced to use considerable basic iron, with silvery added.

About 8000 tons of bessemer and

low phos iron has been salvaged from a ship beached early in the year in the lower Delaware river and was offered for sale last week at Philadelphia by the underwriters, on instruction from London. Action on bids awaits decision from Washington and London. The iron was en route to England and there is considerable speculation on why it is not being sent there now. It recently has been agreed that no more pig iron or scrap will be shipped to England during the rest of the year, and this may be the reason for not forwarding this tonnage.

Indications point to resumption of operations at the Delaware River furnace at Chester, Pa., about the first of the year. Hillman interests at Pittsburgh are reliably reported to have purchased the property from the Philadelphia Electric Co. The furnace has been out of blast for several years and repairs will be necessary. Lake Superior ore will be used. Coke will be supplied from new ovens being built nearby by the Philadelphia Electric Co. The furnace has capacity of about 10,000 tons monthly.

Pacific Coast

Seattle—Fewer new projects are developing as the defense program attains momentum. Mills and fabricators show little interest as backlogs assure maximum output to the end of the year. Construction without priority ratings is being postponed. Shops report the situation somewhat easier with respect to materials as priority regulations are working more smoothly.

Army and navy projects in this area and Alaska dominate the steel market as requirements of these departments get first call. Reclamation bureau, Denver, is soon to call bids for 800 tons of reinforcing bars for a transformer bank at Coulee dam to replace a previous purchase, which was requisitioned by the navy. Northwest Steel Rolling Mills, Seattle, has been awarded 1500 to 2000 tons of reinforcing, instead of 1000 tons previously reported, for the Boeing seaplane plant near Seattle.

The scrap market continues unsettled with demand exceeding supply. Top prices permitted are being paid for both steel and cast iron. Rolling mills report low inventories while dealers' stocks are below normal. Receipts are slow as present prices do not attract shipments to this area. Foundries face difficulties in getting their requirements of cast iron scrap and for defense orders rely on priorities. Some scrap has been imported from British Columbia but the volume is not sufficient to relieve the shortage.

San Francisco—No let-up in demand is noted and obtaining priorities is the biggest problem facing the trade. Work in some shipyards has been held up, due to inability of securing necessary material.

Of outstanding interest was the award of 2500 tons of plates for a penstock ranging in size from 60 to 108 inches for the Pacific Gas & Electric Co., San Francisco, for installation on the Pit river. Western Pipe & Steel Co. secured the award. Awards aggregated 4300 tons and brought the total to date to 549,969 tons, compared with only 154,154 tons for the corresponding period in 1940.

Movement of structural shapes is strong but little private work is being fabricated. Awards totaled 2080 tons, bringing year's aggregate to 532,139 tons, compared with 280,983 tons for the same period a year ago.

Cast iron pipe awards aggregated 3377 tons and brought the total for the year to 43,763 tons as compared with 33,111 tons for the corresponding period in 1940.

Canada

Toronto, Ont.—Iron and steel and machine tools are the principal bottlenecks in Canada's increasing war expansion program. Through priorities and restriction of use for civilian needs and by adding hundreds of small plants that hitherto have not entered war work the government sees a good chance of overcoming these difficulties and turning more Canadian industry into war channels. Steel Co. of Canada Ltd., Hamilton, Ont., last week blew in its new 1000-ton blast furnace, which now is producing close to 750 tons per day, and is providing basic iron for the company's steelmaking facilities.

Demand for iron and steel scrap continues in excess of supply. Steel mills and electric furnace interests are taking all offerings of steel scrap. Cast scrap and stove plate are scarce, consumers report difficulty in obtaining supplies for spot needs and no future delivery booking is being done. Owing to difficulty in placing orders in the United States imports are falling rapidly.

OPM Steel Expansion Report Due This Week

(*Concluded from Page* 22)

handle an increased volume of iron ore.

PORT HENRY, N. Y.: New ore shaft at Fisher Hill, together with hoisting and crushing equipment and a concentration plant with a 1,000,000-ton annual capacity.

New locomotives and railroad cars will be purchased for the new plants to handle the greatly increased tonnage.

An important advantage, in addition to the increased iron tonnage mostly for steelmaking, which will be gained from the expansion, will be the expansion in the production of basic materials needed in the manufacture of medicines and explosives from coke by-products.

T. M. Girdler, Republic chairman, pointed out that the pig iron expansion program is Republic's fourth major step during 1941 in providing facilities for defense. The other three improvements are:

Electric furnaces, either installed or building, have been increased from six to 15.

Installation of a light armor plate plant now producing 7000 tons a month. Armor plate for 200 tanks monthly is finished, shaped and treated, and the balance is processed by the manufacturer.

Facilities now being provided

for an additional 220,000 tons of plates annually bring the corporation's output to 600,000 tons.

Construction is to begin at once and most facilities will be in operation in a year.

Iron Ore

Iron Ore Prices, Page 97

New York — Manganese ore is slightly easier, due to somewhat better movement from abroad, combined with the fact that consumers in this country have about 15 months supply on hand at the moment. Fifty per cent Indian and South African, 46 per cent Brazilian and 47 per cent Chilean are nominally quoted at 68 to 70 cents per unit without duty.

