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STEEL

ESTABLISHED 1882

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PRODUCTION • PROCESSING • DISTRIBUTION • USE

November 24, 1941

PRACTICAL helps
for busy hands...



★ ★ ★
NICKEL

Practical answers to many questions about the selection, fabrication and uses of Nickel alloys are quickly available to you. This helpful information we have gathered, checked and condensed into convenient printed form. It is useful both to experienced men handling new materials or performing unfamiliar operations... and to new employees. This literature is available upon request. You are also offered the assistance of our technical staff in solving material problems arising from a temporary lack of Nickel. Our engineers are offering timely suggestions to many vital industries during the present emergency. Your request for literature or personal consultation will receive our prompt attention.

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

HIGHLIGHTING THIS ISSUE OF STEEL

■ BY LATE last Friday at least 14 blast furnaces had been banked or blown out as a result of the renewed cessation of production at captive coal mines and at many commercial mines closed down by sympathetic strikes. For the same reason, aggravated by the increasing shortage of scrap, ingot production (p. 33) had declined 1½ points. Only immediate resumption of coal production (p. 29) will prevent a further sharp reduction in iron and steelmaking. Indications Friday were that continuation of the coal strike would cause a drop of at least 10 more points in the ingot rate over the weekend . . . Another disturbing new development is the closing of the Pittsburg, Calif., steel plant (p. 31) because of a strike for higher pay.

* * *

It is unlawful for producers (p. 42) to ship steel not covered by a copy of PD-73; a new defense housing plan is announced; additional field offices have been opened

Hardware "Frozen"

by OPM; the container industry is to have priorities assistance; prices on builders' hardware have been frozen; priority assistance to research laboratories has been broadened . . . Use of chlorine for bleaching paper (p. 43) is restricted; phenols are under allocations; lead mines are to produce to capacity; a plan to aid metalplating workers is under development . . . Oil burners again are in good standing in defense housing (p. 44) on the eastern seaboard; output of light trucks for civilians will be curtailed; numerous personnel changes are announced by OPM.

* * *

Scrap dealers are warned to comply fully and immediately with allocation orders; price ceilings have been placed over cars and locomotives and maintenance of way and signal equipment; prices on heating and refrigerating coils and allied products will be considered (p. 118) today

Differ on Expansion

. . . A third meeting to discuss machine tool

prices will be held (p. 40) in December; steel drum manufacturers will have priorities assistance; the date for discontinuance of bright finish on automobiles has been postponed . . . Farm equipment advisory committee (p. 54) has been formed . . . Differences of opinion as to the size of contemplated steelworks capacity expansion are developing (p. 37) in OPM . . . Inflated wages are seen as a threat (p. 45) to the post-armament readjustment.

* * *

The Sedgley submachine gun, one of the simplest yet devised since it has only four moving parts, is described (p. 64) by Professor Macconochie. . . J. S. Graham

The Sedgley Gun Described

explains (p. 73) a number of shortcuts that speed manufacture of air conditioners. . . "Graphitic" steels, how they are made and what they can do, are discussed (p. 80) by Fred R. Bonte. . . Reginald Trautschold tells (p. 89) how automatic malleablizing cycle control steps up output and improves the product. . . A new high-temperature fatigue test operates at 7200 load cycles per minute holding specimen at any temperature from 70 to 1000 degrees Fahr.

* * *

In the ninth article in his series on how to get the most from arc welding, E. W. P. Smith shows (p. 66) when and where to use the automatic shielded carbon arc. In addition to certain technical considerations that are outlined, a sufficient volume of work must be involved. How to

When To Weld Automatically

check this in your own case is explained. . . F. L. Lindemuth discusses (p. 74) factors in design of welded ladles for open-hearth service and includes much practical information on how to prolong ladle life, how to obtain stability, etc. . . The seriousness of the hazard of projecting wire ends in wire rope is outlined by F. L. Spangler (p. 85) who also tells how to eliminate this danger.



Over a Million Soldiers Will Sleep on Cots of Inland Steel

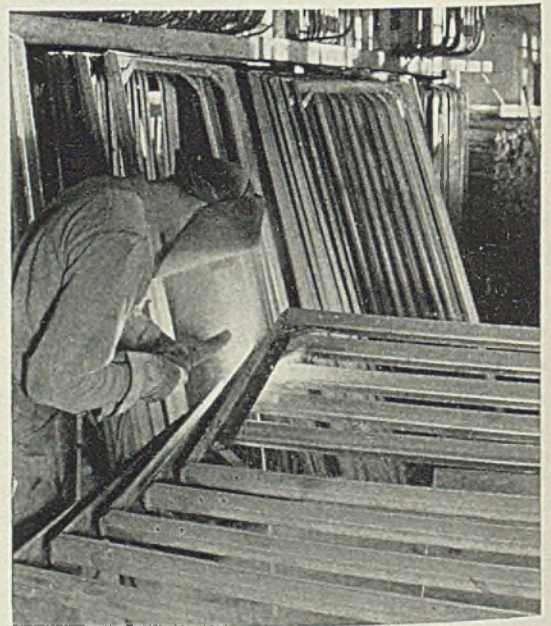
To equip and maintain our Army, steel is needed in vast tonnages—not only for guns, tanks, shells and bombs—but also for such commonplace articles as beds, stoves, cans and lockers.

As an example—more than 14,000 tons of Inland rail steel already has been ordered for frames for Army cots. Soon these will be completed and in use and then over a million American soldiers will sleep on cots made of Inland steel.

Rolled from used railroad rails of the highest quality, Inland rail steel is particularly well suited for this purpose—not only because of its economy, strength and stiffness—but also because its use helps to conserve new ingot steel for the many other requirements of the defense program.

In this department and throughout the entire Inland organization men and mills are working at top speed to produce and deliver steel for defense when and where it is needed. This is Inland's No. 1 Job!

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*Fabricating Inland rail steel into frames
for U. S. Army cots.*

INLAND STEEL CO.

38 S. Dearborn Street, Chicago • Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas City, Cincinnati, New York

14 Furnaces Banked as Coal Stocks

Dwindle; Strike Spreads

Sharper curtailment in prospect this week unless mines resume . . . Many producers' supplies adequate for only one to two weeks . . . Strong government action expected

■ IRON and steel production last week reflected only slightly the seriousness of the coal shortage arising from the strike in captive mines and now spreading through the commercial mines.

Steelworks operations declined $1\frac{1}{2}$ points to $95\frac{1}{2}$ per cent of capacity. This week's schedule is considerably lower and will drop sharply during the week unless the strike is settled quickly.

At least 14 blast furnaces have

been banked. Others will go out this week unless the mines are reopened.

Several batteries of by-product coke ovens have been removed. The beehive ovens in the Connellsville district are facing a complete shutdown.

Hardest hit by the strike to date are the Western Pennsylvania, Ohio Valley and Birmingham districts. Other districts, however, are expected to feel the pinch soon.

Coal supplies at steel mills vary from a few days to two months. Many of the larger producers have sufficient stocks for only one to two weeks' operations.

All but a few of the 53,000 captive miners have quit work. A wave of sympathy strikes spread through the commercial mines and it was estimated half of these miners were out at week's end, with others expected to follow.

Following is a summary of the



■ Clash between pickets and members of an independent miners' union at a captive mine operated by the United States Coal & Coke Co. in Gary, W. Va. This action occurred when the independent miners tried to enter the mine and pickets barred their way. Rocks were hurled and one man was injured. A firehose was used to stop the fight. NEA photo



■ Pickets at the Red Lion (captive) mine near Uniontown, Pa., try to enforce their no-work demand with their fists as a nonstriker attempts to enter the mine. Shortly after this incident 100 pickets engaged in a fight with nonstriking miners. NEA photo

situation in leading steel producing districts.

Coke, Iron, Steel Output Curtailed at Pittsburgh

PITTSBURGH

Coal shortage last Friday forced curtailment at the Clairton, Pa., by-product coke plant of Carnegie-

Illinois Steel Corp. Several batteries of ovens were removed to continue some operations as long as possible. Carnegie-Illinois has banked two blast furnaces at Clairton, two at Duquesne, and one each at Carrie, Mingo and Edgar Thomson.

Steel production in Pittsburgh last week averaged 99 per cent, un-

changed from the previous week. At Wheeling the operating rate dropped 9 points to 82 per cent.

This week operations at Pittsburgh will start 10 points lower and unless the strike ends immediately a rapid drop through the week will follow. Open-hearth and bessemer steelmaking operations started to decline Friday. Equipment being closed included: Bessemer at Mingo; open hearths at Clairton; entire operation at Irvin Works, due to lack of fuel for billet annealing and heat treating furnaces and tin pots; blooming mill at Clairton, and half the finishing mills at Clairton. These curtailments are due to lack of coke oven gas, not to coke itself.

United States Steel Corp. has docked its entire river fleet, which normally hauls all but a fraction of the coal used for coking, following refusal of the National Maritime Union, CIO, to unload barges. All other river boats are expected to refuse coal shipments, whether of captive or commercial mine origin.

Youngstown Coal Supplies Soon To Be Exhausted

YOUNGSTOWN

With iron and steel production already hard hit by the captive mine strike, leading steel plants here will be scraping the bottom of coal piles within the next week or two.

Carnegie-Illinois Steel Corp. has banked a blast furnace and suspended six open hearths at the Farrell plant and a blast furnace at its Ohio works. Both plants are devoting most of output to defense. Coke for both plants is obtained from the Clairton by-products plant and from beehive ovens. Corporation is estimated to have only seven or eight days' stocks.

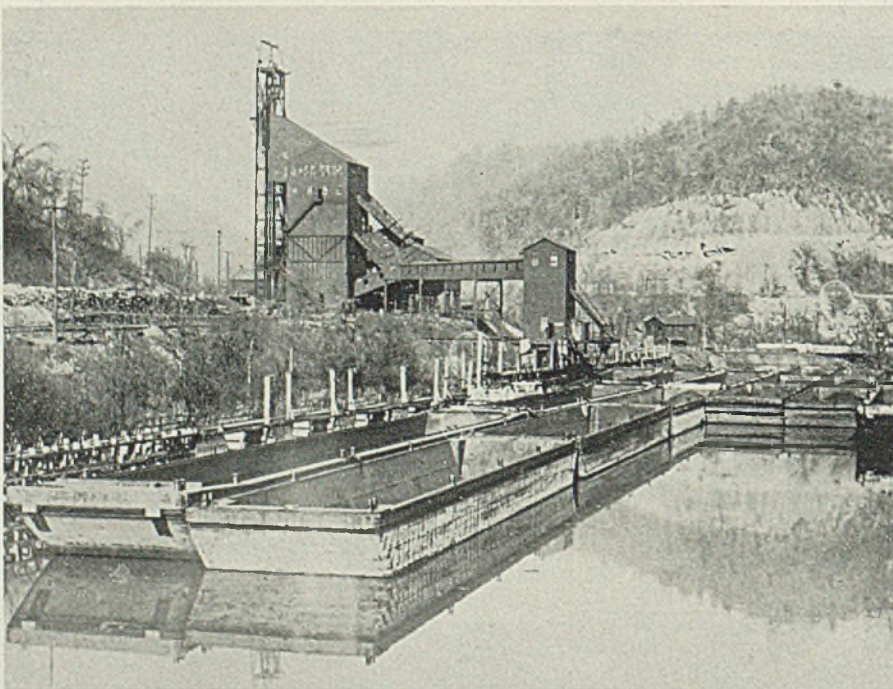
Youngstown Sheet & Tube Co. and Republic Steel Corp. have about two weeks' supply of coal on hand, and have effected no suspensions as yet. Both buy considerable commercial coal.

Sharon Steel Corp. buys beehive coke and coal from commercial mines. Struthers Iron & Steel Co. and Shenango Furnace Co. use beehive coke. Pittsburgh Coke & Iron Co. depends on the Neville Island by-products plant. These companies anticipate no difficulty unless the commercial mine strike becomes acute.

Chicago Operations May Be Reduced Within Week

CHICAGO

Steelmaking operations so far have not been affected by the coal strike, continuing last week at 101.5 per cent of capacity as scheduled. If the strike is prolonged, operations will be curtailed, perhaps this week. Net effect to date has been the bank-



■ HARMARVILLE, PA.: Idle barges at idle mines. Sixteen such vessels, each capable of carrying 1000 tons of coal, were tied up alongside the Wheeling Steel Co.'s mine here, as the strike halted production. NEA photo

ing of two blast furnaces by Carnegie-Illinois Steel Corp., one at Gary and one at South Chicago. Scheduled shutdown of a battery of 70 coke ovens at Joliet Wednesday was postponed with the arrival of a new shipment of coal.

The United States Steel Corp.'s mine at Bunsenville, Ill., was closed when the strike started Monday.

Carnegie-Illinois' coal supply is estimated sufficient for from one to three weeks.

Inland Steel Co. has more than a month's supply. Company obtains coal from a commercial mine at Wheelwright, Ky., which was closed by a sympathy strike Wednesday.

Youngstown Sheet & Tube Co. has stocks adequate for several weeks. It obtains coal from both captive and commercial mines.

Wisconsin Steel Co. has a comfortable supply and is unaffected by the strike since its captive mine at Benham, Ky., is manned by the AFL and is operating.

Republic Steel Corp. is little de-

Columbia Steel Plant Struck

■ PITTSBURG works of Columbia Steel Co., West coast subsidiary of United States Steel Corp., was closed last week by a strike. Welders, chippers and grinders in the foundry department staged a sit-down on Wednesday and demanded wage increases ranging from 15 to 25 cents an hour. Other departments struck in sympathy.

Company has about \$5,000,000 in defense orders for ship parts and other material.

Plant employs 3200.

pendent on coal in this district.

Continental Steel Co., Kokomo, Ind., obtains coal from commercial mines in West Virginia which are closed by sympathy strikes. Company has a two-month supply.

Blast furnace operations and coke

production in the greater St. Louis district have not yet been affected by the coal strike. Large stocks have not been accumulated because of the proximity of the mines. No commercial mines have been closed.

Southern Steelmaking To Taper Within Two Weeks

BIRMINGHAM

Steelmaking operations will taper within two weeks and will be almost at a standstill in this district within four weeks unless coal mining is resumed. Three blast furnaces, two at Woodward Iron Co. and one at Republic Steel Corp., are inactive, although steelmaking continues at 90 per cent of capacity.

Republic has only enough coal on hand for a couple of days, while Woodward has about two weeks' supply for one furnace. Tennessee Coal, Iron & Railroad Co. has somewhat larger stocks. Sloss-Sheffield Steel & Iron Co. operates on commercial coal and is not yet affected by the strike.

Buffalo Steel Plants Have Fairly Comfortable Stocks

BUFFALO

Captive mine strike has had no immediate effects on steel ingot production here. Lackawanna plant of Bethlehem Steel Co. reports reserve stocks "are ample" for "quite some time."

South Park avenue plant of Republic Steel Corp. has sufficient supplies to last for several weeks. River Road plant of Wickwire Spencer Steel Co. also has comfortable stocks.

Connellsville Region Faces Complete Mine Shutdown

CONNELLSVILLE, PA.

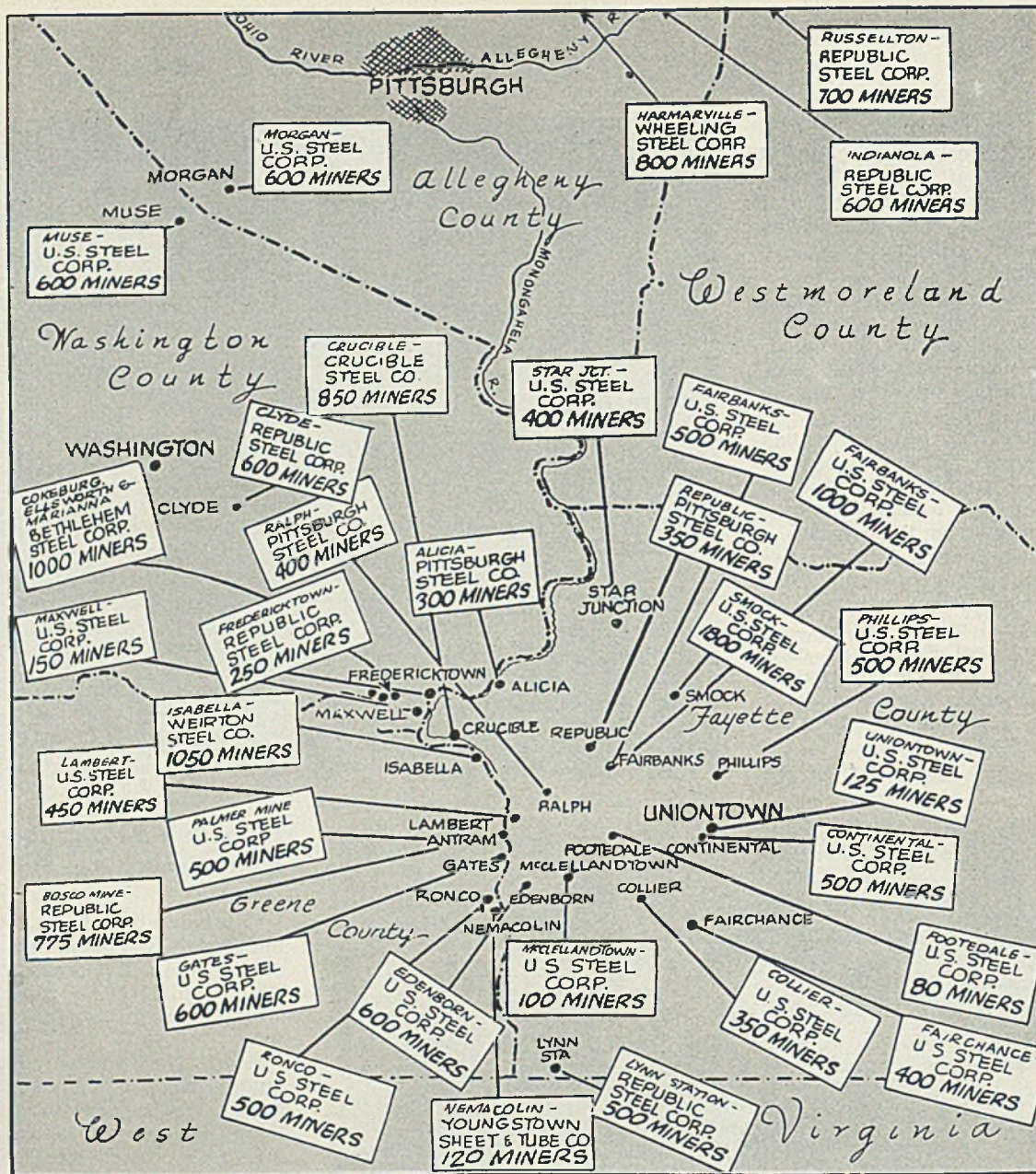
Workers in commercial coal mines in the Connellsville district have joined miners employed in captive mines, a move which threatens to close the entire bituminous mining industry in this district. With 22,000 miners out on Friday an additional 7000 was expected to go out by the week end.