Tin Plate

Tin Plate Prices, Page 94

An important hot-rolled sheet mill in the Pittsburgh district is being devoted entirely to heavy products, mainly plates, and tin mills usually supplied from that source are running on stocks accumulated in preparation for such a contingency. Tin plate production thus rests on the period during which these reserves are available. A saving factor is that the quiet season for tin plate is approaching and demand will be less than in past months.

Negotiations for 1942 tin plate contracts will be taken up soon and while no priority has been placed on this product it has been understood it would be forthcoming whenever needed. Canners are likewise to have a high rating as food has been a top item. Preference has not been necessary up to this time as there has been sufficient hot strip for tin mills. Under the present situation it will be difficult to get mill time for unrated tin plate when other sheet mill products carry ratings.

Steel in Europe

Foreign Steel Prices, Page 97

London—(*By Cable*)—Steel output is practically all concentrated on war products and maintenance in Great Britain. Plants working on war contracts are absorbing all steel and iron output they can obtain. Several restrictions on civilian products causes small demand for certain classes of steel and iron, which explains quicker deliveries and some recession in demand for raw and semifinished steel. Some potential reserves are being built up. American scrap imports are greatly reduced and scrap collection is being organized over the whole country. Present supplies are adequate.

Nonferrous Metals

New York—Metal producers and consumers are awaiting publication by SPAB of its plan to increase production and reduce the non-essential uses.

Copper—Estimated consumption in August rose to a new high of 140,000 tons from 135,000 in July. Metals Reserve Co. is still negotiating with Latin American producers for purchase of the entire 1942 output of 500,000 tons. OPM has not taken any definite step

Nonferrous Metal Prices

Sept.	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
2-26	12.00	12.12½	11.75	52.00	52.00	5.85	5.70	7.25	17.00	14.00	35.00

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	9.10
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

Dealers' Buying Prices

No. 1 Composition Red Brass

New York	10.00-10.25
Cleveland	10.00-10.25
Chicago	9.25-9.50
St. Louis	9.50

Heavy Copper and Wire

New York, No. 1	10.00
Cleveland, No. 1	10.00
Chicago, No. 1	10.00
St. Louis	10.00

Composition Brass Turnings

New York	9.25

Light Copper

New York	8.00
Cleveland	8.00
Chicago	8.00
St. Louis	8.00

Light Brass

Cleveland	5.50-5.75
Chicago	5.75-6.00
St. Louis	5.75-6.00

Lead

New York	5.00-5.25
Cleveland	4.75-5.00
Chicago	4.75-5.00
St. Louis	4.50-4.75

Old Zinc

New York	4.50
Cleveland	4.00-4.12½
St. Louis	4.50-5.00

Aluminum

Mis., cast	11.00
Borings, No. 12	9.50
Other than No. 12	10.00
Clips, pure	13.00

SECONDARY METALS

Brass ingot, 85-5-5-5, l. c. l.	13.25
Standard No. 12 aluminum	16.00

yet to divert scrap suplies to refiners and brass ingot makers.

Lead—Full priority on lead may not be invoked now that supplies have been augmented by foreign purchases. OPM will instruct MRC to sell up to 35,000 tons in October.

Zinc—MRC has contracted with St. Joseph Lead Co. and others for large tonnages of zinc concentrates but there have not been enough boats available to bring the ore up from South America.

Tin—So far the Far Eastern price has not slowed up shipments from that source, despite the relatively high level.

Ferroalloys

Ferroalloy Prices, Page 96

Supply of ferromanganese promises to be somewhat freer with the blowing in last week of an additional furnace by an eastern producer.

Freight Allowance on Lower Aluminum Price

Aluminum Co. of America, Pittsburgh, announces that price reduction on aluminum of 2 cents, to 15 cents per pound, which becomes effective Oct. 1, 1941, will include the extension of additional transportation allowances on shipments of ingot and certain basic fabricated products to destinations west of the Mississippi river.

July Exports Gained 19.9 Per Cent over June

■ Exports of iron and steel products in July, excluding scrap, totaled 478,016 gross tons, valued at $34,855,419, a gain of 19.9 per cent over the June figure of 398,667 tons, valued at $35,213,412. They were well below the July, 1940, total of 707,809 tons, valued at $39,512,005, according to the Department of Commerce.

Exports for seven months totaled 3,494,684 tons, valued at $258,057,699, compared with 3,472,752 tons, valued at $237,340,096 during the comparable period in 1940.

Nonalloy semifinished steel in ingots, blooms and similar products, was the largest item in July exports, 115,778 tons, compared with 58,595 tons in June. Pig iron was second largest, 63,057 tons, compared with 35,402 tons in June, an increase of 27,655 tons. Nonalloy black sheets, at 36,727 tons, was third in July.

Scrap exports gained slightly in July, 59,905 tons, valued at $1,160,533, compared with 59,018 tons, valued at $1,059,524 in June. In July, 1940, scrap exports were 327,129, valued at $5,459,356. Cumulative scrap exports for seven months this year were 475,785 tons, valued at $9,271,884, compared with 1,805,935 tons valued at $30,551,194 for first seven months of 1940.

Bonded Manganese Ore Used

Manganese ore from Soviet Russia included in the Department of

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

(Gross Tons)

Articles	July 1941	July 1940	Jan. thru July 1941
Pig iron	63,057	70,790	367,281
Ferromanganese and spiegeleisen	109	150	2,437
Other ferroalloys	594	2,552	13,755
Ingots, blooms, etc.:			
Not containing alloy	115,778	273,862	747,498
Alloy, incl. stainless	17,901	4,772	247,841
Steel bars, cold fin.	1,949	2,276	57,410
Bars, iron	399	1,324	2,229
Bars, concrete	10,179	8,472	99,421
Other steel bars:			
Not containing alloy	17,131	39,651	129,862
Stainless steel	65	19	377
Alloy, not stainless	5,471	1,727	45,071
Wire rods	14,310	21,162	76,487
Boiler plate	2,581	880	18,750
Other plates, not fab.			
Not containing alloy	20,302	33,840	207,490
Stainless steel	6	29	169
Alloy, not stainless	2,492	176	5,626
Skelp iron or steel	8,860	13,012	91,915
Sheets, galv. iron	2,232	777	7,820
Sheets, galv. steel	5,160	13,811	54,629
Sheets, "black" steel:			
Not containing alloy	36,727	41,021	231,796
Stainless steel	116	87	659
Alloy, not stainless	857	31	7,292
Sheets, black iron	2,235	2,553	10,163
Strip steel, cold-rolled:			
Not containing alloy	7,621	5,400	34,165
Stainless steel	36	76	271
Alloy, not stainless	47	56	492
Strip steel, hot-rolled:			
Not containing alloy	7,404	12,437	54,130
Articles	July 1941	July 1940	Jan. thru July 1941
Stainless steel	.....	2	25
Alloy, not stainless	24	21	372
Tin plate, taggers' tin	23,066	30,078	132,859
Terneplate (incl. long ternes)	908	369	5,127
Tanks, except lined	1,355	2,082	13,228
Shapes, not fabricated	18,479	24,527	160,125
Shapes, fabricated	3,702	4,359	32,210
Plates, fabricated	1,462	642	15,893
Metal lath	107	75	1,305
Frames and sashes	76	150	1,045
Sheet piling	378	1,673	4,089
Rails, 60 lbs.	14,248	12,367	69,789
Rails, under 60 lbs.	1,260	921	23,425
Rails, relaying	432	3,249	3,780
Rail fastenings	1,207	900	11,162
Switches, frogs, crsgs.	358	115	1,168
Railroad spikes	454	494	4,248
R.R. bolts, nuts	114	124	1,140
Boiler tubes, seamless	5,748	1,973	32,357
Boiler tubes, welded	454	162	1,246
Pipe:			
Seamless casing and oil-line	13,288	9,035	56,460
Do., welded	1,125	916	10,359
Seamless black	2,110	4,402	17,499
Pipe fittings:			
Mall.-iron screwed	351	317	2,884
Cast-iron screwed	48	200	613
Pipe and fittings for:			
Cast-iron pressure	1,497	6,246	26,941
Cast-iron soil	1,381	4,872	8,220
Pipe, welded:			
Black steel	4,067	4,220	34,251
Black wrought-iron	506	2,186	2,603
Galvanized steel	4,650	4,361	43,676
Galv. wrought-iron	306	750	2,825
All other pipe, fittings	1,307	1,866	13,977
Wire:			
Plain iron or steel	5,474	8,204	39,426
Galvanized	3,004	5,253	32,552
Barbed	3,221	3,580	34,086
Woven-wire fencing	348	279	2,461
Woven-wire sc'n cloth:			
Insect	64	77	603
Other	246	150	1,550
Wire rope and cable	1,069	1,012	3,644
Wire strand	112	280	1,105
Electric welding rods	282	363	3,184
Card clothing*	.....	1	.....
Other wire	1,129	1,486	7,983
Wire nails	3,411	5,524	28,742
Horseshoe nails	175	173	1,488
Tacks	97	112	679
Other nails, staples	609	687	4,148
Ordinary bolts, machine screws	3,407	2,192	23,933
Castings			
Gray-iron (incl. semisteel)	1,561	289	6,859
Malleable-iron	168	308	2,073
Steel, not alloy	305	84	2,124
Alloy, incl. stainless	169	105	1,117
Car wheels, tires, axles	2,504	716	13,861
Horseshoes and calks	28	9	345
Forgings, n.e.s.:			
Not containing alloy	2,306	2,191	24,537
Alloy, incl. stainless	240	137	3,247
Total	478,016	707,809	3,494,684
Scrap, iron and steel:	.....	326,546	.....
No. 1 heavy melting†	14,689	.....	109,759
No. 2 heavy melting†	30,802	.....	213,637
Baled and bundled†	5,255	.....	41,374
Cast and burnt†	1,691	.....	23,672
Other†	6,200	.....	79,202
Scrap, tin plate	181	150	357
Tin plate circles, strips, cobbles, etc.	249	101	2,708
Waste-waste tin plate	736	226	4,620
Terneplate clippings and scrap	102	106	456
Total scrap	59,905	327,129	475,785
GRAND TOTAL	537,921	1,034,938	3,970,469
Iron ore	268,964	258,201	800,297

*Not separately classified after December 31, 1940. †New class.