H. C. Frick Coke Co. kept its mines open all week, on a greatly curtailed basis, the number of men reporting for work decreasing steadily as picketing became more effective. The latter has been confined to persuading men not to report for work and warning those completing a shift.

Coking companies are endeavoring to keep ovens fired but coal supply is greatly reduced and the ovens must be cooled if more is not made available. It is reported about 75 per cent of miners desire to continue working as wage loss at this time of year is a heavy burden.



■ Spokesmen for the captive mine operators: Left to right, B. F. Fairless, president, United States Steel Corp.; E. G. Grace, president, Bethlehem Steel Co.; and Frank Pumell, president, Youngstown Sheet & Tube Co.



■ CAPTIVE COAL MINES: Spotted on this map are the captive coal mines in Western Pennsylvania, center of the controversy which precipitated the strike. Mines in this section employ about 18,000 miners

Step by Step to the Labor Crisis of the Year

■ CAPTIVE coal mines were closed last week despite President Roosevelt's promise to Congress that a stoppage in these "essential coal mines" would not be permitted.

During the latter part of the week many commercial mines also were closed as some miners covered by the Appalachian agreement walked out in "sympathy" with the captive mine employees.

Efforts to avert the walkout collapsed Sunday, Nov. 16, when conferences between steel company representatives and UMW officials broke up without agreement. On Monday Mr. Lewis informed the President he had refused to accept the open shop agreement with the steel companies because it would invalidate union shop agreements already in effect in the commercial soft coal mines.

Later the three steel executives—B. F. Fairless, United States Steel Corp., E. G. Grace, Bethlehem Steel Co., and Frank Purnell, Youngstown Sheet & Tube Co.—submitted to the Chief Executive a report stating they "firmly and sincerely believe the right to work in our coal mines or in any industry should not be dependent on membership or nonmembership in any organization."

They added that everything reasonably in their power had been done to avert a work stoppage. They denied there was any disagreement among them on the union shop issue. This followed a statement by Mr. Lewis that Mr. Grace "alone had blocked an agreement embodying the union shop clause."

At midnight Sunday, most of the

UMW members employed in the captive mines failed to report for work, although partial forces reported at a number of scattered mines as the stoppage continued.

Violence flared sporadically throughout the captive mine district. Two men were shot at Gary, W. Va., in a melee between pickets and nonstrikers. Independent workers there appealed to President Roosevelt for protection that they might continue working.

In western Pennsylvania clashes between strikers and nonstrikers occurred. Fourteen men were slightly wounded by gunfire in Fayette county. Stonings and fist fights were common.

In the face of the possibility that drastic action would be taken by the President to reopen the mines, (Please turn to Page 118)

Mill Supply Men Told Function Is Important

CHICAGO

■ Some 600 mill supply distributors who attended the ninth annual conference of the Central States Mill Supply Association here Nov. 17 felt greatly encouraged as a result of assurances from H. K. Clark, senior consultant, OPM's Priorities Division, and vice president and general manager, Norton Co., Worcester, Mass., that they are recognized as essential factors in keeping the wheels of industry going.

W. Gibson Carey, president, The Yale & Towne Mfg. Co., Philadelphia, declared that in addition to co-operating fully with the Army and Navy, business men should lift their voices in an attempt to influence the development of sounder national policies in regard to price and wage control, to the regulation of labor and to other factors in our economy.

As things now stand runaway prices and catastrophe lie ahead and, unless some fundamental changes are made, we face lower rather than higher standards of living. In the belief that "a day of active merchandising lies ahead," he counseled individual companies to keep as financially strong as possible, to strengthen their lines of products and to keep their sales departments strong.

New officers of the association are: President, Oscar Iber, O. Iber Co., Chicago; vice president, Walter Ethier, Western Iron Stores, Milwaukee; secretary, John Day Jr., John Day Rubber & Supply Co., Omaha, Neb.; treasurer, George Stalker, W. J. Holliday & Co., Indianapolis.

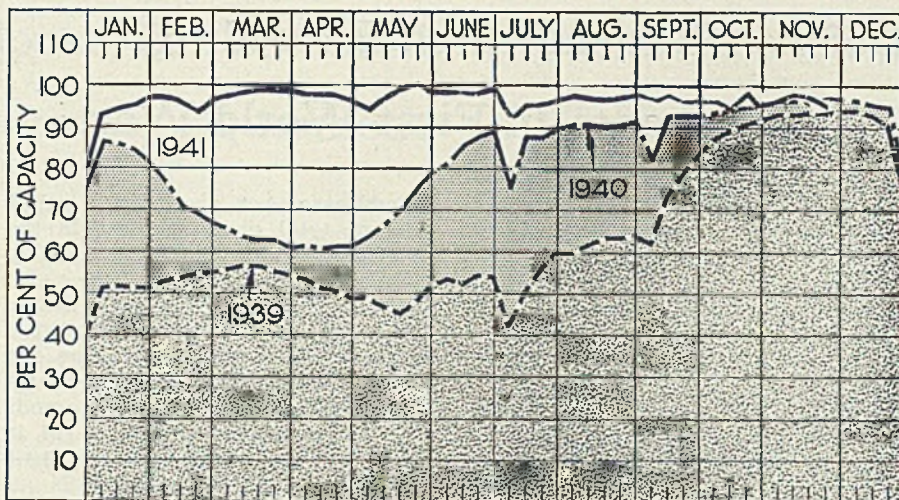
Baldwin Gets Russian Order for Large Presses

■ Baldwin-Southwark Division of Baldwin Locomotive Works, Philadelphia, has received an order from the Russian government, through Amtorg Trading Corp., for ten large extrusion presses and auxiliary equipment having a total value of \$2,250,000.

Presses, ranging in capacity up to 4000 tons, will make possible rapid production of light alloy shapes, tubes and rods, to be used in manufacturing wide variety of defense material, including airplanes and tanks.

OPM Considers "Freezing" 1942 Automobile Models

OPM Automotive branch will recommend that 1942 passenger car model designs be "frozen" to eliminate necessity for retooling for 1943 models.



PRODUCTION . . . Down

■ PRODUCTION of open-hearth, bessemer and electric furnace ingots last week declined 1½ points to 95½ per cent. One district advanced, four declined and seven were unchanged. A year ago the rate was 97 per cent; two years ago it was 93½ per cent.

Chicago—Down 1 point to 101½ per cent, as four producers took furnaces off for repair. One company held its rate and another advanced slightly. Coke shortage is an imminent threat.

St. Louis—Steady at 98 per cent. One mill, facing shutdown for lack of scrap, has received a supply sufficient for the remainder of the month.

Detroit—Production continues at 96 per cent, practical capacity.

Birmingham, Ala.—Unchanged at 90 per cent.

Buffalo—Still restrained by shortage of scrap, production holds at 79 per cent.

Cincinnati—Gained 3½ points to 91½ per cent, two open hearths idle.

Cleveland—Down 2½ points as one producer took off an open hearth for repair.

Youngstown, O.—Coal strike and scrap shortage caused a drop of 6 points to 88 per cent, with 65 open hearths and three bessemer active.

Republic Steel Corp. has five open hearths idle because of scrap scarcity. Carnegie-Illinois Steel Corp. has suspended six open hearths and a blast furnace at Farrell, Pa., and a blast furnace at Youngstown. The rate this week is expected to be about 85 per cent or lower.

New England—Held steady at 92 per cent.

Pittsburgh—Rate held last week at 99 per cent but will start this week at 89 per cent and decline rapidly from that point if the coal strike continues.

Wheeling—Down 9 points to 82 per cent, on scrap, coke shortage.

Central eastern seaboard—Steady at 91 per cent.

Foundry Equipment Sales Index Rises in October

■ Foundry Equipment Manufacturers' Association, Cleveland, reports index of net orders closed for new equipment in October was 414.2, compared with 372 in September and 298.2 in August. Index for repairs was 327.2, compared with 339.2 in September and 356.9 in August. Total sales index was 403.8 in October, 363.8 in September, 312.9 in August.

Indexes are percentages of monthly averages of sales to metalworking industries, 1937-39.

Contract Blast Furnace

■ Freyn Engineering Co., Chicago, engineers and contractors, announced last week that it has been awarded a contract to build a new 1300-ton blast furnace in the Middle West. Reconstruction of four stoves is included. Details were not disclosed.

District Steel Rates

Percentage of Ingot Capacity Engaged
In Leading Districts

	Week ended Nov. 22	Change	Same week	
			1940	1939
Pittsburgh	99	None	97	94
Chicago	101.5	- 1	100	95
Eastern Pa.	91	None	94	86
Youngstown	88	- 6	93	90
Wheeling	82	- 9	93.5	93
Cleveland	92	- 2.5	86	88
Buffalo	79	None	93	95
Birmingham	90	None	97	94
New England	92	None	82	100
Cincinnati	91.5	+ 3.5	97.5	84.5
St. Louis	98	None	87.5	81
Detroit	96	None	96	90
Average	95.5	- 1.5	97	93.5

Defense Expenditures Exceeding Disbursements in First World War

■ COMPARISON of the United States' present industrial defense effort with that of 1917 shows according to an OPM survey, that:

Disbursements for industrial activity month by month are running at a higher level today than in World War I.

Due to a lower price level today, the country probably is getting more for its money than was obtained for every dollar spent in 1917 and 1918.

Because of increased industrial efficiency through technical advances and billions of dollars of additional investment, the productive capacity of each workman has been vastly increased.

To arrive at an approximate figure for industrial disbursements for defense in the current effort, OPM economists took monthly totals of disbursements paid on defense contracts and added payments made by foreign governments for war materials produced in the United States. The disbursements for World War I were estimated on data which give a comparative picture.

In order to compare expenditures for military purposes, money paid out for food shipments to the Allies in 1917-1918 was deducted from total expenditures in the first period. The amounts spent for food under the

Lend-Lease Act are only a small part of total disbursements in the current defense effort, hence they have not been deducted.

Disbursement figures used in this study were not corrected for differences in prices of 23 years ago and now. The Bureau of Labor Statistics index of prices on all commodities at wholesale stood at 114 in April, 1917, and 78 in July, 1940 (1926 equals 100); hence it is assumed that a given dollar volume of disbursements probably represented a smaller physical volume of production at 1917 prices than at 1940 prices.

The study also takes account of the fact that in April, 1917, the war effort had been going on for almost three years and the Allies had been making substantial purchases of munitions and other materials in the United States for about two years. Under the stimulus of these purchases munitions production capacity had been built up, and when we finally declared war on Germany considerable plants and experience were available. It was probably necessary for the present defense program to start closer to scratch than in the previous effort.

Tremendous advances in industrial efficiency have been made since 1917-1918, it is noted. Overall indus-

trial efficiency can be measured roughly by output per man-hour—the quantity of goods one man can produce in one hour. Economists have constructed index figures designed to show relative output per man-hour of American industry. These computations indicate an increase in the output of the average industrial worker of about 135 per cent between the period of World War I and World War II. This is due largely to improvements in technical processes, in machinery and in management methods.

Navy "E" Presented To Carnegie-Illinois

■ Admiral William H. Standley, U.S.N., retired, presented the Navy "E" pennant to Carnegie-Illinois Steel Corp., United States Steel subsidiary, at the Hunt Armory, Pittsburgh, last Friday evening, before an audience of 22 mayors and burgesses and over 8000 employes from the Pittsburgh and Chicago districts.

The ceremony marked the first time the United States Navy Band participated in an industrial program. Permission was granted by Secretary Knox after an invitation had been extended by J. L. Perry, president of Carnegie-Illinois.

The Navy "E" pennant was presented for the company's record in carrying forward its schedules for production of materials for the two-ocean fleet.

Bethlehem To Receive Awards

Bureau of Ordnance flag and Navy "E" will be presented to Bethlehem Steel Co., Nov. 25, at the Bethlehem, Pa., plant. The ceremony will be held in a building devoted to ordnance production.

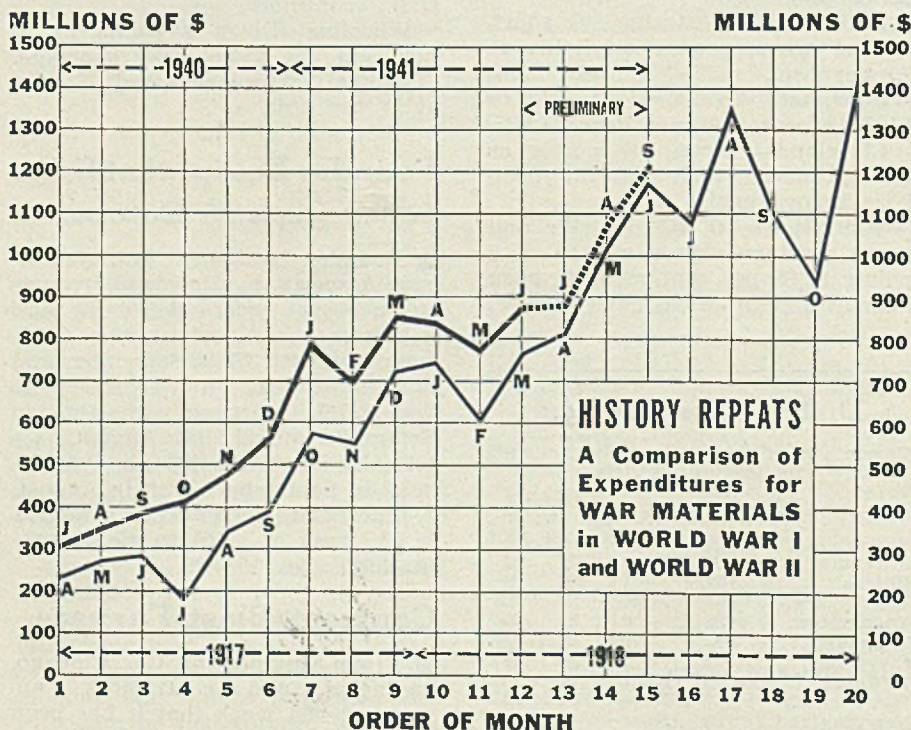
Awards will be made by Rear Admiral A. E. Watson. Following the ceremony the admiral, his staff and press representatives will "make the initial visitation to the opening of the new \$23,000,000 forging plant."

199 Koppers Employes Awarded Service Pins

■ Koppers Co., Pittsburgh, awarded service pins last week to 199 employes who have been with Koppers or predecessor companies for 25 to 40 years. Presentations were made by J. P. Williams Jr., president, at a dinner in William Penn hotel.

C. J. Ramsburg, vice president, presided as toastmaster. J. T. Tierney, chairman, made an address and H. B. Kirpatrick, vice president, presented entertainment.

Eight employes have been with the company 40 years, 16 for 35 years, 32 for 30 years and 143 for 25 years.



■ Remarkable parallels in war expenditures in 1917-18 and 1940-41 are revealed in the above chart. Disbursements in World War II are running consistently ahead of those in the first World war, and the government reports it is obtaining more material for each dollar expended

Organize Clearing House To Aid Small Industries Obtain Materials, Equipment

CHICAGO

■ TO AID in keeping small industry going during the present emergency by discovering and making available the materials and other articles which have become stagnant in their present location and are out of the market, and to bring together the owners as vendors and the needy as vendees, the National Small Business Men's Association, Illinois Division Inc., has established a Materials Clearing House Committee.

Now ready to function, the work of the committee, with headquarters at 411 South Wells street, here, will become a major activity of the association.

According to Frederick A. Virkus, president of the organization, a special investigation has disclosed existence of surpluses of various items of useful materials, tools and equipment, which have accumulated in storehouses, warehouses and plants, for which the owners have no present need and for which there is no established market.

Much of such property constitutes remnants from changed models, or stocks, established to meet needs

which rapid changes have made obsolete, or the gradual accumulation of items which have become unstandard to the purposes of the owner. Mr. Virkus states that great quantities of useful miscellaneous materials, tools, machines, and needful supplies are lying idle and partly forgotten. If their whereabouts be ascertained and their availability made known, urgent needs of those who lack them may be met, and the owners may convert what is otherwise likely to become scrap into cash or other useful assets.

Effort Will Be Supplementary

Function of the Materials Clearing House Committee is to cope with this situation, to discover these hidden stocks and see that they are applied to needs which may not otherwise be met. Mr. Virkus points out that an activity of this kind with experts in charge will also allow suggestions for use of substitute materials out of available stocks. This procedure will supplement efforts of recognized industrial outlets serving particular industries or groups.

Plan under which the committee

will operate is simple. It will endeavor to locate materials, hand and machine tools, power and other equipment, related supply items, and other property of a needful sort which is scarce on the open markets, which the owners are willing to list with the committee and release for a reasonable price. All listings are to be subject to prior sale or cancellation.

Complete description and specifications of such property will be procured, with samples or drawings thereof when appropriate, and the f.o.b. price at which it is available. Each item will be identified with a reference number, the owner's quoted f.o.b. price will be shown, and the zone location of the property will be given so that those tentatively interested may reckon transportation time and expense.

If a manufacturer is interested in any scheduled item, the committee will furnish the name and address of the owner or individual in position to act for him, with whom the inquirer may negotiate directly, and wholly independently. For this service the committee will charge a fee of 10 per cent of the f.o.b. selling price. This fee will be remitted by the seller at the time of payment and is a necessary charge to make the committee effort self-sustaining.

The committee will not buy and sell on its own account. It is to be entirely independent and unaffiliated with brokers, materials men, manufacturers and others. It is to be staffed with men who have had broad experience in general business, materials, tools, equipment, and manufacturing activities.

The plan also sets forth that to the greatest practicable extreme, but without responsibility to the association, the committee will endeavor to see that property which may be offered for sale is not misrepresented, and it reserves the right to refuse to list items which may be offered which it judges to be unreasonably high priced or not of useful quality.

To place the plan in effect, the association is now enlisting the support of several thousand small manufacturers through a mail campaign.

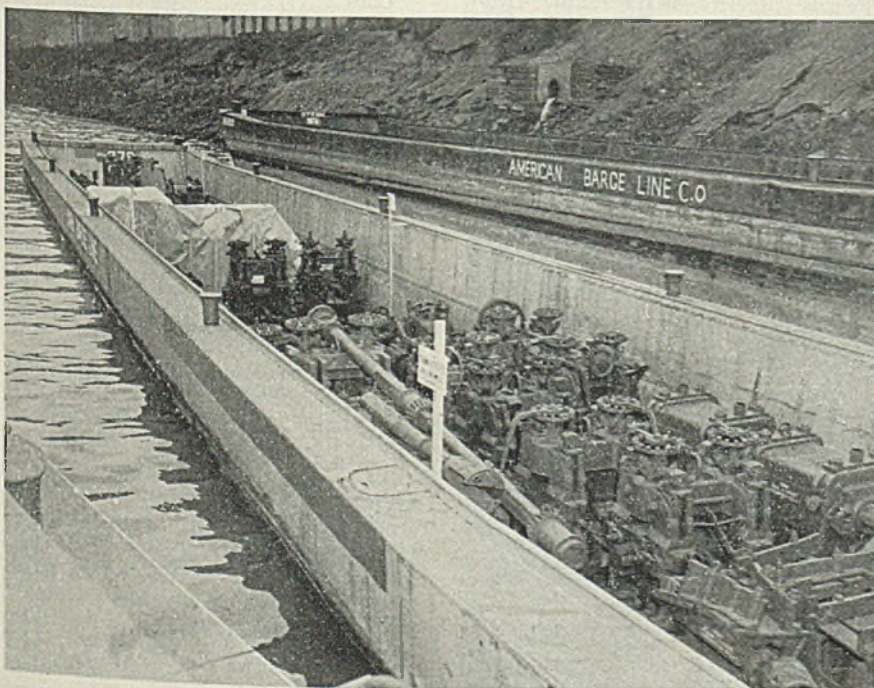
October Machine Tool Shipments \$77,200,000

■ Machine tool shipments rose to \$77,200,000 in October as compared to \$68,700,000 in September and \$64,300,000 in August, according to the National Machine Tool Builders' Association, Cleveland.

In October a year ago shipments were estimated at \$49,000,000.

The October shipments indicate that the industry will exceed its announced goal of \$750,000,000 in 1941.

Steel Mill Equipment Shipped by River



■ All-river shipments of bulk commodities are common in the Pittsburgh district, but shipment of machinery via the rivers is a comparatively new development. Shown here is a partial shipment of rolling mill equipment which was recently moved from Pittsburgh to a downriver mill by Frank B. Foster, Pittsburgh. Believed to be one of the first shipments of this type, it was also one of the largest. Name of the buyer was not disclosed

September Steel Exports Up 4 Per Cent; Scrap Shipments Decline

■ CONTINUING the upward trend begun in July, exports of steel and iron products, excluding scrap, increased again in September, totaling 641,094 gross tons, valued at \$38,946,334, according to the Department of Commerce. This was a gain of 4 per cent over August exports of 617,477 tons, valued at \$44,375,965, but falls short of September, 1940, exports of 965,444 tons, valued at \$50,630,630.

Cumulative exports for nine months, 4,753,255 tons, valued at \$341,379,998, are below the 5,487,012 tons, valued at \$341,841,419, exported in the comparable period last year.

Nonalloy ingots and blooms were largest item in September, 328,662 tons, an increase of 51 per cent over August exports of the same material. Nonalloy black sheets were second in size in September, 27,889 tons, followed by tin plate at 27,025 tons and pig iron, 26,331 tons.

September scrap exports totaled 65,486 tons, valued at \$1,214,548, a decrease from 80,255 tons, valued at \$1,564,209 tons exported in August. Scrap exports in September, 1940, the last full month before licenses were applied, were 255,608 tons, valued at \$4,437,019. For nine months scrap exports totaled 621,526 tons, valued at \$12,050,641, compared with 2,417,534 tons, valued at \$41,066,454, in the comparable period in 1940.

Industrial Machinery Exports Off 18 Per Cent

■ Industrial machinery exports in September totaled \$34,250,644, a decline of 18 per cent from \$41,976,614 in August, the Department of Commerce reports. Machine tool exports declined 16 per cent, from \$17,124,324 in August to \$14,274,854 in September, all classes showing smaller shipments. Lathes dropped from \$3,544,183 to \$3,511,262; milling machines from \$4,151,690 to \$3,365,716; grinding machines from \$2,399,030 to \$2,090,655; drilling machines from \$1,629,846 to \$720,228.

Metalworking machinery other than machine tools declined from \$3,574,584 in August to \$2,304,092 in September. Shipments of rolling mill equipment totaled \$726,645 in September, against \$543,558 in August. Forging machinery declined to \$401,395 from \$979,475, and sheet and plate metalworking machinery to \$704,008 from \$1,558,422.

Mining, well and pumping equipment was exported to the value of \$4,103,735, a reduction of 28 per

cent from August shipments of \$5,715,118. Power generating machinery exports in September were valued at \$2,339,016, compared with \$3,081,224 in August.

Farm Implement Exports Higher in September

■ Exports of farm implements and machinery in September were valued at \$6,697,683, an increase of 36 per cent over \$4,912,825 in September last year, the Department of Commerce reports. Exports for the first nine months this year were practically unchanged at \$61,825,171, compared with \$61,842,549 in

the corresponding period in 1940.

Exports of tractors, parts and accessories were valued at \$5,192,491 in September, 37 per cent above \$3,793,943 in September, 1940. Tillage implement exports in September were valued at \$552,374, an increase of 31 per cent over \$422,489 in September last year. Harvesting machinery exports were valued at \$378,830 against \$328,881 in September last year. Miscellaneous types of farm implements and machinery were exported to the value of \$573,988, compared with \$367,512.

■ Priority clinic will be held in Pittsburgh Nov. 25, in the ballroom of Hotel William Penn. The meeting is sponsored by the Office of Production Management and the National Association of Manufacturers, cooperating with the Pittsburgh Chamber of Commerce, Tri-State Industrial Association, and Purchasing Agents Association of Pittsburgh.

Exports of Iron and Steel Products

(In gross tons)

Articles	Sept. 1941	Aug. 1941	Jan. thru Sept. 1941	Articles	Sept. 1941	Aug. 1941	Jan. thru Sept. 1941
Pig iron	26,331	64,925	458,537	Cast-iron soil	1,297	2,006	11,523
Ferromanganese and spiegeleisen	351	215	3,003	Pipe, welded:			
Other ferroalloys	759	506	15,020	Black steel	6,307	4,715	45,273
Ingots, blooms, etc.:				Black wrought-iron	615	366	3,584
Not containing alloy	328,662	217,563	1,293,723	Galvanized steel	4,432	6,120	54,228
Alloy incl. stainless	20,113	24,322	292,276	Galv. wrought-iron	613	574	4,012
Steel bars, cold fin.	2,506	2,219	62,135	All other pipe, fts.	2,588	1,141	17,706
Bars, iron	834	582	3,645	Wire:			
Bars, concrete	10,041	8,072	117,534	Plain iron or steel	5,737	7,505	52,668
Other steel bars:				Galvanized	4,918	5,078	52,548
Not containing alloy	13,578	15,479	158,919	Barbed	3,450	4,653	42,189
Stainless steel	122	98	597	Woven-wire fencing	394	485	3,340
Alloy, not stainless	5,531	9,141	59,563	Woven-wire sc'n cloth:			
Wire rods	18,113	23,947	118,547	Insect	111	64	778
Boiler plate	505	1,003	20,258	Other	350	404	2,304
Other plates, not fab.	23,949	26,536	257,975	Wire rope and cable	1,718	1,708	12,070
Stainless steel	13	15	197	Wire strand	127	119	1,351
Alloy, not stainless	246	2,343	8,215	Electric welding rods	381	487	4,052
Skelp iron or steel	8,770	14,289	114,974	Card clothing*		1,290	10,942
Sheets, galv. iron	875	456	9,151	Other wire	1,669	6,027	38,495
Sheets, galv. steel	6,182	7,204	68,015	Wire nails	3,726	6,027	38,495
Sheets, "black" steel:				Horseshoe nails	206	297	1,991
Not containing alloy	27,889	31,906	291,591	Tacks	135	138	952
Stainless steel	113	110	882	Other nails, staples	606	785	5,539
Alloy, not stainless	1,146	1,750	10,188	Ordinary bolts, machine screws	3,713	3,857	31,503
Sheets, black iron	1,804	2,470	14,437	Castings:			
Strip steel, cold-rolled:				Gray-iron (incl. semisteel)	524	1,240	8,623
Not containing alloy	3,619	3,613	41,397	Malleable-iron	457	333	2,863
Stainless steel	68	66	405	Steel, not alloy	312	438	2,874
Alloy, not stainless	56	68	616	Alloy, incl. stainless	104	424	1,645
Strip steel, hot-rolled:				Car wheels, tires, axles	3,968	2,416	20,245
Not containing alloy	7,402	8,368	69,900	Horseshoes and calks	74	101	520
Stainless steel	2		27	Forgings, n.e.s.:			
Alloy, not stainless	698	301	1,371	Not containing alloy	5,166	4,564	34,267
Tin plate, taggers' tin	27,025	32,588	192,472	Alloy, incl. stainless	311	815	4,373
Terneplate (incl. long ternes)	393	450	5,970	Total	641,094	617,477	4,753,255
Tanks, except lined	459	1,100	14,787	Scrap, iron and steel:			
Shapes, not fabricated	17,881	17,021	195,027	No. 1 heavy melting†	12,764	21,192	143,715
Shapes, fabricated	2,454	2,633	37,297	No. 2 heavy melting†	28,163	40,264	282,064
Plates, fabricated	1,383	735	18,011	Baled and bundled†	9,287	6,557	57,218
Metal lath	254	151	1,710	Cast and burnt†	734	1,576	26,282
Frames and sashes	54	398	1,497	Other†	13,600	9,583	102,385
Sheet piling	1,106	374	5,569	Scrap, tin plate			
Rails, 60 lbs.	3,877	7,262	80,928	Tin plate circles, strips, cobbles, etc.	137	227	3,072
Rails, under 60 lbs.	1,098	2,838	27,361	Waste-waste tin plate	671	556	5,847
Rails, relaying	21	300	4,101	Terneplate clippings and scrap	130		586
Rail fastenings	283	911	12,356	Total scrap	65,486	80,255	621,526
Switches, frogs, crsgs.	319	107	1,594	GRAND TOTAL	706,580	697,732	5,374,781
Railroad spikes	505	301	5,054	Iron ore	252,620	294,722	1,347,639
R.R. bolts, nuts, etc.	157	271	1,568				
Boillertubes, seamless	1,417	4,999	38,773				
Boiler tubes, welded	58	65	1,369				
Pipe:							
Seamless casing and oil-line	5,932	8,890	71,282				
Do., welded	7,842	1,087	19,288				
Seamless black	3,239	4,183	24,921				
Pipe fittings:							
Mall. iron screwed	364	494	3,742				
Cast-iron screwed	112	123	848				
Pipe and fittings for:							
Cast-iron pressure	754	4,479	32,174				

*Not separately classified in 1941.
†New class.

OPM Officials Differ on Extent of Steel Capacity Expansion Necessary

WASHINGTON
■ DIFFERENCE of opinion is developing not only outside OPM but among OPM officials themselves regarding the proposed steel expansion program. Main difference seems to be that some think there will not be enough scrap and pig iron to take care of the new steel capacity when it is completed.

Officials in the Steel Expansion Unit of OPM point out, however, that they are not overlooking that situation but are planning to take care of pig iron at least, even if they are unable to do anything about scrap.

Survey is now being made by that unit of the pig iron productive capacity of the country. It will be recalled that some months ago a green light was given to increase this capacity by 6,500,000 tons. The survey which is just being completed shows the need for some 10,000,000 tons of pig iron additional and it is probable that OPM will go ahead on that basis.

Wants Increased Armor Capacity

There has been some opposition to the increased steel production from the Navy, but it is pointed out at OPM that the Navy wants to have its increased armor plate capacity. It is not so worried about other kinds of production, so long as it gets what it especially needs.

Up to this time Jesse Jones and his Defense Plant Corp. have co-operated 100 per cent, it is stated at OPM, on the expansion program, even to the proposed West Coast increased production which hasn't yet been finally approved. It is reported here that that particular job will run well over \$100,000,000 when it is completed.

The new figure of 10,000,000 tons more pig iron takes into consideration foundry requirements. This is taken into consideration, it is reported, the scrap situation and also is based on 100,000,000 tons ingot capacity in round numbers for the country.

Scrap situation is again coming to the front. There is quite some difference of opinion about this also, some OPM officials feeling that if Leon Henderson increased the price of scrap that it would bring more scrap into the market while others feel that no matter what the price, even \$30 per ton, it would not bring out any appreciable increased amount over the present.

It is the opinion of some of the steel industry representatives who

come to Washington frequently that the speech made on Armistice day by R. C. Allen, an assistant chief of the Iron and Steel Section, was not in accord with other OPM officials. He said, among other things, that 34 more blast furnaces would be needed in addition to those which are projected by the Steel Expansion Unit.

Defense Officials Tour New Crankshaft Plant

■ New \$4,500,000 defense plant of Ohio Crankshaft Co., Cleveland, was inspected last week by 115 Army, Navy, Air Corps and government officials, key defense industrialists and Wright Aeronautical Corp. executives from Paterson, N. J., and Cincinnati.

Equipped with 314 high speed precision machines valued at more than \$3,000,000, the new plant comprises 229,000 square feet of floor space and is reported by the company as the first unit in Cleveland to be built, completely equipped and operated solely for defense. First shipment of finished crankshafts was made eight months after the contract with Defense Plant Corp. was signed.

Production at the new unit, Plant No. 4, is devoted entirely to machining 206-pound crankshafts for 1700-horsepower Wright 14-cylinder Cyclone aviation motors used in medi-

um bombers. With highly precise requirements, the job involves 607 distinct machine and inspection operations. Entire output goes to Wright Aeronautical Corp. at Cincinnati.

Ohio Crankshaft shafts are also used in tanks, scout cars, military trucks, naval vessels and artillery tractors. Order backlog is said to total millions, and further expansion is already planned. Built at the Navy's request, a 40,000-square foot addition to Plant 3 for machining heavy-duty diesel engine crankshafts will be ready next January.

Luncheon commemorating Ohio Crankshaft's twenty-first anniversary preceded the inspection tour. Sixteen of the company's 18 original employes, still active on the payroll, had earlier represented 1550 workers in four plants in presenting flowers and a desk set each to Messrs. Dunn and Denneen. Employment is expected to total more than 2000 by the year's end.

Bolt and Nut Producers, OPA Study Prices

■ Bolt, nut and rivet manufacturers have failed to reach an agreement with OPA regarding prices and further conferences on the subject will be held.

At a recent meeting, OPA officials referred to what they called the "substantial" profits of the manufacturers during the first six months this year and argued that price increases were unnecessary.

The manufacturers contended first half profits represented liquidation of low-cost inventory and did not represent earnings under present raw materials costs.



■ Francis S. Denneen, left, secretary and treasurer, and William C. Dunn, president, Ohio Crankshaft Co., Cleveland, hosts at the company's official defense plant inspection tour last week

MEN of INDUSTRY

■ **H. T. FLORENCE** has been named vice president, Cleveland Crane & Engineering Co., Wickliffe, O., and will also continue as general manager. Mr. Florence has been associated with the company 20 years in various shop departments, engineering and sales.

W. C. Sayle, formerly vice president, has been elected president, succeeding his father, the late W. D. Sayle.

O. J. Smidl has been appointed supervisor of contracts, Chicago, Burlington & Quincy railroad, Chicago.

James A. Heitzmann has been elected vice president and a director, Acme Pattern & Tool Co. Inc., Dayton, O.

Robert B. Wolcott has been appointed manager of sales, New York office, South Chester Tube Co., Chester, Pa. Mr. Wolcott has been a sales representative for the company in New York over 15 years.

Sr. Marcelino A. Ceriale, director of the national standardizing body of Argentina, will visit the United States in February or March as a guest of the American Standards Association, New York.

Arthur F. Johnson has joined the staff of Reynolds Metals Co. at Listerhill, Ala. He formerly was in charge of the development program of the Silver Lake mine in Silverton, Colo.

C. E. Herington has been appointed sales director of a newly created sales service department established by Meehanite Research Institute of America Inc., Pittsburgh. Mr. Herington, formerly advertising manager, will continue to supervise Meehanite promotional activities.

R. C. Dalzell, technical adviser, Baltimore division of Revere Copper & Brass Inc., has been elected president, Baltimore Alumni Association of Tau Beta Pi Honorary Engineering Fraternity.

E. P. Larsh, heretofore president, has been elected to the newly created post of chairman of the board, Master Electric Co., Dayton, O.
I. I. Warriner has been elected



H. T. Florence



Robert B. Wolcott



C. E. Herington

president and general manager. Other officers are: **W. R. Clements**, vice president and sales manager; **H. E. Kline**, secretary-treasurer; **D. T. Warner**, works manager, and **W. H. Nicholas**, comptroller.

J. D. Wright, secretary-treasurer, Thompson Products Inc., Cleveland, has been elected vice president and general manager, Thompson Aircraft Products Inc., Euclid, O., wholly-owned subsidiary of Thompson Products. He will also serve as secretary-treasurer of the new company.

Other officers of the aircraft company are **L. M. Clegg**, executive vice president, and **A. T. Colwell**, vice president. They will continue to serve the parent company in the same capacities. Operating heads of the Euclid plant are **E. A. McBride**, plant manager; **P. B. Lerch**, general superintendent; **E. F. Gibian**, chief engineer; **J. G. Moore**, production manager; **G. N. Hackett**, purchasing agent; **E. W. Ackerman** and **A. D. Messner**, assistants to general manager.

George P. Herrington has been appointed sales and engineering representative in the mid-western states by Lord Mfg. Co., Erie, Pa., with headquarters at 844 North Rush street, Chicago.

Oscar F. Tangel has joined the technical staff of Battelle Memorial Institute, Columbus, O. He has been assigned to the division of materials beneficiation where investigations of coal preparation and ore concentration methods are in progress.

Harry Wilson Jr., since 1931 works manager, Jessop Steel Co., Washington, Pa., has been elected vice president in charge of operations. He joined the company in 1905, serving successively in the chemical laboratory, crucible melting department, and sheet mill division.

R. J. Murray, associated with the company 16 years, has been elected assistant treasurer, in addition to his duties as secretary.

William H. Milton Jr., assistant manager, plastics department, General Electric Co., Pittsfield, Mass.

has been promoted to manager of that department. He succeeds **G. H. Shill**, who has been made assistant to the manager, appliance and merchandise department, with headquarters in Bridgeport, Conn.

Eugene McAuliffe, president, Union Pacific Coal Co. and Southern Wyoming Utilities Co., Omaha, Nebr., has been elected president, American Institute of Mining and Metallurgical Engineers, New York. **Chester A. Fulton**, president, Southern Phosphate Corp., Baltimore, and **L. E. Young**, vice president, Pittsburgh Coal Co., Pittsburgh, have been elected vice presidents of the institute.

H. A. Campbell, research engineer, Solar Aircraft Co., San Diego, Calif., has been appointed by the Office of Production Management to serve on the Technical Advisory Committee to deal with national emergency specifications for aeronautical steels.