Commerce report on June imports of iron and steel products and totaling 2828 tons, represented two withdrawals from bonded warehouses, it was reported last week. The manganese ore apparently had been stored many months.

Machinery Exports in July Decline Slightly

■ July exports of industrial machinery were valued at $27,794,765, a decline of 2 per cent from the June total of $28,377,146, the Department of Commerce reports. Increases were made in all classes except metalworking machinery.

Machine tools continued to decline, dropping to $9,226,262 in July from $11,233,804 in June; the May figure was $14,389,047. Metalworking machinery other than machine tools also fell off in July to $2,279,740 from $2,318,416 in July. Forging machinery exports in July were $719,161, up from $696,247 in June, and rolling mill equipment exports rose to $456,542 from $441,544. Shipments of sheet and plate metalworking machinery in July were $650,128, compared with $621,226 in June.

Mining, well and pumping equipment valued at $2,961,543 was exported in July, an increase of 22 per cent over June shipments of $2,429,269. July exports of construction and conveying machinery were valued at $3,290,620, a gain of 25 per cent over $2,615,313 in June. Other industrial machinery exports totaled $5,421,083 in July, slightly smaller than June shipments valued at $5,606,157.

Mirrors of Motordom

(*Concluded from Page* 40)

operation. Total output in the period was 70,375 tons of glass, which would cover solid an area of 1442 acres. Repairs to the 117-foot furnace will take only a week or ten days.

Confirmation came from Washington last week of the report published here a week ago to the effect that Ford shortly will undertake production of tanks for the army. While company officials in Detroit were silent on the subject, information from the capital indicated Ford will build both 30-ton and 60-ton tanks complete from motors to treads. Armor plate for tanks, as well as cylinder barrels, crankcases and other parts for airplane engines, and landing gear parts for bombers, will be supplied from the new steel foundry being planned for the Rouge. It becomes evident that Ford is attempting to assume the maximum amount of defense production possible in the hope of avoiding layoffs in automobile divisions resulting from curtailed production.

Automakers Granted A-10 Rating For Replacement Parts

Two additional orders affecting automobile manufacturers have been issued by the OPM Priorities Division. These orders, covering the production of repair parts for passenger cars and light trucks, are part of the broad program of priorities and limitations in the automotive field, which has been worked out in the Office of Production Management by the Divisions of Priorities, Labor, and Civilian Supply.

One is Limitation Order L-4, and the other Preference Rating Order P-57. They are designed to assure the continued operation of passenger cars and light trucks now on the roads, by providing for the adequate production of replacement parts, as defined in the orders.

Limitation Order L-4 sets a top quota for the production of spare parts for passenger cars and light trucks, and Preference Rating Or-

der P-57 extends priority assistance in securing the material needed to manufacture the authorized amounts.

In line with the recent orders which now control the manufacture of passenger cars and light trucks, Limitation Order L-4 provides that a producer of spare parts for passenger cars and light trucks may make during the period from Sept. 15 to Dec. 31, 1941, 60 per cent of the number of parts sold by him for replacement purposes during the period from Jan. 1 to June 30, 1941. This means that during the last 14 weeks of this year, he will be operating at the same high rate as during the first six months of 1941, when production had already jumped to approximately 130 per cent of the 1940 output.

In determining the number of replacement parts which he may produce between Sept. 15 and the end of the year, he may exclude from his calculations all parts sold during the first six months of the year to the Army and Navy, certain other listed government agencies, and to the governments of those countries whose defense the President deems essential to the defense of this country. He may likewise manufacture, after Sept. 15, to fill orders from these sources without regard for his established quota for civilian uses.

Preference Rating Order P-57 assigns an A-10 rating to deliveries of materials for the manufacture of the listed replacement parts, within the quantities established in the limitation order.

A manufacturer of replacement parts is not required to make application to the Priorities Division before applying the A-10 rating to his orders. This may be done by certification on his purchase order that the rating is being applied under the terms of order P-57.

A supplier may follow the same procedure, if it is necessary to assign the rating to deliveries to him by a subsupplier.

Yardstick for Interchangeable Auto Parts Adopted by DCS

A yardstick to be used by manufacturers of automotive replacement parts in estimating the proportion of materials used in interchangeable parts to which an A-3 preference rating may be applied and that to which an A-10 rating may be applied was adopted last week by the OPM Division of Civilian Supply.

A rating of A-3 has been assigned to replacement parts for heavy and medium trucks and passenger carriers with a seating capacity of 15 or more. An A-10 rating has been assigned to replacement parts for passenger cars and light trucks.