L. E. Earnest, production control manager of Solar Aircraft, has been appointed a member of the Resistance Welding Committee, Engineering Foundation, sponsored by the American Welding Society and American Institute of Electrical Engineers.

F. T. H. James, assistant to chief of motive power, Lackawanna railroad, has been promoted to chief of motive power, with headquarters in Scranton, Pa. He succeeds **E. E. Root**, who has requested a leave of absence due to ill health.

Automotive and Metals Safety Groups Elect

Sectional officers of the National Safety Council, elected for 1941-42 at the Thirtieth National Safety Congress and Exposition held in Chicago recently, include the following:

Automotive and machine shop section, executive committee: **Paul S. Strecker**, Purdue University, West Lafayette, Ind., general chairman; **H. B. Duffus**, Westinghouse Electric & Mfg. Co., Springfield, Mass., machine shop division vice chairman; **C. E. Wooliever**, Aviation Engine Plant, Melrose Park, Ill., automotive division vice chairman; and **O. F. Lehman**, Chrysler Corp., Detroit, secretary.

Metals section, executive committee: **H. J. Spoerer**, Youngstown Sheet & Tube Co., East Chicago, Ind., general chairman; **R. H. Ferguson**, Republic Steel Corp., Cleveland, vice chairman; **John P. O'Rourke**, Bethlehem Steel Co.'s Maryland plant, Sparrows Point, Md., vice chairman; and **Earl Fyler**,

Carnegie-Illinois Steel Corp., Gary, Ind., secretary and news letter editor.

Will Build More Copper, Aluminum Facilities

United Engineering & Foundry Co., Pittsburgh, will construct an aluminum fabricating plant costing \$22,000,000 at Fairview, Oreg., it was reported last week. Plant site comprising 115 acres has already been purchased by the Defense Plant Corp. Aluminum Co. of America, Pittsburgh, will operate the plant, which is to have an annual capacity of 60,000,000 pounds of fabricated aluminum.

Defense Plant Corp. has also executed a contract with Castle Dome Copper Co. for provision of facilities at Miami, Ariz., for production of electrolytic copper. Estimated cost is \$9,000,000, and capacity will be 46,000,000 pounds per year.

Aluminum Co. of America will build likewise an aluminum plant at Lake Catherine, near Malvern, Ark., at a total cost of about \$33,000,000. Plant will include facilities for manufacture of 128,000,000 pounds of aluminum annually, plus required power generating equipment.

Purnell Offered Job As Steel Division Chief

Frank Purnell, president, Youngstown Sheet & Tube Co., Youngstown, O., has been offered the position as chief of the iron and steel division, Office of Production Management, it was reported last week. Mr. Purnell, if he accepts the appointment, would succeed **Arthur D. Whiteside**, president, Dun & Bradstreet Inc., who has tendered his resignation as chief of the section to **William S. Knudsen**, effective Dec. 1.

In some quarters it was thought Mr. Purnell would not accept the post. At the same time it is known a number of others are under consideration for the position.

Reliance Buys Plant

Reliance Electric & Engineering Co., Cleveland, has purchased the plant now occupied by the Cleveland Hobbing Machine Co., it was reported by Reliance officials last week. The newly-acquired unit is located near the Reliance plant.

Acquisition of the facilities will give Reliance an added 31,000 square feet of floor space. Part of this will be used to relieve congestion in assembly lines and the rest for storage.

Cleveland Hobbing Machine is expected to move its operations into a new plant in Euclid, O., soon, permitting Reliance to take possession of the old unit by Dec. 31.

DIED:

CLIFFORD S. STILWELL, 51, executive vice president, Warner & Swasey Co., Cleveland, and president, National Machine Tool Builders' Association, Nov. 19, in Cleveland.

Mr. Stilwell and his brother **Charles**, president of Warner & Swasey, constituted one of the outstanding brother teams in industry. Born in Freehold, N. J., in 1890, son of the late **Dr. Herbert F. Stil-**



Clifford S. Stilwell

well who came to Cleveland in 1903 as pastor of the First Baptist Church of which **Ambrose Swasey** was an active member, **Clifford Stilwell** entered the Warner & Swasey organization as a special apprentice following graduation from Denison University in 1912.

In 1914 he was appointed manager of the company's Detroit office; in 1930 he was recalled to Cleveland as general sales manager; in 1935 he was elected vice president; and in 1939 executive vice president. He was elected president of the Machine Tool Builders' Association about a month ago.

John P. O'Neil, 68, for 25 years president, Western Foundry Co., Chicago, until his retirement six years ago, Nov. 14, in La Canada, Calif.

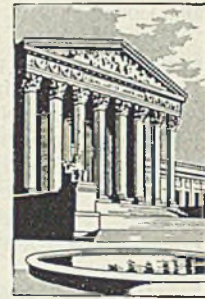
Albert Pack, 50, chairman of the board, Continental Roll & Steel Foundry Co., East Chicago, Ind., and Detroit Seamless Steel Tubes Co., Dearborn, Mich., Nov. 15, in Chicago.

E. W. Buell, 52, assistant engineer, Budd Wheel Co., Detroit, Nov. 17, as the result of a hunting accident.

Theodore Cox, 33, for 16 years chemist at Detroit Testing Laboratory, in Detroit, Nov. 18.

Windows of WASHINGTON

OPA still considering maximum price schedule for machine tools . . . Steel drum manufacturers required to set aside specified inventory of sheet steel to provide material for emergency overseas shipments . . . Builders' hardware prices "frozen" at Oct. 21 levels . . . OPM requests lead producers to operate at capacity . . . January output of civilian light trucks to be curtailed 35.9 per cent



By L. M. LAMM

Washington Editor, STEEL

WASHINGTON ■ FURTHER discussion of a schedule of maximum prices for new machine tools will take place at a third meeting early in December between representatives of the industry and the OPA.

The initial meeting with machine tool makers was held Oct. 22 after Price Administrator Henderson had announced that consideration was being given to the issuance of a formal ceiling price schedule. A second meeting took place Nov. 18, at which technical information as to trade methods and practices was obtained.

Machine tool manufacturers represented at the second meeting included: Ajax Mfg. Co., Cleveland; American Tool Works Co., Cincinnati; Axelson Mfg. Co., Los An-

geles; Cincinnati Milling Machine Co., Cincinnati; Cincinnati Planer Co., Cincinnati; Clearing Machine Corp., Chicago; Ex-Cell-O Corp., Detroit; Hall Planetary Co., Philadelphia; Heald Machine Co., Worcester, Mass.; Jones & Lamson Machine Co., Springfield, Vt.; Monarch Machine Tool Co., Sidney, O.; National Acme Co., Cleveland; Niagara Machine Tool Works, Buffalo; Racine Tool & Machine Co., Racine, Wis.; Van Norman Machine Tool Co., Springfield, Mass.; Warner & Swasey Co., Cleveland.

"Bright Work" Deadline To Be Postponed Until Dec. 31

An additional 15 days to use up existing stocks of bright finish or trim on passenger cars will be rec-

ommended by the OPM Division of Civilian Supply.

Under a recent order manufacturers were told to cease using such bright work on Dec. 15. The current recommendation extends the deadline to Dec. 31. If any stocks remain in inventory after that time, manufacturers will be permitted to use them only "if they are painted or treated in some manner so that they will lose their identity as bright finish permanently."

Priorities Division Expedites Manufacture of Steel Drums

Two orders, designed to make possible the speedy manufacture of steel drums for overseas shipment of gasoline, oil, and other petroleum products, have been issued by the Priorities Division.

Under General Preference Order M-45, manufacturers of steel drums will be required to set aside a specified inventory of the 16 and 18-gage hot-rolled sheet steel from which the drums are made. This inventory is to be used only upon specific order of the Director of Priorities. The companion order, making up the other half of the program, is Preference Rating Order P-76. It extends a rating of A-4 to deliveries of the sheet steel to drum manufacturers for the purpose of replenishing the original inventory. Any sheet steel acquired with its assistance must be held under the same conditions as the originally designated inventory.

A manufacturer is not required to set aside more than the original reserve inventory, and he is not required to replace it. If he wishes, he can use the preference rating extended by Preference Rating Order P-76 to acquire the necessary stock.

This method of assistance was

Highspots in the Week's Washington News

- Laboratory equipment manufacturers granted A-5 rating (p. 42).
- Builders' hardware prices stabilized at Oct. 21 levels (p. 42).
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OVER A BILLION IN USE—OVER 100 SHAPES AND SIZES



extended because orders for overseas shipments are frequently placed on an emergency basis, often not more than one week before sailing dates. It is impractical to create a substantial stockpile of finished drums, because of the large areas that would be required for storage. In place of this, the stockpile of the basic raw material is provided for.

Investigate Plastics as Scarce Metals Substitute

National Bureau of Standards is co-operating closely with the Navy, Army, OPM and other defense agencies to determine to what extent plastics can be utilized to replace scarce metals and other critical materials.

Every new plastic or new application of an existing plastic submitted for test receives immediate attention.

Emergency specifications have been prepared to utilize plastics in place of scarce metals and essential materials for a long list of articles purchased by the government. These cover a wide range—from vital airplane parts to door knobs.

Steel Purchasers Warned To File PD-73 Forms with Producers

Purchasers of steel face delay in receiving shipments if they fail to file Form PD-73 with producers, the OPM Iron and Steel Branch has warned.

Under Steel Order M-21, it is unlawful for producers to make shipments after Oct. 15, if the producer does not have a copy of PD-73 covering the order. A number of shipments are now being held up, the branch disclosed, pending receipt of forms by producers.

Form PD-73 provides for complete information by the customer as to the classification of steel ordered, its ultimate use, completion date of contract for which the material is required, and other pertinent data.

Co-operative Housing Plan for Defense Workers Formulated

A co-operative housing plan for defense workers, designed to provide homes at moderate cost for families with incomes between \$1200 and \$1800 a year, has been announced by Charles F. Palmer, Co-ordinator of Defense Housing.

Under the plan, groups of workers may organize co-operatives and apply to the Federal Housing Administration for mortgage insurance under Defense Housing Title VI, which permits insurance up to 90 per cent of the appraised value of the house.

Mr. Palmer emphasized that the initiative must be taken by the

workers themselves in order to obtain the advantage of the economics of group housing and FHA mortgage insurance.

Co-operatives will employ their own architects to select sites and prepare plans. Although built in groups for the sake of economy and for good community planning, only individual homes are contemplated under this plan. No multiple-unit housing is included.

Information concerning methods of financing, organization, and operation of the co-operative, may be obtained from the co-ordinator's office which has prepared a description of the plan for the guidance of interested groups.

Contract Distribution Division Opens Five New Field Offices

Field offices of the OPM Contract Distribution Division have been opened in five additional cities. The offices and their addresses are: Chattanooga, Tenn., 909-910 James building; Fall River, Mass., 27 South Main street; Lancaster, Pa., 655 Woolworth building; Scranton, Pa., Room 717, First National Bank building; Wilkes-Barre, Pa., 528 Miners National Bank building.

This brings the total of Contract Distribution field offices to 62.

Nonmetal Container Producers Granted Priority Assistance

To facilitate the operations of the cooperage and wooden container industries, and to lend assistance to the production of paperboard containers, the Priorities Division has issued Preference Rating Order P-79, extending to manufacturers in these fields priority assistance in obtaining the necessary hardware, including wire and nails, saws, knives, and other tools.

Makers of all types of wooden barrels and kegs, and containers made from sawed lumber, veneer or plywood, and of paperboard containers, are included within the terms of the new order. It is believed that this assistance will greatly stimulate the substitution of these forms of packages for metal containers, and effect a considerable saving in the amounts of critical materials currently consumed in packaging.

A rating of A-5 is assigned to the deliveries of ferrous material, defined in the order as "any products made principally from iron or steel," except wire, to delivery of which an A-8 rating is applicable.

A producer, to apply the preference rating to deliveries to him, must sign an acceptance of the order, and file it with the Priorities Division, and furnish an unsigned copy to each of his suppliers with whom he has placed a purchase order for ferrous material. The supplier, in turn,

may extend the order in the same fashion to obtain material to be physically incorporated in his deliveries to his customer.

The producer, or supplier, making use of the order must endorse the following statement, "Purchase order for ferrous material, preference rating _____ pursuant to Preference Rating Order No. P-79," on the original and all copies of each purchase order.

Builders' Hardware Prices "Frozen" at Oct. 21 Levels

Manufacturers' and jobbers' prices of a wide variety of builders' hardware items have been stabilized at levels prevailing Oct. 21 in a maximum price schedule announced by OPA.

Prices of insect screen cloth, which is distributed through the same channels as builders' hardware, also are held to their Oct. 21 levels by the OPA ceiling.

While the new schedule became necessary as direct result of the OPM copper conservation order of Oct. 21, it is not confined to articles made wholly or partly of copper or brass, but extends to all products named, no matter what material is used in their manufacture.

Numerous advances of 10 per cent in manufacturers' prices for various items of builders' hardware have taken place since the OPM limitation order was issued. That this probably would occur was recognized by OPA on Oct. 26, when Mr. Henderson first announced a comprehensive program to stabilize prices of all products made of copper, brass or other copper base alloys. At that time, the administrator disclosed that one of the first steps in this program would be to establish "present prices" as a maximum for builders' hardware.

The new schedule covers eight types of knobs and handles, 20 types of door locks, 13 types of hinges, 16 items of miscellaneous door hardware, 10 items of window hardware, five of screen hardware, and 12 miscellaneous articles, such as house numbers, transom chains and snap catches. Painted galvanized, commercial bronze, hand-drawn copper and "koolshade" fabric window screen cloth are included.

Further Priority Assistance Extended to Laboratories

To broaden the assistance already extended to research laboratories, the Priorities Division has issued an order assigning a preference rating of A-5 to acquisition of the scarce materials required by manufacturers of the necessary laboratory chemicals and equipment.

Producers who supply laboratories engaged in research, testing, analy-

sis, and in plant control studies, as well as clinical and academic (college and high school) laboratories, are covered by the order. The rating is applicable to material required for packaging the equipment for delivery, as well as to those elements entering into its manufacture.

A producer to whom the order has been issued may extend it to a supplier, if necessary, by executing an additional copy in the manner prescribed.

A previous order, P-43, extended to certain accredited laboratories engaged in scientific research a preference rating of A-2, and is applicable to orders placed by them for essential materials. The new order, however, specifically aids producers of certain equipment which the laboratories require.

Limit Use of Chlorine as Paper Bleaching Agent

Decreased use of chlorine in the manufacture of pulp, paper and paperboard, effective immediately, has been ordered by the Priorities division in General Limitation Order L-11.

Result will be less whiteness, or "brightness" in the idiom of the paper trade, in practically all grades of paper. The changes will be noticeable, it was said, on close examination but will not be observable on casual inspection.

In general, all grades of paper will correspond to the standards of 1931-32. Since that time increased use of chlorine has resulted in whiter papers.

Restrictions will save 60,000 tons

of chlorine a year, which is half the new chlorine entering the paper manufacturing industry annually. All of the chlorine saved will go directly into national defense uses.

Chlorine enters into many phases of defense production. Among its important uses are in the manufacture of plastics for degaussing cable used to make ships immune to magnetic mines; in the manufacture of waterproofing paraffins for canvas; as a solvent in armament plants; in the manufacture of guncotton; as a coolant for liquid-cooled airplane engines; in the manufacture of non-freezing dynamite, and in chemical warfare.

Phenols Placed Under Allocations System

Complete allocations system covering phenols is provided in an amendment to General Preference Order M-27 which originally imposed a milder form of control on phenols Aug. 30.

The priorities director, on and after Dec. 1, will give specific directions each month as to shipments of phenols.

Priorities Regulation No. 1 generally will apply, according to the amendment, and a special inventory report is required for all persons, except producers, who have more than a 30-day supply on hand, based on the year ended Sept. 30.

A preference rating of A-10 is assigned to all defense orders not otherwise assigned.

Reason for the order is a current shortage caused by the increased

use of plastics in aircraft production and heavy military export demands. New phenol plants now under construction will not be in operation for three or four months.

The order applies to phenols of all grades and all related products.

Steel Mill Inventories Slightly Lower in September

September index of value of steel mill inventories was 125.6 compared with 126.8 in August and 121.1 in September, 1940, taking Dec. 31, 1938, at 100, according to the monthly survey of the Department of Commerce.

Department's figures show also that taking January, 1939, at 100, the September index of value of new orders received by steel mills was 249, compared with 223 in August, and 199 in September of last year.

Index of the value of steel manufacturers' shipments in September was 262 compared with the same figure for August and with 180 in September of last year, taking January, 1939, at 100.

There was an increase of 1 per cent in September over August in the value of steel manufacturers' unfilled orders while in August the increase over July was 2 per cent. In September of this year there was an increase of 236 per cent in the value of these unfilled orders.

Lead Producers Requested To Operate at Capacity

Operation of lead mining facilities at capacity was requested by OPM recently in telegrams to producers and miners. The wire, signed by Director General William S. Knudsen and Associate Director Sidney Hillman, said:

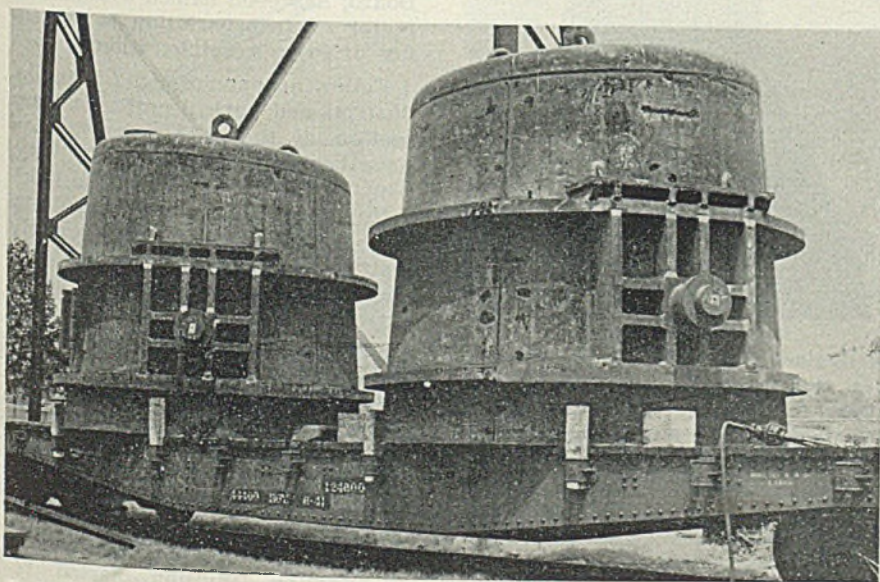
"The urgency of the defense program requires that your mining properties be operated at their maximum productive capacity, 24 hours a day, six days a week and where possible, seven. You are requested to take all necessary steps to this end and if necessary acquire such additional equipment to improve the operating conditions of the mines that will result in increased production. Please advise us if we can be of any assistance."

Propose Plan To Aid Metalplating Workers

OPM Labor Division has proposed a four-point plan to relieve anticipated unemployment among 7000 employes in the metalplating industry recently hit by a priorities order curtailing the use of "bright work" on automobiles for decorative purposes.

The plan, which was offered at a

Ladles Fabricated by Welding



Two of six 140-ton ladles fabricated by welding at the Birmingham plant of the Chicago Bridge & Iron Co. for the Tennessee Coal, Iron & Railroad Co. Ladles are 10 feet 5 inches in diameter at the bottom, 11 feet 3 $\frac{3}{4}$ inches at the top and 11 feet 3 $\frac{1}{2}$ inches deep

joint meeting of 19 union, management and government representatives, proposed:

1—No new plating plants or facilities to be built as long as there are plants and facilities available.

2—The pooling of facilities on both an industry-wide and geographical basis in order to obtain defense contracts or subcontracts.

3—An industry-wide study to be made in co-operation with the OPM to ascertain how the industry's facilities may best be adapted to production conforming with Army and Navy specifications.

4—Investigation of the extent to which the curtailment order will affect employment in the industry with a view to preparing for possible future revision of the curtailment order.

OPA To Establish Scrap Price Enforcement Office in West

Headquarters will be established in San Francisco early in December to oversee administration and enforcement of the iron and steel scrap price schedule in California, Oregon, Washington, and adjacent states.

Two OPA officials, William S. Whitehead, representing the Price Division, and Harold Swope of the Legal Division's Enforcement Section, have arrived in San Francisco to begin preliminary work.

The new San Francisco office will be in the Newhall building, 260 California street.

Oil Burners for Eastern Seaboard Are Approved

Amendments to the defense housing critical list and to Interpretation No. 1 of this list, announced last week, restore to good standing the use of oil burners in defense housing construction on the eastern seaboard.

Due to the petroleum shortage existing at the time the original critical list was issued, the acquisition of oil burners for defense housing units in certain eastern states was not assigned the priority assistance applicable to other building materials.

It has been found desirable further to encourage construction for rent, rather than for sale, and this has been done by assigning higher preference ratings than formerly to houses which will be rented by defense workers, since rental is better suited than purchase to their needs.

Production of Civilian Light Trucks Curtailed 35.9 Per Cent

Production of light trucks for civilian use in January, will be curtailed 35.9 per cent below output in

the same month this year.

Companies manufacturing both passenger cars and light trucks (those less than 1½ tons) may exceed the ceiling on truck output, provided passenger car production is correspondingly reduced so that combined quotas are not exceeded, under a provision in the orders.

Defense Agencies Announce Changes in Personnel

Changes in personnel in the OPM Division of Materials announced last week include: David A. Uebelacker, present chief of the nickel branch, becomes chief of the copper branch, succeeding John A. Church. Mr. Church becomes senior consultant for the copper branch.

Louis Jordan, assistant chief of

New Lights for Liberty



■ Engineers are working on plans to use modern lamps, such as mercury vapor, in relighting the Statue of Liberty to make the torch approximately twice as brilliant as before and to add new color effects to the statue's copper robes. In the flame 300 feet above Bedloe's Island in New York harbor now are thirteen 1000-watt incandescent lamps. The new lighting is expected to transform the faded green hue of the statue at night to an almost phosphorescent emerald color. Westinghouse photo

the nickel branch, has been named acting chief.

Howard C. Sykes, present chief of the mica, graphite branch, moves over to become chief of the stockpile and shipping imports branch, succeeding Philo W. Parker. Mr. Parker has served his agreed term in OPM and is returning to private business.

Howard F. Wierum, assistant chief under Mr. Sykes, replaces him as chief.

Both Mr. Uebelacker and Mr. Sykes are from Englewood, New Jersey, and have been connected with defense agencies since 1940. Mr. Jordan came from New York to join OPM in March of this year. Mr. Wierum spent ten years in Washington with the Tariff Commission before coming over to OPM in June, 1940.

James Gordon Robinson has been appointed administrative officer in OPM, succeeding Roy Jackson, who has resigned to enter private business. Mr. Robinson for the past three years has been director of railroad unemployment insurance, Railroad Retirement Board.

Burton E. Oppenheim has been named executive assistant to Lessing J. Rosenwald, chief, bureau of Industrial Conservation. Mr. Oppenheim is on temporary loan to the bureau from the Department of Labor, where he was Director of the Industry Committee Branch of the Wage and Hour Division.

Louis B. Lindemuth, a consulting engineer in New York who has been connected with the Bethlehem Steel Co. and other steel companies, will be a consultant in the OPM steel expansion unit.

Joseph L. White, transportation consultant of the National Resources Board, has been named assistant director of transportation in the Office of Price Administration.

Following appointments to the industrial and agricultural machinery section of the OPA price division have been announced: R. D. Petty, New York, to be chief of the fabricating equipment and machinery unit; Henry W. Erickson, formerly district manager of the Eimco Corp., New York, to the construction and extraction unit; Arthur H. Moran, formerly with the F. W. Dodge Corp., New York, to the liaison and research unit; William N. Smith Jr., formerly director of purchases for the Meyer Motor Corp., Milwaukee, as business specialist in the farm equipment unit.

Managers for newly established field offices of the OPM Contract Distribution Division named recently include: F. J. Holman, Albany, N. Y.; T. D. Harter, Syracuse, N. Y.; T. Wilbur Weger, Spokane, Wash.

Urges Workers Be Sold On Employer's Integrity

■ Employees should be sold on the integrity of management in as active a manner as customers are sold, Charles J. Stilwell, president, Warner & Swasey Co., Cleveland, declared before a labor relations forum at the annual meeting of the Ohio Chamber of Commerce in Toledo recently.

Mr. Stilwell recommended that employers take their workers into their confidence and keep them informed as to the workings of the enterprise; that pride of workmanship should be cultivated and rewarded with a public "pat on the back"; that the public also should be taken into management's confidence.

"Until manufacturers have gone the limit for all-out production for defense, I don't see how we can successfully sell our employes on the same philosophy . . .

"It seems to me it is paramount that we do those things that are necessary to impress not only upon our employes but upon ourselves the terrific seriousness of this war situation. And I have a feeling that if we bring home to the vast majority of our employes that fact that both

we and they are working together to save the country we live in from the plight of the occupied countries of Europe, we will find ourselves working in better spirit, in better cooperation—and, consequently, we will find some of the more intimate employe problems will resolve into a situation that we can deal with much more effectively."

Meehanite Institute Elects Smalley President

■ Oliver Smalley, president, Meehanite Metal Corp., Pittsburgh, was elected president, Meehanite Research Institute of America Inc., at the group's thirteenth annual meeting in Cleveland, Nov. 6-8.

Other officers elected: Vice president, H. B. Hanley, American Laundry Machinery Co., Rochester, N. Y.; and secretary-treasurer, Frank M. Robbins, president, Ross-Meehan Foundries, Chattanooga, Tenn.

Thirty-five research papers pertaining to recent developments in foundry and metallurgical practice, particularly as applied to recent problems created by defense work, were presented and discussed. For meritorious service, A. C. Denison, president, Fulton Foundry & Ma-

chine Co., Cleveland, was presented a suitably engraved gold watch by the institute. Attendance at the meeting totaled nearly 100.

Compressed Air Institute Contest To Open Dec. 1

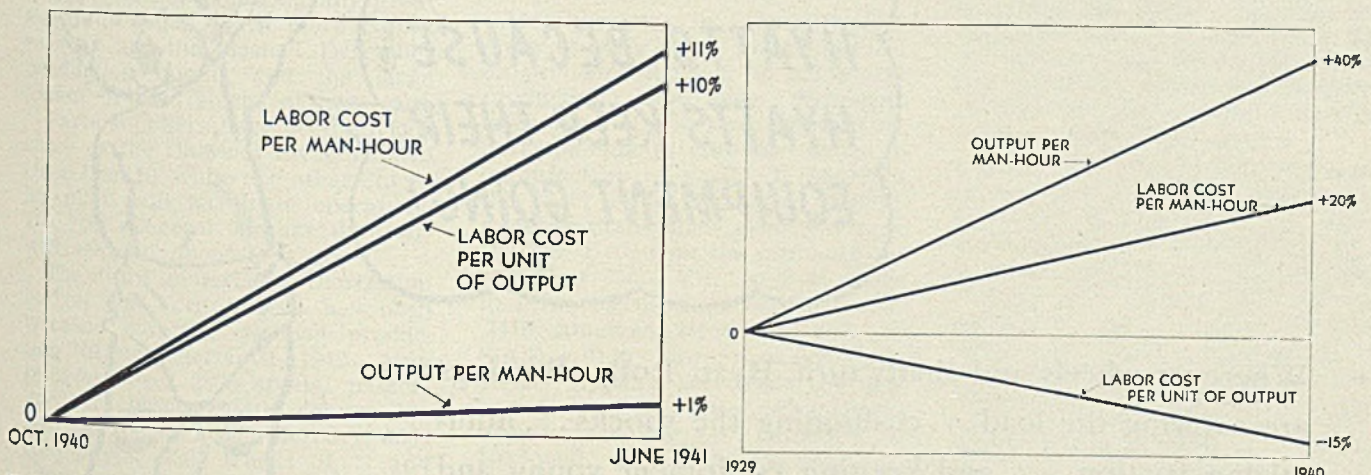
■ Nation-wide contest for written articles dealing with any phase or aspect of compressed air application was announced last week by the Compressed Air Institute, East Orange, N. J. Scheduled to start Dec. 1, the contest will continue six months.

All employes of any organization using or associated with compressed air in any department are eligible to enter the contest. Executives of companies comprising the institute, however, are excepted.

Fourteen cash prizes will be awarded: First of \$100, three \$50 prizes, ten \$25 awards. As many additional awards of \$25 shall be made as there are contestants who submit material acceptable for publication in technical journals.

Contest presentations are to be mailed to C. C. Rohrbach, secretary, Compressed Air Institute, 90 West street, New York, before June 1.

Inflated Wages Seen as Threat To Post-Armament Readjustment



■ RAPIDLY accelerating labor costs per man-hour as compared to output per man-hour, stimulated by defense production since October, 1940, may force the United States into a "difficult post-war readjustment period with wage rates far out of relation to the purchasing power of consumers of manufactured products", according to a study on wages prepared by the National Association of Manufacturers, New York.

Major conclusions of the report: "From 1929 to 1940, labor costs per man-hour in manufacturing increased 20 per cent. Output per man-hour, in the same period, increased 40 per cent. Thus industry was able to reduce labor cost per

unit of product by 15 per cent. This trend has been reversed since the defense program began. From October, 1940 through June, 1941, labor costs per man-hour increased 11 per cent, but output per man-hour increased only 1 per cent. Accordingly, labor costs per unit of output increased 10 per cent. It would appear that rising labor costs are not being offset by further increases in output per man-hour.

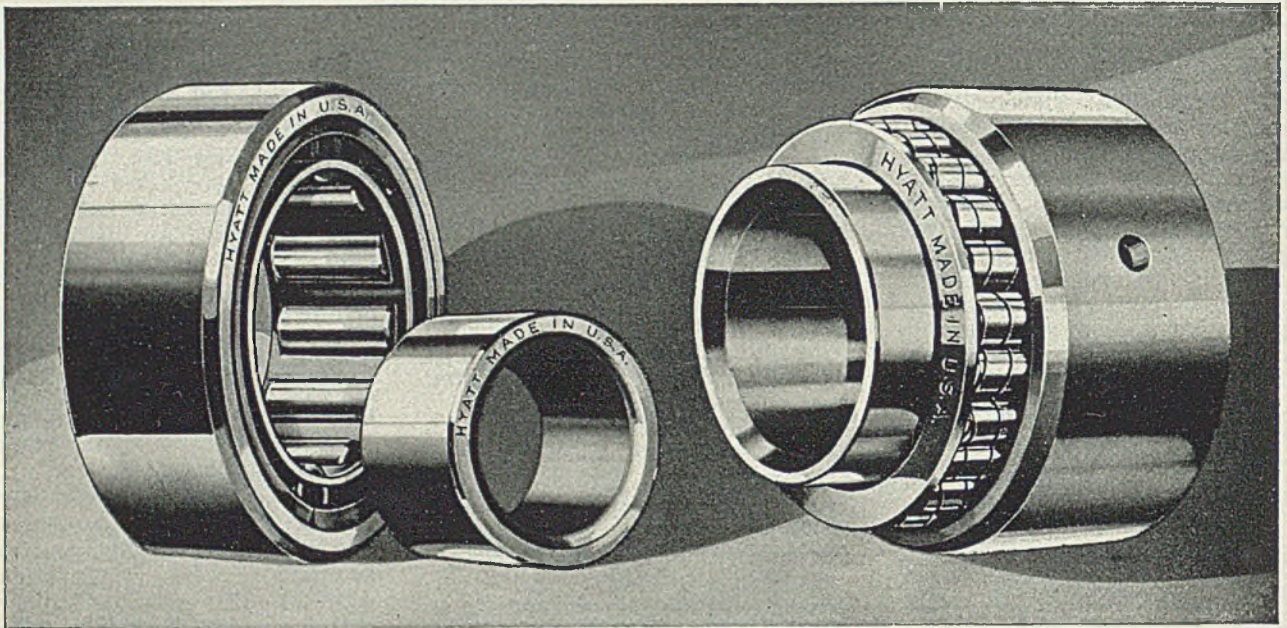
"Further increases in hourly rates of pay will start an upward spiral of inflationary price rises. Rising wages will cause living costs to rise and will lead to demands for wage increases. Further increases in wages may, unless controlled, lead to further price rises and these

again will lead to demands for still further wage increases.

"To fix controls over the price of finished manufactured goods without stabilizing wage rates will threaten, and may impoverish, manufacturing industry. If costs go beyond the price the manufacturer will receive for his finished goods, he cannot stay in business and his employes and those persons who have invested funds in the concern will suffer.

"In the post-armament adjustment period, we may be faced with wage rates fixed at uneconomic levels when other costs, prices and profits are falling. If this happens, another wave of unemployment will be the inevitable result."

KEEP THEM YOUNG WITH HYATTS



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*THEY ALL GO FOR
HYATTS BECAUSE
HYATTS KEEP THEIR
EQUIPMENT GOING!*



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R O L L E R B E A R I N G S

Q U I E T

STEEL

Mirrors of MOTORDOM

Passenger car production decelerating until end of year, most plants closing by Dec. 15 . . . Ford authorizes materials for another 112,500 cars and trucks, covering first quarter . . . Metallurgists debate reasons for age-softening of bullet core steel . . . Advance truck buying will do little to soften blow of disemployment . . . Cast steel parts for airplane engines show well in tests



By A. H. ALLEN
Detroit Editor, STEEL

DETROIT
AUTOMOBILE assemblies last week started to taper off, a process which will continue over the balance of the year, most plants operating only three days last week because of the holiday, and this week four-day schedules will be the rule due to limitations of OPM ceilings. In December, prospects are for part-week operations until the 15th when a general shutdown for the balance of the year is considered likely.

Reason for this mid-month closing ostensibly is for the changeover to painted trim, but obviously this is not a matter requiring any great length of time. Two more potent reasons are the slashed December production quotas and the large extent of field stocks of new cars.

Parts suppliers have been advised some of the Chrysler divisions will close Dec. 10, while one other Chrysler plant will terminate operations Dec. 5. General Motors divisions will ease off about Dec. 10.

The third material authorization budget for Ford buyers has been released covering planned production through March 31, 1942. New releases cover 2800 special passenger car chassis, 30,500 deluxe, 14,500 superdeluxe, 6000 Mercury, 6000 commercial, 2300 trucks of $\frac{3}{4}$ and 1-ton capacity, 35,400 trucks of $1\frac{1}{2}$ -ton capacity, 15,000 reconnaissance cars of Willys design and 15,000 tractors. The new authorization, totaling 112,500, brings cumulative releases of the current model to 9800 special passenger chassis, 66,500 deluxe, 141,500 superdeluxe, 32,000 Mercurys, 32,000 commercial, 9800 small trucks, 103,250 large trucks, 17,650 reconnaissance units and 110,000 tractors, totaling 412,500.

Additional releases were made for 500 station wagons for the Navy, 138 Mercury town sedans for the Army, 793 trucks for lease-lend, 8500 plow bases, 10,100 plows and other miscellaneous production. High priorities—A-1-D, A-1-I, A-1-J, A-2, etc.—apply on Army and Navy

purchases, as well as on 6344 6-cylinder truck engines.

Passenger car releases are no certain yardstick of what production will be, as buyers are instructed to cover only for actual current production needs, and to stay under the ceiling of these authorizations. At least they suggest that Ford is planning on trying to maintain some measure of production of passenger cars through the first quarter of next year.

Age Softening of 37-MM Cores Baffles Experts

Metallurgists in this district, many of them at the moment active on problems incident to armament production, have been discussing lately one of the most mysterious developments to crop up as yet in manufacture of shell. It concerns the steel bullet core for 37-millimeter antitank shell, now said to be the No. 1 item on the ordnance department list. The core is made in three pieces, with cap of S.A.E. 7410 tungsten steel and body of S.A.E. 4150 chrome-molybdenum steel. Mystery surrounds the performance of the latter steel which, after machining, is hardened to Rockwell 65, with specifications calling for a minimum of Rockwell 60 for penetration of $1\frac{1}{2}$ -inch case hardened armor plate.

With hardness of 65 the core will penetrate the armor according to specifications, but the strange part is that after one week's time this hardness drops to around 58, some as low as 57, which is not sufficient to enable penetration of the plate in firing tests. Thus, "fresh" shells perform according to specifications, but seem to undergo a progressive age softening to the point where they fall below requirements, and no one can seem to offer a plausible explanation.

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One suggestion was to place the softened shell in dry ice, which often will bring back hardness, but whether the hardness would be retained once the steel cooled down to normal again is the next question. Other alternative appears to be changing the steel specification to a higher carbon content. To date, The Mystery of the Age-Softening of the Thirty-Seven Millimeters has yet to be unraveled, but it may in some way be tied up with strain hardening and the fact that the shells originally are hardened above the maximum figure which could be expected with this analysis. Hardening, incidentally, is by the electric induction process, with rapid quench.

While no official announcement of the award of eight million incendiaries has yet come to light, latest word on the project is that a great many more primary contractors have been drawn into the picture by the Chemical Warfare Service in Chicago, reported to be supervising the program. Originally there were only 24, but this may have been expanded now to better than a hundred.