Manufacturers were requested, in a letter from Reavis Cox, supervisor of industry branches of the division, to use the figure of 20 per cent in estimating the proportion of materials used in interchangeable parts to which an A-3 rating may be applied, and 80 per cent in the case of materials for interchangeable parts to which an A-10 rating may be applied.

The yardstick for interchangeable parts is to be used only in cases where the manufacturer has been unable to ascertain whether the parts are intended for use in vehicles in the A-3 or in the A-10 category.

Cancel Chicago Show

■ Forty-second annual Chicago automobile show, originally scheduled for Oct. 12-19, has been called off. Chicago Automobile Trade Association, sponsor, took this action because of curtailed production by automobile manufacturers under the armament program.

Construction and Enterprise

Ohio

ASHTABULA, O.—Mercury Equipment Co., 1523 East Forty-fifth street, Cleveland, has bought part of Aetna Rubber Co. plant and is equipping it for production of aerials for motor vehicles. M. W. Lewis is in charge.

CANTON, O.—Diebold Safe & Lock Co., Mulberry road, will take bids soon for a 65 x 200-foot addition costing about $50,000.

CLEVELAND—Parker Appliance Co., 17325 Euclid avenue, has been alloted $432,230 for installation of additional machinery for building airplane parts, by Defense Plant Corp.

Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 102 and Reinforcing Bars Pending on page 104 in this issue.

WARREN, O.—American Welding & Mfg. Co., Griswold extension, will build plant for manufacture of army tanks, adjoining present plant, financed by $484,000 Defense Plant Corp. loan, $342,000 being for machinery and equipment. H. J. Kaighin is president.

CLEVELAND—Reel Tool & Mfg. Co., recently incorporated, has bought plant and business of Namet Electric Co., 9312 Cassius avenue. Production of tools and dies will be continued.

CLEVELAND — Cleveland Pneumatic Tool Co. has let contract to Sam W. Emerson Co., 1836 Euclid avenue, for $300,000 engineering and administration building and to Hadlock-Krill Co., 2169 East Thirty-third street, for a 30,000-square foot machine shop.

CLEVELAND — Land, buildings and equipment of J. A. Cochrane Brass Mfg. Co., 1390 East Forty-first street, will be sold at bankruptcy auction Oct. 2, by Gus Rosen, 1608 N.B.C. building. G. L. Knott, 410 Leader building, is receiver.

ELYRIA, O. — Bendix Westinghouse Automotive Brake Co. will build a 100 x 260-foot air brake plant addition, general contract to Austin Co., 16112 Euclid avenue, Cleveland, at about $100,000. (Noted Sept. 8.)

ELYRIA, O.—Elyria Foundry Co. has let contract to Paugh & Brown Inc.,

6007 Euclid avenue, Cleveland, for a casting and cleaning building, to cost about $75,000. Crane and locker contracts will be let later.

EUCLID, O.—Gent Machine Co., A. Gent, president, 5810 Richmond road, is building a one-story 50 x 110-foot and 11 x 25-foot plant and boilerhouse, costing about $40,000. Contract had been let to Charles E. Lewis & Son, 1200 Green road, Cleveland.

TORONTO, O.—Ohio Edison Co., 47 North Main street, Akron, O., is having plans made for addition of 40,000-horsepower plant to river station, to cost about $3,600,000.

WARREN, O.—American Welding & Mfg. Co. has been granted a government loan of $484,000 for construction of a plant to manufacture tanks for the army.

WARREN, O.—Packard Electric division of General Motors Corp., 305 Dana street N. E., will build $30,000 plant addition with 15,500 square feet floor space. Company has been given $58,000 contract for aircraft power and lighting cable by government.

Connecticut

WATERBURY, CONN.—American Brass Co., Main street, is having plans prepared for a one-story 75 x 110-foot plant addition to cost about $40,000. (Previous expansion noted June 23.)

New Jersey

JERSEY CITY, N. J.—Public Service Gas & Electric Co., South Park place, Newark, N. J., will build a one-story 45 x 100-foot generating station addition, 85 feet high. Contract has been given to United Engineers & Constructors Inc., 1401 Arch street, Philadelphia. Cost estimated at about $200,000.

Pennsylvania

CANONSBURG, PA.—Canonsburg Steel & Iron Co., R. Rupert, general manager, will build plant additions and make improvements, to cost about $50,000.

PHILADELPHIA—Midvale Co., Wissahickon avenue, has let contract to W. Jay Tinney Co., Bartram avenue, for a forge building costing about $40,000.

PHILADELPHIA—Bids will be taken Oct. 8 by water department for furnishing and installing six horizontal centrifugal pump and electric motor units at Lardners Point pumping station.

SHARON, PA.—Westinghouse Electric & Mfg. Co. will expand its transformer plant by addition of a shop building 160 x 1100 feet and an office building. Cost is estimated at about $1,800,000.

TITUSVILLE, PA.—Titusville Iron Works Co. will build a one-story addition costing about $50,000.

WILKES-BARRE, PA.—Pressed Steel Co. will build a one-story plant addition costing about $50,000.

Michigan

DETROIT—Hyatt Tool & Mfg. Co., 6605 Walton avenue, has been incorporated with $5000 capital to deal in mechanical appliances, by Claire D. Hyatt, Detroit.

DETROIT—Plymouth Steel Co., 3268 Penobscot building, has been incorporated with $150,000 capital to deal in steel and steel products, by Walter J. Bothwell, 19311 Woodston road.

DETROIT—Detroit Gasket & Mfg. Co., East Milwaukee avenue, has given contract to Krieghoff Co., Detroit, for addition and alterations to plant.

DETROIT—Chrysler Corp., Massachusetts avenue, Highland Park, Mich., has let a contract for a one and two-story power plant to W. E. Wood Co., 4649 Humboldt avenue. Cost is estimated at $50,000.

GRAND RAPIDS, MICH.—Cargocraft Aviation Corp., 500 Michigan Trust building, has been incorporated with $375,000 capital to deal in aviation products, by Roger B. Kenney, 760 San Jose drive, Grand Rapids.

PONTIAC, MICH.—Yellow Truck & Coach Mfg. Co., South boulevard, is having plans prepared for a one-story 36 x 208-foot machine shop, to cost about $50,000. R. Wenzel, care owner, is engineer.

Illinois

AURORA, ILL.—Western United Gas & Electric Co. has awarded contract for foundations and substructure for new power plant building, additions and alterations to present plant to Abell-Howe Co., 530 West Jackson boulevard, Chicago. Estimated cost is $500,000. (Noted July 28.)

CHICAGO—Chicago & North Western railroad is spending $450,000 for improvements to its Chicago yards, including servicing yard for streamlined trains. This is estimated to cost $370,000 and includes three inspection pits, drop pits for changing wheels and transfer table for changing complete power truck under diesel-electric locomotives.

CHICAGO—Pheoll Mfg. Co., 5700 West Roosevelt road, manufacturer of screws, bolts and nuts, has bought a site adjacent to its plant, containing a one-story building, to allow for manufacturing expansion.

CHICAGO—State of Illinois, department of public works and buildings, W. A. Rosenfeld, director, Springfield, Ill., has let contract for a machine shop at Crawford avenue and 159th street, one story 140 x 279 feet, to Kinnare Corp., 2816 West Monroe street.

MONSANTO, ILL.—Monsanto Chemical Co., 1700 South Second street, St. Louis, has awarded contract for one-story 134 x 182-foot plant to Boaz-Kiel Construction Co., 4030 Chouteau avenue, St. Louis. W. J. Knight & Co., Wainwright building, St. Louis, are engineers. (Noted August 18.)

Maryland

HAGERSTOWN, MD.—Fairchild Aircraft division of Fairchild Engine & Airplane Corp. probably will be granted $1,675,967 for expanding its airplane plant.

Kentucky

LEXINGTON, KY.—Kentucky Utilities Co., First National Bank building, will let contract soon for 25,000-kw. steam-electric power generating plant on Kentucky river. Estimated cost will be $3,000,000. Excavating and grading has been let to Codell Construction Co., Winchester, Ky.

LOUISVILLE, KY.—Defense Plant Corp. has authorized Hycar Chemical Co., jointly owned by B. F. Goodrich Co. and Phillips Petroleum Co., to build and operate synthetic rubber plant at cost of $2,750,000, with annual capacity of 10,000 gross tons.

Tennessee

MEMPHIS, TENN.—Continental Piston Ring Co., 276 Walnut street, is converting its plant to manufacture of armor-piercing anti-aircraft shells, including installation of a number of special tools.

West Virginia

WHEELING, W. VA.—Wheeling Machine Products Co. is having plans prepared for a factory and office building at Elm Grove, a suburb, on which bids will be taken this fall.

Virginia

STAUNTON, VA.—Staunton Textile Corp., subsidiary of Celanese Corp. of America, C. F. Beron, vice president, 190 Madison avenue, New York, has let contract to George F. Hazelwood, Cumberland, Md., for a rayon plant.

Missouri

ST. LOUIS—E. H. Baare Mfg. Co., 1618 Tower Grove avenue, manufacturer of wire guards for electric fans, has bought site at 1610 Tower Grove avenue for expansion of plant.

ST. LOUIS—American Can Co. has

started construction of its new plant on South Kingshighway boulevard, at cost of $2,000,000. Will include one-story main manufacturing building 621 x 1035 feet, one-story office building 50 x 175 feet and service building and machine shop 100 x 375 feet. Norris Construction Co., 59 East Van Buren street, Chicago, has general contract. (Noted Sept. 15.)

ST. LOUIS—C. Nelson Mfg. Co., 4016 Union boulevard, has given contract to John B. Gutman Construction Co., Wainwright building, for one-story addition, at about $40,000. Company manufactures electric refrigerators and kindred products.

ST. LOUIS—Mallinckrodt Chemical Co., Second and Mallinckrodt streets, has given contract for one-story warehouse 20 x 143 feet, 46 x 94 feet and 32 x 45 feet at 111 Detrchan street. Jamieson & Spearl, Arcade building, are architects. Cost over $25,000.