Advance Truck Buying To Have Little Disemployment Effect

Publicized as an effort to minimize disemployment resulting from curtailed automobile production in the months ahead, the placing of orders for 215,000 trucks involving expenditure of about \$400,000,000, actually will have little effect on absorbing disemployed workmen. Proposed orders do not represent any move on the part of the Army to buy extra trucks and store them, but rather a combination of certain lease-lend requirements plus normal replacements to be expected in the next year in the Army's truck fleet.

Present Army truck orders, being

assembled at a rate of about 4000 a week, will be filled by next April 10 at the latest, hence new buying is essential to avoid layoffs in the truck industry itself next spring. About five months time is necessary between placing of orders and delivery of initial assemblies on such orders. Truck industry is now operating at 80 per cent of capacity and is assembling 16,000 units a week in both civilian and military classifications.

New rating of light, medium and heavy trucks will be announced shortly from Washington. They will be based on maximum gross vehicle weights, anything under 9000 pounds being considered a light truck, from 9000 to 16,000 pounds a medium truck, and over 16,000 pounds a heavy truck. Production restrictions imposed by OPM permit the industry to build 84 per cent of the light trucks built last year, medium trucks equivalent to the rate for the first six months of last year, and no limit other than natural production ceiling on heavy trucks.

Propose New Engine Uses

In his message to stockholders, K. T. Keller of Chrysler mentions that his engineers have designed and expect shortly to submit to test an arrangement of Chrysler engines for propelling the medium tank now being produced in the Chrysler tank arsenal at a rate of about ten a day. The tanks now are powered by 450-horsepower Wright radial motors. If the new system is successful, it will permit Chrysler to employ a larger number of its own workmen facing

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	468,895
Aug.	103,343	89,866	164,792
Sept.	192,679	284,583	248,751
9 mos. ...	2,570,370	3,160,060	4,031,191
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†	
Oct. 25	91,855	117,080	
Nov. 1	92,879	118,092	
Nov. 8	93,585	120,948	
Nov. 15	92,990	121,943	
Nov. 22	76,820	102,340	

†Comparable week

"disemployment" on equipment which they are trained to operate. An installation of Chrysler engines already has been made on a full-size SEA OTTER type of cargo boat and is undergoing tests at sea.

To Conserve Office Supplies

Systematic drive to conserve office supplies having as their basis materials essential to defense production has been initiated by Studebaker at its headquarters in South Bend, Ind. W. E. Tarr, office manager, explains that many of the

office worker's tools are fabricated from essential materials. For example, white paper requires chlorine, an acid used in defense work. Pencils require restricted brass, rubber and graphite. Silk shortage affects production of typewriter ribbons, and carbon paper manufacturers are said to be using materials faster than they can be replaced.

"To mention the lowly paper clip," says Mr. Tarr, "may sound inconsequential, but Studebaker alone used more than 11 million clips and staples, about 4000 pounds, in the past 12 months. When you multiply this by all businesses, you arrive at a staggering sum.

"Our normal annual consumption of typewriter ribbons would stretch more than 60 miles. We plan to get 'better mileage' for the duration by continually reminding our personnel to turn ribbons before discarding, wherever practicable. Instead of scrapping metal typewriter ribbon spools as in the past, we will return them to the manufacturer for further use."

Further savings in vital defense materials are made by virtue of a new wood convertible office desk designed by Mr. Tarr and C. I. Center, manager of the office service division. Since the desk can be converted quickly and easily from an executive or clerical type to a right or left-hand secretarial type, the metal typewriter mechanism is eliminated.

Cast Steel for Aluminum

At a recent appearance before a group of Detroit foundrymen, E. C. Jeter, metallurgist with Ford Motor Co., cited some details of a statically cast steel crankcase section which machines to the same weight as the aluminum forging now used. The cast steel has analysis of 1 per cent carbon, 1.35 silicon, annealed to brinell hardness of 196-228, yielding a part with elastic limit of 60,000 p.s.i. tensile strength of 114,000 p.s.i. and elongation of 16 per cent in 2 inches.

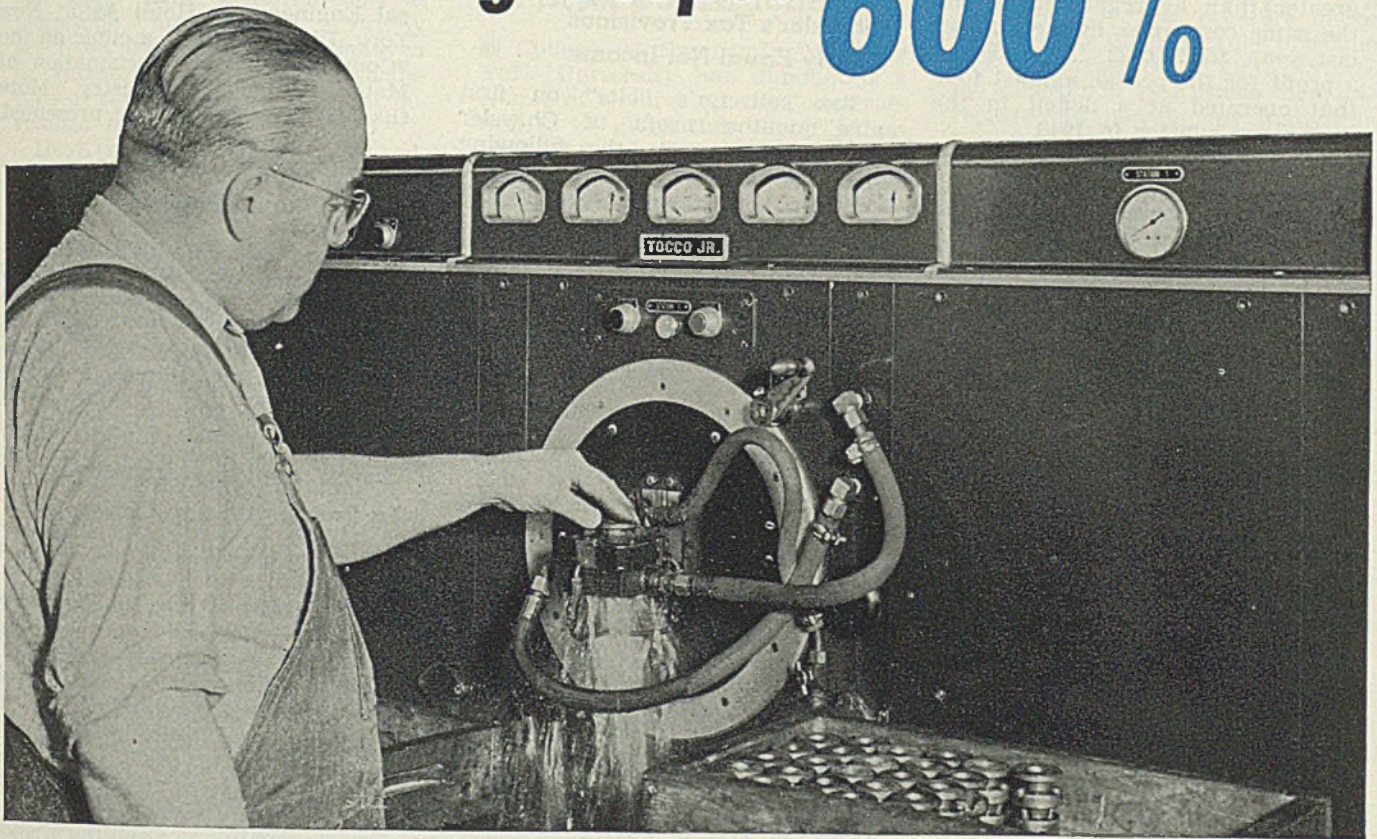
He also showed results of a hydrostatic test applied to cast and forged steel cylinder barrels for aircraft engines. The forging split down the line on which it was rolled and failed at an ultimate load of 494,000 pounds or 5200 pounds per square inch. The casting failed with a more or less jagged rupture, indicating no particular line of weakness, at an ultimate load of 869,000 pounds or 9200 pounds per square inch.

It was on the basis of these tests that Ford was given the go-ahead on production of several hundred radial engines employing the cast steel barrels.



■ Executives for important posts in both car and defense divisions of Oldsmobile were announced last week by S. E. Skinner, general manager. D. E. Ralston was named manager of automotive operations; R. E. Griffin, manager of defense operations and H. A. Trevellyan, general sales manager. Seated, left to right: Ralston and Skinner; standing left to right: Trevellyan and Griffin

TOCCO speed boosts hardening output **600%**

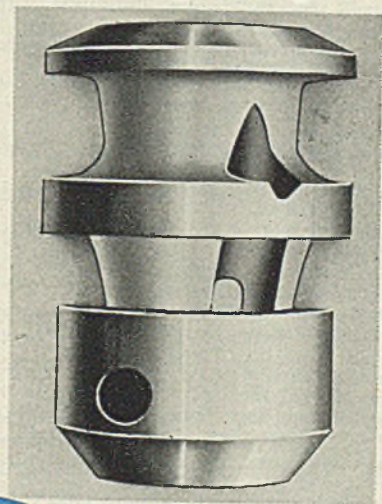


... Elimination of rejects saves \$7300 per year

• Two years ago, The Jacobs Manufacturing Company installed an early model TOCCO Jr. to harden drill chuck bodies . . . to increase hardening speed and eliminate distortion and rejects caused by the former process.

With chucks used extensively in aircraft plants and other defense industries, Jacobs production has jumped 600%. To meet this demand, the plant recently installed a larger, more modern TOCCO Jr. It is hardening chuck bodies at a rate which represents a 60% gain over the first TOCCO Jr. . . . and a 600% gain in output per operator-hour over the former process. And it saves more than \$7300 per year by elimination of rejects due to distortion.

Why not find out how the TOCCO process for hardening and heating of parts can increase your production speed, improve your products and cut your costs. The services of our engineers are yours for the asking.



**THE
OHIO CRANKSHAFT
COMPANY**

Cleveland • Ohio

TOCCO

World's fastest, most accurate heat-treating process

Irregular shape of chuck body caused serious distortion with former hardening process which heated whole front end. TOCCO heats up and hardens only the nose and wrench holes, the wearing areas. Eliminates distortion and rejects. Courtesy of The Jacobs Manufacturing Co., Hartford, Conn.

FINANCIAL

105 Consumers' Nine Months' Profit Up 26.5 Per Cent

■ COMBINED net profit earned by 105 iron and steel consumers in the third quarter totaled \$79,935,601. This was more than 56 per cent greater than aggregate earned by the same companies in the quarter last year, \$51,229,923. All reported a profit for the period, against four that operated at a deficit in the September quarter in 1940.

Eighty-six of the companies reported a higher profit in the third quarter, 1941, than in the corresponding period a year ago.

Aggregate net earnings for the same group of companies in the first nine months this year was \$233,321,304, a 26.5 per cent increase from \$184,408,291 reported by them in the three quarters in 1940. All but

one operated at a profit in the period, against five that incurred deficits a year ago. For the three-quarter period, 99 companies earned larger profits than in the corresponding nine months in 1940.

Accompanying tabulation includes 52 companies; a prior compilation, listing 53, was published in STEEL, Nov. 10, p. 51.

Chrysler's Tax Provisions Nearly Equal Net Income

Tax collector's "bite" on first nine months' profit of Chrysler Corp. is shown in the following skeleton analysis of a recently issued financial report:

	1941	1940
Net sales	\$665,525,554.89	\$514,698,389.82
Profit before taxes	52,460,847.70	45,106,094.22
Profit after taxes	29,460,847.70	30,706,094.22
Provision for taxes this year is		

	Third Quarter 1941	Third Quarter 1940	Nine Months 1941	Nine Months 1940
Allis-Chalmers Mfg. Co., Milwaukee	\$1,781,216	\$1,159,639	\$4,170,793	\$3,769,397
American Bosch Corp., Springfield, Mass.	244,708	173,049	633,931	556,701
American Pulley Co., Philadelphia	50,244	18,804	147,550	58,508
American Steel Foundries, Chicago	716,248	413,921	2,783,967	2,080,446
Babcock & Wilcox Co., New York	1,245,513	357,361	3,095,576	1,832,266
Bliss & Laughlin Inc., Harvey, Ill.	247,967	165,723	672,265	513,941
Bower Roller Bearing Co., Detroit	273,564	260,362	930,436	826,569
Briggs & Stratton Corp., Milwaukee	308,007	163,008	959,094	833,595
Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.	133,551	23,243	537,694	392,476
Chapman Valve Mfg. Co., Indian Orchard, Mass.	176,150	145,549	577,567	462,280
Chicago Railway Equipment Co., Chicago	128,272	31,652	480,722	179,389
Chrysler Corp., Detroit	8,486,005	211,820†	29,460,848	30,706,094
Diamond T Motor Car Co., Chicago	351,057	35,477	732,318	87,349
Doehler Die Casting Co., New York	305,402	115,980	1,004,544	709,914
Ex-Cell-O Corp., Detroit	765,103	485,581	1,853,810	1,315,465
Fyr-Fyter Co., Dayton, O.	33,298	20,771	80,532	32,410
Gabriel Co., Cleveland	71,362	15,291*	116,022	46,710*
Gar Wood Industries Inc., Detroit	249,782	75,087	783,103	377,376
Graham-Palce Motors Corp., Detroit	80,721	469,944*	54,721*	1,016,596*
Holland Furnace Co., Holland, Mich.	705,151	841,775	1,170,154	1,104,159
Hoskins Mfg. Co., Detroit	120,245	113,209	450,870	390,855
Hudson Motor Car Co., Detroit	1,190,788	531,195	1,433,839	1,289,004*
Industrial Brownhoist Corp., Bay City, Mich.	146,884	27,951	461,684	188,526
Kalamazoo Stove & Furnace Co., Kalamazoo, Mich.	215,235	296,677	257,771	362,161
Maytag Co., Newton, Iowa	512,203	352,334	1,368,593	1,050,799
National Acme Co., Cleveland	858,193	853,335	2,430,660	2,090,385
National Supply Co., Pittsburgh	1,775,081	76,818	3,989,828	989,649
Link-Belt Co., Chicago	865,809	815,461	2,172,824	1,780,740
Parkersburg Rig & Reel Co., Parkersburg, W. Va.	254,606	56,153	373,394	252,828
Pittsburgh Screw & Bolt Corp., Pittsburgh	397,962	297,629	990,532	574,999
Pittsburgh Forgings Co., Coraopolis, Pa.	163,891	28,409	465,078	456,782
Reed Roller Bit Co., Houston, Tex.	508,493	317,867	1,296,401	1,080,906
Reo Motors Inc., Lansing, Mich.	237,176	240,140*	385,170	1,026,128*
Rheem Mfg. Co., Richmond, Calif.	156,780	95,181†	486,566	418,965
Richmond Radiator Co., Uniontown, Pa.	23,144	78,009	134,485	134,153
Savage Arms Corp., New York	1,037,085	351,658	2,415,212	577,864
Simonds Saw & Steel Co., Fitchburg, Mass.	799,012	344,215	1,987,716	1,102,587
Square D Co., Detroit	858,530	357,874	2,255,876	1,263,004
Steel Products Engineering Co., Springfield, O.	236,659	221,193	591,202	414,024
Stewart-Warner Corp., Chicago	599,839	317,439	1,370,111	994,684
Studebaker Corp., South Bend, Ind.	702,303	499,814	2,016,180	457,495
Superheater Co., New York	266,703	401,530	980,134	821,108
Sullivan Machinery Co., Michigan City, Ind.	168,276	151,886	450,784	264,606
Symington-Gould Corp., Rochester, N. Y.	255,781	45,808	726,165†	649,092
Terre Haute Malleable & Mfg. Co., Terre Haute, Ind.	24,946	10,709‡	70,577	26,146‡
Thompson Products Inc., Cleveland	341,584	560,802	1,264,783	1,608,704
Timken Roller Bearing Co., Canton, O.	2,975,928	1,944,052	7,629,563	6,940,598
United Aircraft Corp., East Hartford, Conn.	5,188,382	2,971,662	10,771,732	9,199,768
United-Carr Fastener Corp., Cambridge, Mass.	273,647	200,395	836,748	462,007
Walworth Co., New York	402,000	302,255	1,311,820	505,670
White Sewing Machine Corp., Cleveland	149,802	96,885	550,679	320,721
Yellow Truck & Coach Mfg. Co., Pontiac, Mich.	2,714,959	785,760	6,615,282	3,506,869

*Loss; †before excess profits tax provision; ‡before federal income taxes; ††after tax adjustment.

\$23,000,000, compared with \$14,400,000 in the same period last year.

MEETINGS

Conservation of Materials To Be Discussed

■ FEATURING the annual meeting of the American Society of Mechanical Engineers at Hotel Astor, New York, Dec. 15, will be a clinic on the "Conservation and Reclamation of Materials" used in industry. More than 86 papers are to be presented.

Speakers Are Chosen for I.M.A. Annual Banquet

C. F. Kettering, vice president, General Motors Corp., and Senator W. F. George, of Georgia, chairman of the financial committee, will be speakers at the forty-eighth annual banquet of the Illinois Manufacturers Association, Stevens hotel, Chicago, Dec. 9.

Government Representatives

To Speak at Scrap Convention

A government clinic on the manner in which the various forms of control apply to the iron and steel scrap industry will feature the program of the business sessions at the annual convention of the Institute of Scrap Iron and Steel Inc., in Hotel Sherman, Chicago, Jan. 6-8.

Representatives of OPA will speak on the scrap price schedule; the division of priorities will explain the recent priority order and the method of allocating scrap; OPM will relate the place of scrap in defense.

Chicago Area Leads Nation in Horsepower

■ Chicago's industrial area leads all other metropolitan districts in power concentration, according to the Illinois Manufacturers' Association, based on a recent report from the Bureau of Census. Information was compiled from the 1939 census.

Prime movers in the Chicago region total 1,418,316 horsepower, and installed electric motors driven by purchased energy are rated at 1,763,629 horsepower. In 1929, aggregate horsepower in the Chicago area, comprising Cook, Du Page, Kane, Lake and Will counties in Illinois, and Lake county, Indiana, totaled 2,474,130.

Pittsburgh area, with a prime mover installation of 1,377,627 horsepower and 1,354,356 horsepower in electric motors driven by purchased energy ranks second, followed in order by the Detroit region; the New York-Newark-Jersey City, N. J., area; the Philadelphia-Camden, N. J., district; the Youngstown, O., area; and the Boston district.

Ordnance Heat Treating Described in Pamphlet

■ Published recently by Surface Combustion Corp., Toledo, O., an illustrated pamphlet entitled *The Great American Emergency* portrays differences in heat treating outstanding items of ordnance as compared with requirements of peacetime manufacture. Briefly described are the methods employed in fabrication of the items, with the type of heat treating equipment developed for each.

Heat treatment necessary in producing cartridge cases is explained, as is that required for forcing, nosing and drawing of projectiles, the manufacture of bombs, cartridge belt links, gun barrels, gun carriages, mounts and other ordnance materials.