ST. LOUIS—Herman Body Co., 4400 Clayton avenue, has let contract for one-story addition 50 x 108 feet, to Murch-Jarvis Co. Inc., Cotton Belt building, to increase production of commercial automobile bodies. Hart Van Hoefen, Cotton Belt building, is architect. Cost is estimated at $40,000, with equipment.

Minnesota

ST. PAUL, MINN.—J. B. McGrath, 30 East Fillmore street, is attorney for eastern steel interests which are interested in construction of iron ore docks in Minnesota, at cost of about $500,000.

Texas

DALLAS, TEX.—Guiberson Diesel Engine Co., 1000 Forest street, has been granted $2,411,036 increase in funds for expansion of plant, by Defense Plant Corp. Diesel engines for defense will be produced.

DALLAS, TEX.—Wagner Electric Corp., Allen building, plans 100 x 120-foot building at 417 Olive street. Joe Pitzinger, Southland Life building, is architect.

HOUSTON, TEX.—Southwestern Construction Co., 3802 Calhoun road, has general contract for bomber landing gear plant on McCarthy street, for United States government, and is placing subcontracts.

Kansas

KANSAS CITY, KANS. — Fruehauf Trailer Co., Fairfax district, will build a one-story addition 180 x 1500 feet to add to productive capacity.

Iowa

AMES, IOWA—Iowa Highway Commission has let contract for one-story 150 x 152-foot machine and repair shop building to James Thompson & Sons, Ames, at $81,650.

SLATER, IOWA—City has voted $65,000 in bonds to finance municipal light and power plant. R. W. Gearhart, 349 Twenty-first street, Cedar Rapids, Iowa, is consulting engineer. (Noted Sept. 1.)

WATERLOO, IOWA — Iowa Public Service Co. has let contract to Semet-Solvay Corp., for addition to municipal gas plant, to cost about $60,000.

WATERLOO, IOWA—Rath Packing Co. has let contract to Wildes Construction Co., Waterloo, for seven-story annex to plant, to cost about $40,000, with equipment.

California

BURBANK, CALIF.—Vega Airplane Co. 2535 Hollywood way, has plans for plant additions, including warehouse and office building, flight hangar and paint hangar. Will be financed by RFC loan of $1,822,713.

BURBANK, CALIF.—Menasco Mfg. Co., 805 East San Fernando road, will build an addition 120 x 120 and 120 x 345 feet, costing about $125,000, financed by Defense Plant Corp.

LONG BEACH, CALIF.—Union Pacific railroad has let contract to Cain Rig Builders, 2689 Easy avenue, at $60,000, for six steel derricks in the company's Long Beach oil field.

LOS ANGELES—Aero Tool Mfg. Co. has been formed by Benjamin J. Kovach and will conduct business at 5923 South Hoover street, Los Angeles.

LOS ANGELES—Taper-Seal Ring & Piston Co. has been incorporated with $100,000 capital by Henry J. Shively and associates. Sherman & Sherman, 411 West Fifth street, are representatives.

SAN FRANCISCO—Rees Blow Pipe Co., 340 Seventh street, has let contract for a plant addition to R. A. Helegisson, 2695 Twenty-third avenue, at about $40,000.

Oregon

HERMISTON, OREG.—City has been granted federal funds, $96,134 for additions and improvements to water system and $109,680 for sewage disposal system.

Washington

SEATTLE — Associated Shipbuilders will build a warehouse at 2751 Sixteenth avenue S. W. to house machine and pipe shops, 100 x 173 feet, to cost about $45,000.

SEATTLE—Western Steel Casting Co., 145 Horton street, will build a foundry addition 40 x 70 feet.

Canada

EDMONTON, ALTA.—Mackenzie Air Service Ltd. will build aircraft overhaul and repair plant to cost $800,000, without equipment. H. G. MacDonald, Edmonton, has been given contract.

WINNIPEG, MAN.—MacDonald Bros. Aircraft Ltd., 50 Robinson street, is having plans prepared by Northwood & Chivers, architects, Nanton building, and will let contracts through W. J. Sturgess, department of munitions and supply, C. N. R. depot, Winnipeg, for a plant addition to cost $250,000, with equipment.

LEASIDE, ONT.—Sangamo Co. Ltd., 183 George street, Toronto, Ont., maker of electric meters, etc., will build a plant addition on Eglington avenue, costing about $175,000, with equipment. Anglin-Norcross Ltd., 57 Bloor street West, Toronto, has been given general contract.

LEASIDE, ONT.—Research Enterprises Ltd., government-owned company, Col. W. E. Phillips, president, will build radio assembly plant costing $250,000, with equipment. Milne & Nichols, 57 Bloor street West, Toronto, Ont., has contract.

ST. CATHARINES, ONT.—Packard Electric Co., 13 Race street, has given contract to C. Monk, 399 St. Paul street, for a plant addition costing $25,000, without equipment.

WAKEFIELD, ONT.—Aluminum Co. of Canada Ltd., 1155 Metcalfe street, Montreal, will build brucite refining plant, to cost $125,000, general contract to Anglin-Norcross Ltd., 892 Sherbrooke street, Montreal.