Importance and methods of heat treating armor plate, airplane steels, engine parts and high speed tool steels are also described.

In conclusion, the pamphlet calls attention to the situation that will

face American industry when the war ends. Most Surface Combustion heat treating furnaces, it is explained, can then be readily converted into normal peacetime production.

Offers Lecture Course On Steel Construction

■ College of Engineering of New York University has announced a course of lectures on steel construction to be given this winter in cooperation with the American Institute of Steel Construction, New York. Attendance will be open without charge to students and others interested in the subject, as well as employes of structural steel fabricators and contractors.

Speakers have been selected from recognized authorities with long experience in the subjects treated. Programs may be obtained from the American Institute of Steel Construction, 101 Park avenue, New York.

BIRTHDAYS

Ashcroft 90, Observes "Stainless Steel Anniversary"

■ Ashcroft Gauge Division of Manning, Maxwell & Moore Inc., Bridgeport, Conn., is observing this year the ninetieth anniversary of its founding. The first pressure gages applying the Bourdon Tube principle were manufactured in United States by Ashcroft in 1851. Since then, it is reported by the company, many millions of Ashcroft gages have been produced.

Because no special method for observing a ninetieth anniversary has been commonly accepted, the company has decided to call it the stainless steel celebration. Further emphasis is placed upon the occasion by the company's report that output of Ashcroft gages this year will be nearly double that of any prior 12-month period.

Amsler-Morton's Twenty-fifth

Amsler-Morton Co., Pittsburgh, designers and builders of melting, heating, heat treating and annealing furnaces, recently published an illustrated pamphlet commemorating the company's twenty-fifth anniversary. Depicting some of the equipment developed and manufactured by the company, the publication traces progress made in this field.

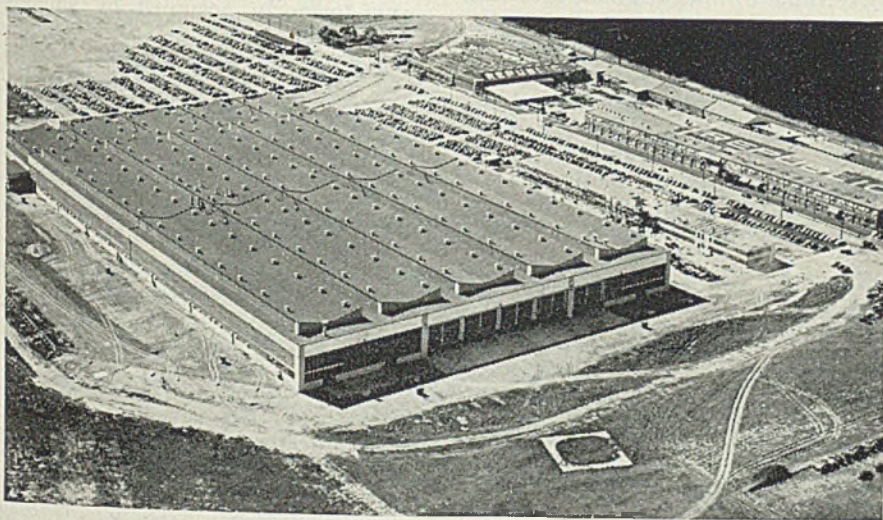
Predecessor of the present organization, the Amsler Engineering Co. was founded in 1903, and first engaged in general engineering and construction. Since 1913, however, there has been a growing tendency to specialize in combustion and fuels as applied to the steel and glass industries, the pamphlet reports.

Veterans Honored by Lamson & Sessions Co.

■ Employees with 15 years or more of service with Lamson & Sessions Co., Cleveland, attended a dinner given by the company Nov. 15 to honor veteran employes. George S. Case, chairman, presented service emblems to Richard Vacha, employe since 1891, to William Behrend, whose service dates from 1890, and to a score of workers with 25 years' service. R. H. Smith, president, presided.

Whiting Williams, authority on industrial relations, cited pride in accomplishment as one of the outstanding motivating impulses in the minds of employes. The satisfaction that comes from the belief that the individual in contributing something worthwhile, said Mr. Williams, often transcends mere dollars and cents considerations.

Triples Production Capacity



■ Tripling previous production facilities, a new \$6,000,000 plant with 500,000 square feet of floor space has been placed in service by Republic Aviation Corp., Farmingdale, N. Y. Work is now concentrated on P-43 pursuit planes, although shortly the new P-47 "Thunderbolt" pursuit will go into production in the new building. The latter is the first army pursuit plane to use a 2000-horsepower double-row radial engine for power.

Designed by Albert Kahn, the building provides 10 acres of floor space under one roof, with clear height of 35 feet. Main working floor consists of three areas, the center 200 x 800 feet. Western end of the structure, consisting of five 100-foot wide bays is being used for

tool shops and stock rooms and is divided from the eastern portion by a barrier made up of paint shops and tooling cribs, a narrow aisle connecting one section with the other. All parts from subassembly and detail shops will be channeled through this aisle, making possible complete control of parts flow by the inspection department.

Equipment runs into the hundreds of thousands of dollars and includes batteries of heavy hydraulic presses and smaller punch presses, spot welders, automatic and hand painting equipment and an overhead monorail system for handling materials. The entire plant is lighted with 42 continuous rows of fluorescent fixtures 500 feet in length, spaced 22 feet apart.

Shipbuilding Facilities Increased Nearly Five-Fold in 18 Months

■ NEARLY five-fold increase in private shipbuilding facilities is revealed in a survey by the National Council of American Shipbuilders, New York. Before the emergency there were only 21 private yards engaged in the construction of steel seagoing vessels. These yards had available 83 active ways of 300 feet or more in length. At present there are 65 yards with a total of 383 ways of 300 feet or more.

These figures do not take into consideration the yards building smaller vessels.

At present, 775 seagoing merchant ships and 503 combatant and seagoing auxiliary vessels are under construction in the privately owned shipyards. These yards are employing approximately 250,000 workers, as compared with 65,000 before the emergency.

Excellent records are being made in the construction of all types of ships, both naval and commercial. The estimated contract building times of naval craft have been reduced from a matter of months to as much as a year.

An illustration of the reduced building time of merchant vessels is the recently completed OCEAN VANGUARD, a 10,500-ton dead-weight cargo ship, which was delivered in six and one-half months after laying of keel. Formerly it

took ten months to a year to build a vessel of comparable size.

Employment of additional workers, the use of shift work, improved techniques, standardization of design, decentralization, spreading the work and use of experienced management have all contributed to this reduction in building time, according to the council.

British Foundries Form Overall Organization

(Special Correspondence)

London—Council of Iron Foundry Associations has been formed to represent practically all trade, technical and labor organizations in the British foundry industry. Previously various branches of the trade have had their several associations, which will continue to carry on their work. The new council will serve as a contact with the iron and steel control agencies of the government in negotiations affecting raw material supply, contract allocation and other matters involved in war work.

The new body represents the greater portion of existing associations responsible for most of the national castings production. It is planned also as an agency to deal with post-war problems, nationally

and internationally. Fitz Herbert Wright, director of the Butterly Co. Ltd., Ripley, has been elected chairman, and Vincent Delpont, European editor of STEEL, secretary.

Even Directors' Room Used To Fill Shell Orders

■ How the Bridgeport Brass Co., Bridgeport, Conn., installed machinery in its directors' room, evacuated its garages, and tore down neighborhood saloons to obtain manufacturing space to enable it to turn out defense orders on time was revealed recently when the company received the Navy "E" production award.

When the Navy called on the company to produce 5-inch shell cases early in the war, a large section of the plant devoted to manufacture of fire extinguisher cases and refrigerator parts was taken over, special equipment installed, and production started. First deliveries were made Jan. 26, 1940.

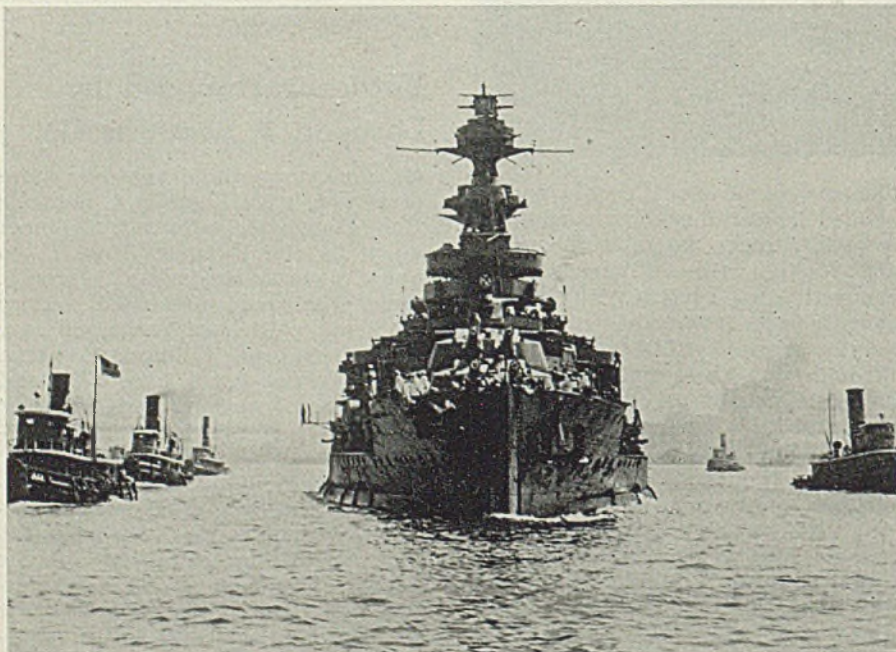
Soon afterward the Army called for 75-millimeter cases. Machines were installed in company garages and now are shipping 500,000 75-millimeter cartridge cases a month.

In a new building erected on a site formerly occupied by saloons and old shacks, company is producing 1,000,000 medium-size cases.

A hundred thousand cases are inspected and packed each day in what was formerly the directors' room.

To manufacture 20-millimeter shell cases for the British, company moved its offices to a new building and used the space evacuated to produce that type case.

English Warship Repaired in New York



■ British warship, H.M.S. MALAYA, leaves New York harbor after being refitted with facilities afforded by the United States government. NEA photo

Domestic Manganese Ore Output Up in September

■ Domestic production of manganese ore containing 35 per cent or more manganese during September was 9400 gross tons, shipments also 9400 tons and producers' stocks at the end of the month 1200 tons, according to the Bureau of Mines. These figures are based on reports from producers which accounted for 84 per cent of 1940 production. In August production was 9100 tons, shipments 9000 tons and stocks at the month end 1200 tons. Rate of shipments averaged 3344 tons monthly in 1940, the year's total being 40,123 tons.

August imports for consumption of battery-grade ore were 2322 gross tons, containing 1322 tons of manganese. General imports of the same grade were 3762 tons, containing 2163 tons of manganese. September imports for consumption were 2019 tons, containing 1081 tons of manganese.

Canada Lifts Restrictions on Diesel Oil and Engines; Contracts Heavy

TORONTO, ONT.

■ G. R. COTTRELLE, Canadian Oil Controller, has lifted the ban on sale or purchase of diesel oil and the installation of diesel engines, to facilitate work of such primary industries as agriculture, mining, lumbering, fishing and construction.

During October the Department of Munitions and Supply awarded 143 construction contracts valued at \$8,497,396. Construction contracts awarded from July 14, 1939 to date total 1701; expenditure, \$154,551,316. Contracts include all construction being carried out for the Royal Canadian Air Force and the Air Training Plan. In addition, projects are under way for the Army and Navy account and on plant extensions to factories engaged in the manufacture of airplanes and war materials.

The Department of Munitions and Supply in the week ending Nov. 4 placed 3483 contracts, total value \$10,903,238, of which orders placed with United States companies were valued at \$93,761. Orders include:

Land transport: Ford Motor Co. of Canada Ltd., Windsor, Ont., \$1,396,703; Chrysler Corp. of Canada Ltd., Windsor, \$5788; Brantford Coach & Body Ltd., Brantford, Ont., \$439,652; Eastern Steel Products of Canada Ltd., Preston, Ont., \$36,855; Metallic Roofing Co. of Canada Ltd., Toronto, \$6004; Massey-Harris Co. Ltd., To-

ronto, \$83,311; General Motors Products of Canada Ltd., Oshawa, Ont., \$13,296.

Aircraft: Fairchild Aircraft Ltd., Longueuil, Que., \$83,897; Canadian Wright Ltd., Montreal, Que., \$9653; Noorduyn Aviation Ltd., Montreal, \$17,099; Railway & Power Engineering Corp. Ltd., Montreal, \$15,357; Link Mfg. Co. Ltd., Gananoque, Ont., \$16,740; Belleville Foundries Ltd., Belleville, Ont., \$7830; DeHavilland Aircraft of Canada Ltd., Toronto, \$76,665; Prencro Progress & Engineering Corp. Ltd., Toronto, \$6160; Fleet Aircraft Ltd., Ft. Erie, Ont., \$469,499.

Instruments: Ontario Hughes-Owens Co. Ltd., Ottawa, Ont., \$49,177; Sutton-Horsley Co. Ltd., Toronto, \$49,332; Sparlon of Canada Ltd., London, Ont., \$6926.

Electrical equipment: Canadian Marconi Co., Montreal, \$28,448; Canadian General Electric Co. Ltd., Ottawa, \$7644; Canadian Telephones & Supplies Ltd., Toronto, \$42,300; Rogers Majestic Ltd., Toronto, \$5434; A. L. Wynston Jr., Toronto, \$8910; Canadian Westinghouse Co. Ltd., Hamilton, Ont., \$7644; Federal Wire & Cable Co. Ltd., Guelph, Ont., \$58,968; Sparlon Ltd. of Canada, London, \$6164.

Ordnance: Overseas Requisition, London, England, \$10,000.

Munitions: Wabi Iron Works Ltd., New Liskeard, Ont., \$48,197.

War construction projects: Armstrong Bros. Construction Co., Brampton, Ont., \$164,000; Bird Construction Co. Ltd., Winnipeg, Man., \$587,000; Claydon Co. Ltd., Winnipeg, \$470,000; Henry Borger & Son Ltd., Winnipeg, \$35,000; W. C. Wells, Wilkie, Sask., \$95,000.

Miscellaneous: Canadian Ice Machine Co. Ltd., Toronto, \$6313; Aga Heat (Canada) Ltd., Toronto, \$5364; Bates Valve Bag Co. Ltd., Montreal, \$8750; Gillette Safety Razor Co. of Canada Ltd., Montreal, \$15,145; J. Roger Binks, Ottawa,

\$20,268; Wood Mfg. Co. Ltd., Ottawa, \$36,375; Way Sagless Spring Co. Ltd., Toronto, \$26,145; Dominion Brush Mfg. Co. Ltd., Granby, Que., \$9600; Jenkins Bros. Ltd., Montreal, \$9756; S. A. Felton & Son, Hamilton, Ont., \$6982; Canadian Johns-Manville Co. Ltd., Ottawa, \$15,179; Pyrene Mfg. Co. of Canada Ltd., Toronto, \$8021; Pressure Pipe Co. of Canada, Ltd., Montreal, \$8635; J. M. Macpherson, North Bay, Ont., \$5000; Saskatoon Contracting Co., Saskatoon, Sask., \$19,000; Hagen & Co., Halifax, N. S., \$10,000; Barr & Anderson Ltd., Vancouver, B. C., \$9000; Collet Freres Ltd., Montreal, \$20,000.

Iron, Steel Production in Dominion Sets Record

■ Steel ingot, pig iron and ferroalloy production in Canada for nine months this year set an all-time record, according to the Dominion Bureau of Statistics. Pig iron and ferroalloy output in September showed moderate gains over August but steel ingots and castings production was slightly lower. Pig iron total has been exceeded only in May and June, this year. Only one of the ten blast furnace stacks in the Dominion is idle, an old stack of Algoma Steel Corp., at Sault Ste. Marie, Ont., out of blast for many years.

	Steel ingots, castings	Pig iron	Ferroalloys
Sept., 1941 ..	200,559	111,757	16,912
August, 1941 ..	202,746	105,795	16,251
Sept. 1940 ..	164,515	105,020	13,147
9 Mos., 1941 ..	1,749,056	945,108	138,642
9 Mos., 1940 ..	1,464,548	839,456	90,345
9 Mos., 1939 ..	937,693	487,982	51,098

Bethlehem Plant Wins Two Safety Awards

■ National Safety Council trophy presented annually to the large steel plant finishing the year with the fewest lost-time accidents has been awarded to the Bethlehem plant of Bethlehem Steel Co.

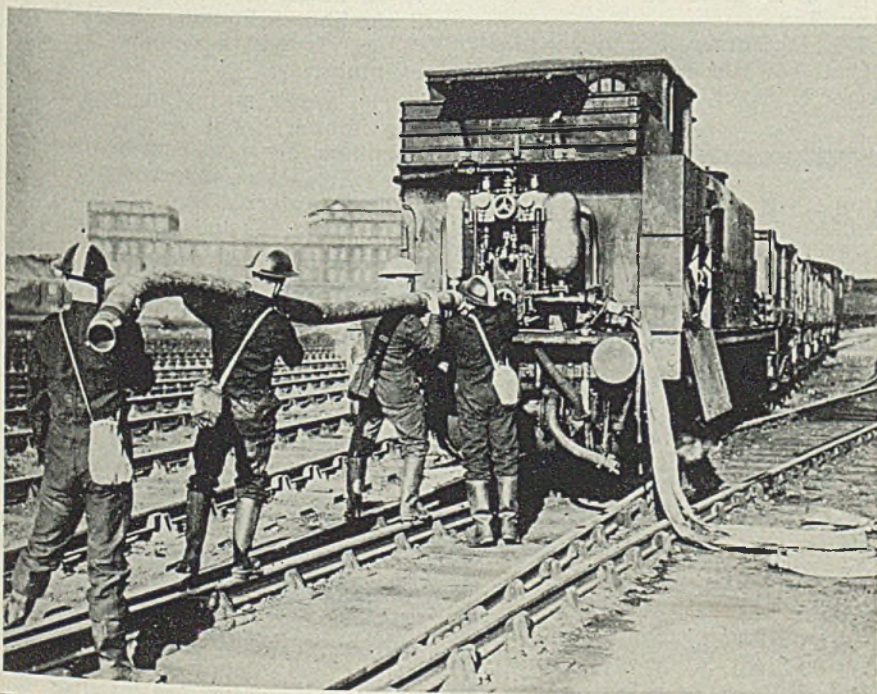
The award was restricted to steel plants operating on a scale of 750,000 man-hours or more per month. Bethlehem plant operations July 1, 1940 to July 1, 1941, the period considered for the award, were more than four times greater than necessary to qualify for the contest.

This is the first time in the history of the contest that the trophy has been won by a plant finishing the year with so many man-hours.