CAP DE LA MADELEINE, QUE.—Electric Steel Co. Ltd., is completing arrangements for plant addition costing $175,000. general contract to Anglin-Norcross Ltd., 892 Sherbrooke street West, Montreal, Que.

LACHINE, QUE.—Dominion Engineering Works, Ltd., First avenue, will build addition costing $50,000, general contract to Hyde & Miller, 1500 Guy street, Montreal, Que.

MONTREAL, QUE.—Canadian Vickers Ltd., 5136 Notre Dame street East, manufacturer of marine and industrial equipment, will make repairs to plant and install additional equipment, at cost of about $100,000. Belmont Construction Co., 679 Belmont street, has contract.

MONTREAL, QUE.—J. & R. Weir, 33 Nazareth street, builders of boilers, etc., will build a machine shop on Dalhousie street, costing $50,000. General contract has been given to James Thom & Co. Ltd., 660 St. Catharines street West.

SHAWINIGAN FALLS, QUE.—Shawinigan Chemicals Ltd. will build addition costing $1,500,000, with equipment, for manufacture of rubber substitutes, etc.

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Punch, SE. Cleve., G.48" tht., cap. 2x1" (never used)
Punch, Coping, Cleve. I., 36" tht., for M.D.
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TURRET LATHE, 18" Libby, H.S. 3-9/16", M.D.
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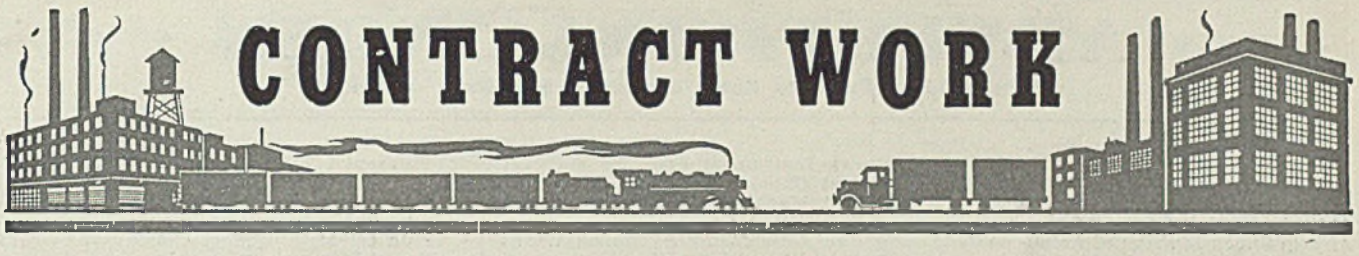

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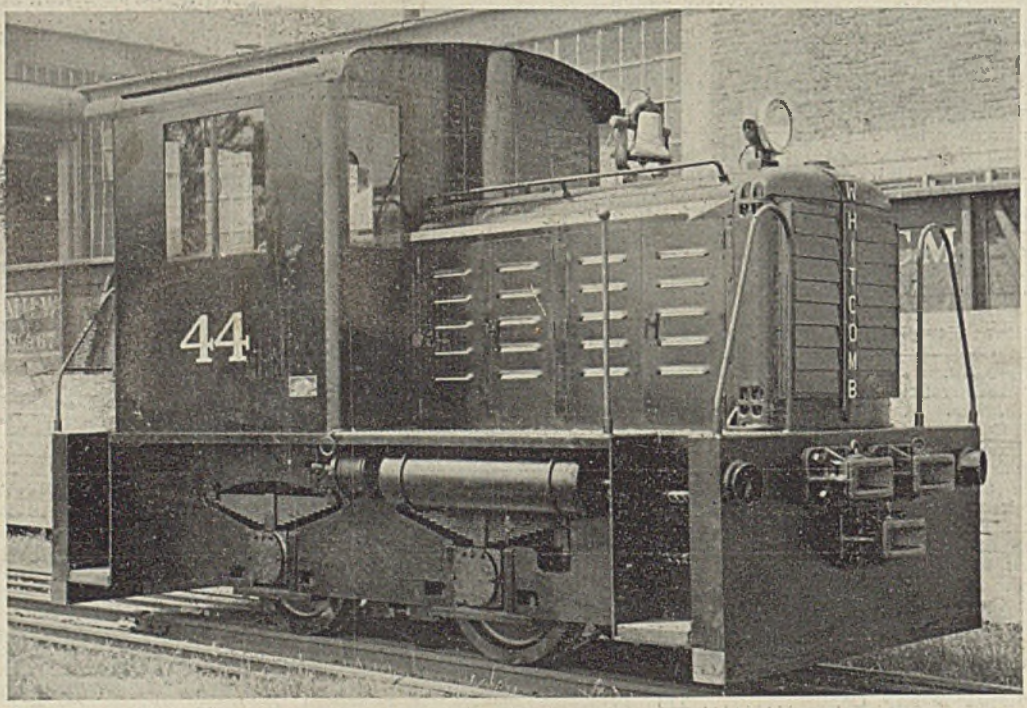

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