The Bethlehem plant also has been presented with a Certificate of Merit by the Pennsylvania state department of labor and industry for having completed the year with a safety record better than the average of the industry.

■ Gary, Ind., works and Joliet, Ill., coke plant, Carnegie-Illinois Steel Corp. have been awarded a bronze plaque for winning the twenty-fifth semiannual Interplant Accident Prevention Contest of the Greater Chicago Safety Council for the first six months this year.

Fire-Fighting Train for Britain's Railways



■ English fire-fighting train crew practices for action in combatting blazes that might be started by enemy bombers. The railway fire-fighting engine draws a long train of trucks each of which holds 2200 gallons of water. NEA photo passed by British censor

248 Defense Plant Expansions Costing \$535 Million Approved in September

WASHINGTON

■ TWO HUNDRED and forty-eight projects for defense industrial plant expansions were approved by government agencies during September. Estimated cost totals \$535,000,000, the OPM Bureau of Research and Statistics reports.

Of this amount, \$483,000,000 was public funds committed for 53 projects—52 United States government financed and one financed by a foreign government. Private financing, as measured by certificates of necessity approved, covered 195 projects amounting to approximately \$52,000,000.

This brings to 3004 the total number of defense industrial projects approved from June, 1940, to the end of September. Total estimated cost is \$5,260,463,000. Commitments of public funds on 628 projects—568 United States government commitments, and 60 foreign government commitments—amounted to \$4,266,707,000, or 81 per cent of the total estimated cost. The estimated cost of 2376 privately financed projects is \$993,756,000.

Defense Corp. Finances More Plant Additions

Defense Plant Corp., subsidiary of the Reconstruction Finance Corp., last week executed more lease agreements for the expansion of facilities considered essential for expediting the rearmament program, it was reported by Jesse Jones, federal loan administrator. Title to the facilities

will be retained by the Defense Corp. The agreements included:

- American Zinc Co., East St. Louis, Ill., \$4,000,000 for facilities at East St. Louis to be used in the manufacture of slab zinc.
- Todd-California Shipbuilding Corp., Oakland, Calif., \$12,000,000 for the construction of three additional plants for the manufacture and fabrication of magnesium metals (loan by Reconstruction Finance Corp.).
- Youngstown Sheet & Tube Co., Youngstown, O., \$1,900,000 for constructing and equipping plant at Indiana Harbor, Ind., for the production of an estimated 120,000 tons of steel ingots annually.

Farm Equipment Advisory Committee Appointed

■ Bureau of Clearance of Defense Industry Advisory Committee of the OPM has announced formation of the Farm Machinery and Equipment Industry Advisory Committee.

Members are: George C. Stoddard, secretary, the DeLaval Separator Co., New York; Wade Newbegin, president, R. M. Wade & Co., Portland, Oreg.; H. Dempster, president, Dempster Mill Mfg. Co., Beatrice, Nebr.; Z. W. Craine, president, Craine Inc., Norwich, N. Y.; P. E. Herschel, vice president, R. Herschel Mfg. Co., Peoria, Ill.; W. J. Fisher, vice president and general manager, A. B. Farquhar Co. Ltd., York, Pa.; George A. Kelly, president, G. A. Kelly Plow Co., Longview, Tex.

J. L. McCaffrey, vice president, International Harvester Co., Chicago; Roger M. Kyes, vice president, Fer-

guson Sherman Mfg. Corp., Dearborn, Mich.; J. P. Wheeler, general manager, David Bradley Mfg. Co., Bradley, Ill.; J. C. Myers, president, The F. E. Myers & Bro. Co., Ashland, O.; D. Ray Hall, president, Gravely Motor Plow & Cultivator Co., Dunbar, W. Va.; Lee Madden, vice president, Stover Mfg. & Engine Co., Freeport, Ill.

Colin Brown, president, E. C. Brown Co., Rochester, N. Y.; S. Mahon, vice president, James Mfg. Co., Ft. Atkinson, Wis.; C. D. Wiman, president, Deere & Co., Moline, Ill.; King McCord, vice president, Oliver Farm Equipment Co., Chicago; Theodore Johnson, secretary, J. I. Case Co., Racine, Wis.; W. A. Roberts, general manager, Tractor Division, Allis-Chalmers Mfg. Co., Milwaukee; W. C. MacFarlane, president, Minneapolis-Moline Power Implement Co., Minneapolis; W. H. Roberts Jr., sales manager, S. L. Allen & Co. Inc., Philadelphia; L. J. Brower, treasurer, Brower Mfg. Co., Quincy, Ill.

AFA and University Offer Foundry Courses

■ Three tuition-free foundry courses will be conducted at Elizabeth, N. J., by Rutgers University, New Brunswick, N. J., in co-operation with the Metropolitan chapter of the American Foundrymen's Association. Donald J. Reese is chairman of the educational committee.

One course is on metallurgy and metallography of cast metals, by Roy M. Allen, consulting metallurgist, Bloomfield, N. J., and Dr. R. A. Flinn, metallurgist, American Brake Shoe & Foundry Co., Mahwah, N. J. It will be given Thursday evenings.

The course on melting metals for the foundry will be on Tuesday evenings, by specialists in the various fields, under supervision of F. G. Sefing, International Nickel Co., New York. Foundry materials will be considered in the third course, Wednesday evenings, R. E. Nesbitt, Pratt Institute, Brooklyn, N. Y., supervisor.

Each course will be given one night each week, from 7 to 10 o'clock, beginning Nov. 25, with no sessions between Dec. 23 and Jan. 3. Details may be obtained from Engineering Defense Training, Rutgers University.

■ Time lost by employes through illness is costing American industry \$10,000,000,000 a year, according to Dr. C. O. Sappington, industrial health consultant and executive director, American Conference on Industrial Health, Chicago, speaking at the second annual meeting of the conference in Chicago, recently.

Government Forms Are Available

■ Forms PD-73, PD-25-C, PD-25-D which now must be attached to every order or contract for defense supplies are available to STEEL's readers, shipments being made 24 hours after orders are received.

These forms can be obtained from STEEL, Readers' Service Department, Penton Building, Cleveland, at the following prices:

Quantity of	
100	\$1.00
200	\$1.50
300	\$2.00
400	\$2.50
500	\$3.00
1,000	\$3.55
2,500- 5,000	\$3.25 per M
5,000-10,000	\$2.95 per M
10,000-20,000	\$2.75 per M
20,000 and over	\$2.55 per M

NOTE: Postage is not included in above prices. If your order originates in Ohio, please include sales tax.

\$53,500,000 High Explosives Ordnance Plant Authorized by President Roosevelt

■ **AUTHORITY** for construction of a new \$53,500,000 ordnance works in Vermilion county, Indiana, was signed last week by President Roosevelt. To be known as the Wabash River Ordnance Works, it will be located near the Wabash river north of Terre Haute, Ind., and will produce a special high explosive.

Title to buildings and machinery will be retained by the federal government. Construction will be financed by War Department and lend-lease funds. Options on 18,000 acres have already been taken, and some surveys made.

Preliminary studies by Army engineers, it is reported, show the area has an ample supply of resources and utilities necessary for operation of such an industry, including gas, coal and electric power.

Scheduled to be comparable in size to the giant ordnance works at Charlestown, Ind., the new plant will be operated by E. I. du Pont de Nemours & Co., Wilmington, Del. Estimated 34,000 employees will be required.

Defense orders reported last week by the War Department included:

Air Corps Awards

American Chain & Cable Co. Inc., Detroit, drag assemblies, \$51,300.

Atlas Car & Mfg. Co., Cleveland, trucks, \$16,380.
Automatic Transportation Co., Chicago, trucks, \$66,960.
Baker-Raulang Co., Cleveland, trucks, \$155,400.
Bendix Aviation Corp., Eclipse Aviation Division, Bendix, N. J., parts for generators, maintenance parts, \$237,122.
Crescent Truck Co., Lebanon, Pa., trucks, \$53,340.
Curtiss-Wright Corp., Airplane Division, Buffalo, airplanes and parts, \$107,434-037.
Easton Car & Construction Co., Easton, Pa., trucks, \$46,200.
Elwell-Parker Electric Co., Cleveland, trucks, \$46,563.
Emerson Electric Mfg. Co., St. Louis, machine gun turrets, \$20,029,362.
Fairchild Engine & Airplane Corp., Fairchild Aircraft Division, Hagerstown, Md., airplanes and parts, \$4,329,908.
Farnsworth Television & Radio Corp., Ft. Wayne, Ind., radio apparatus and parts, \$63,541.
Firestone Tire & Rubber Co., Firestone Steel Products Division, Akron, O., oxygen cylinders, \$830,729.
General Electric Co., Schenectady, N. Y., tachometer indicators and generators, \$477,375.
General Motors Corp., New York, hardware, \$405,101.
Holtzer-Cabot Electric Co., Boston, inverters, \$115,200.
Klauer Mfg. Co., Dubuque, Iowa, snow remover trucks, \$405,390.
Lockheed Aircraft Corp., Burbank, Calif., airplanes and parts, \$92,277,800.
Longines-Wittnauer Watch Co. Inc., New York, time and stop watches, clocks, \$425,240.

Mallory, P. R., & Co. Inc., Indianapolis, release assemblies, \$225,354.
Manning, Maxwell & Moore Inc., Bridgeport, Conn., pressure gages, \$628,320.
Mercury Mfg. Co., Chicago, trucks, \$6140.
Palnut Co., Irvington, N. J., locks, nuts, \$133,799.
Rolls-Royce Inc., Detroit, tools, \$133,505.
Schweizer Aircraft Corp., Elmira, N. Y., gliders and trailers, \$53,388.
Stein Bros. Mfg. Co. Inc., Chicago, cases, \$13,335.
U. S. Department of Agriculture, Forestry Service, Washington, steel towers, \$110,000.
Yale & Towne Mfg. Co., Philadelphia, trucks, \$167,180.

Chemical Warfare Service Awards

Alvey Conveyor Mfg. Co., St. Louis, conveyors, \$4408.
Brown, E. C., Co., Rochester, N. Y., decontaminating apparatus unit and parts, \$21,611.
Diamond Mfg. Co., Wyoming, Pa., tin plate, \$16,861.
Eureka Vacuum Cleaner Co., Detroit, eyerings, \$60,273.
Precision Fabricators Inc., Rochester, N. Y., inlet valve discs, \$12,147.
Prentice, G. E., Mfg. Co., New Britain, Conn., hook and eye clasps and loops, \$9434.
Revere Copper & Brass Inc., Rome, N. Y., sheet brass, \$349,376.
Stewart-Warner Corp., Chicago, elbow nozzles, \$40,136.
United-Carr Fastener Corp., Cambridge, Mass., couplers, buttons and washers, plates, sockets, studs, \$102,044.

Signal Corps Awards

Anaconda Wire & Cable Co., New York, wire, \$82,590.
Federal Telephone Co. Inc., Newark, N. J., radio equipment, \$74,214.
Friez, Julien P., Sons, Baltimore, barograph, \$8200.
General Dry Battery Inc., Cleveland, batteries, \$10,035.
Graybar Electric Co. Inc., New York, bars, cable, reels, switchboards, frames, \$19,798.
Hammarlund Mfg. Co. Inc., New York, radio equipment, \$52,250.
Kellogg Switchboard & Supply Co., Chicago, telephones, harnesses and headsets, \$26,525.
National Carbon Co. Inc., New York, batteries, \$54,787.
Ray-O-Vac Co., Madison, Wis., batteries, \$85,350.
Wilcox-Gay Corp., Charlotte, Mich., chests, \$19,505.

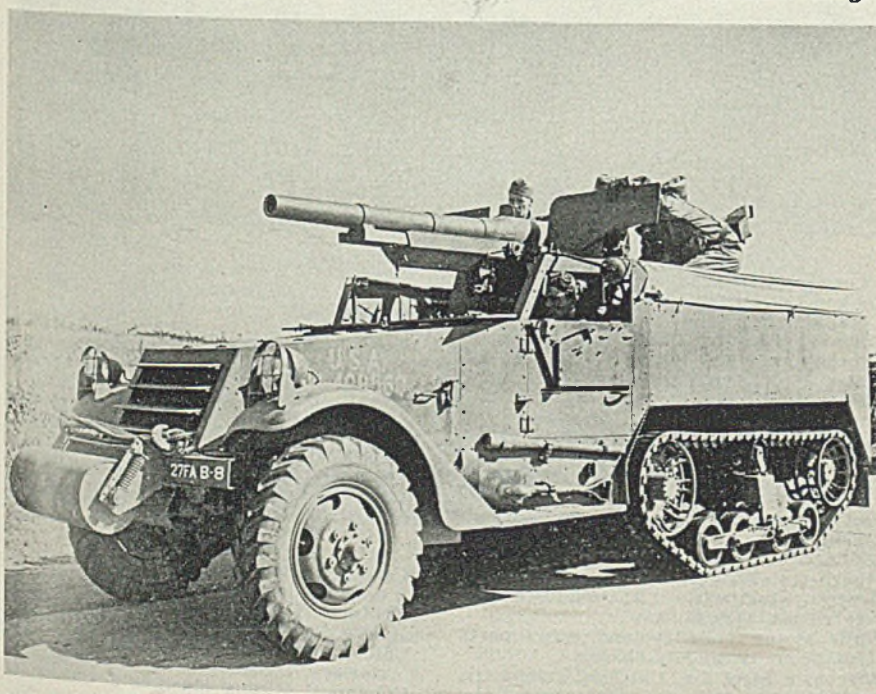
Quartermaster Corps Awards

Chattanooga Implement & Mfg. Co., Chattanooga, Tenn., component parts for tent stoves, \$16,800.
General Motors Corp., Chevrolet Division, Detroit, trucks, \$44,509.
Foster Stove Co., Ironton, O., component parts for tent stoves, \$24,000.
Karr Range Co., Belleville, Ill., component parts for tent stoves, \$12,000.
Logan Co. Inc., Louisville, Ky., tent stoves, \$59,625.
Yellow Truck & Coach Mfg. Co., Pontiac, Mich., trucks, \$31,388.

Ordnance Department Awards

Albertson & Co. Inc., Sloux City, Iowa, valve resurfacing refacers, \$9950.
Allegheny Ludlum Steel Corp., Brackenridge, Pa., steel, gages, \$44,919.
Allis-Chalmers Mfg. Co., Milwaukee, tractors and angle dozers, \$4773.
Aluminum Co. of America, Pittsburgh, aluminum alloy ingots, \$6750.
American Type Founders Inc., Elizabeth, N. J., spare parts assemblies for recoil mechanisms, \$122,000.
American Bridge Co. Inc., New York, steel roof trusses, \$6425.
American Locomotive Co., New York, steel springs, \$28,638.
American Type Founders Inc., Elizabeth,

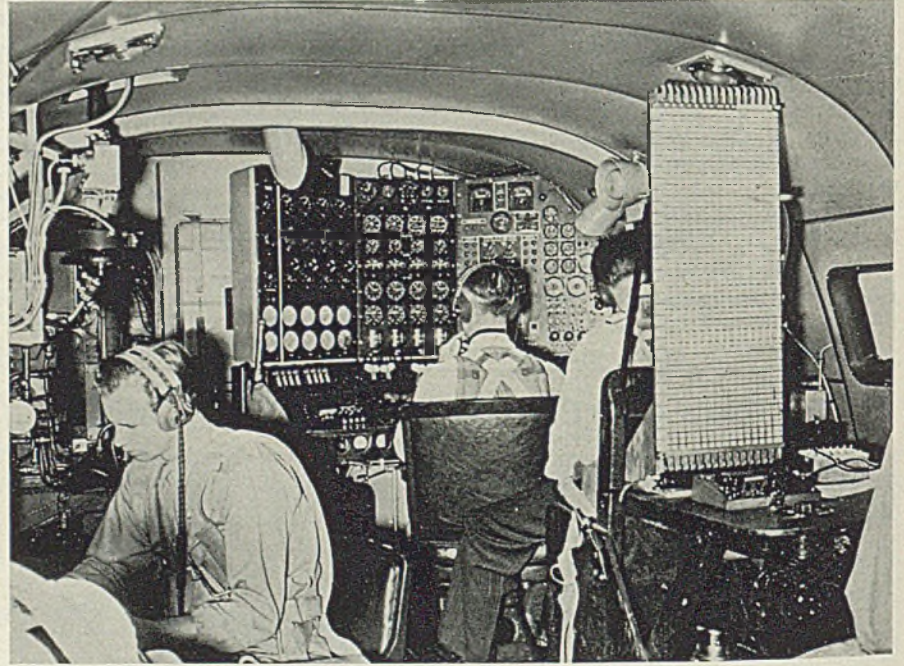
75-MM Gun Can Be Fired While Truck Is Moving



■ Newly developed unit in United States Army's mechanized equipment is this armored truck mounting a 75-millimeter cannon, which can be fired while truck is moving. Older type 75-millimeter guns must be detached from truck and set up before firing. The unit now is being tested in maneuvers in the Carolinas.

NEA photo

N. J., recoil mechanisms, \$537,649.
 Bridgeport Brass Co., Bridgeport, Conn., brass, \$19,387.
 Bristol Brass Corp., Bristol, Conn., brass rods, \$71,981.
 Byron Jackson Co., Los Angeles, recoil mechanisms, \$1,163,843.
 Carnegie-Illinois Steel Corp., South Chicago, Ill., steel, \$11,025.
 Caterpillar Tractor Co., Peoria, Ill., tractors, cranes, \$561,337.
 Chase Brass & Copper Co. Inc., Waterbury, Conn., cartridge cases, \$416,250.
 Colonial Broach Co., Detroit, broaches, \$17,715.
 Conco Engineering Works, Mendota, Ill., cranes, \$11,350.
 Dillon, D. M., Steam Boiler Works Inc., Fitchburg, Mass., furnace shells, \$12,063.
 Edgcomb Steel Co., Philadelphia, steel, \$4609.
 Ex-Cell-O Corp., Continental Tool Works Division, Detroit, broaches, \$14,925.
 General Electric Co., Erie, Pa., howltzers, \$885,699.
 General Motors Sales Corp., New Department Division, Bristol, Conn., ball bearings, \$2012.
 Genesee Tool Co., Fenton, Mich., tools, \$4267.
 Goodman Mfg. Co., Chicago, guides for manufacture of recoil mechanisms, \$123,200.
 Graybar Electric Co., New York, distributing duct, \$3099.
 Great Lakes Steel Corp., Ecorse, Detroit, steel, \$17,152.
 Greenfield Tap & Die Corp., Greenfield, Mass., gages, \$2084.
 Hall Mfg. Co., Toledo, O., grinders, \$12,966.
 Hanssen's, Louls, Sons, Davenport, Iowa, pliers, \$7776.
 Harnischfeger Corp., Milwaukee, cranes, \$16,325.
 Hartford Electric Steel Corp., Roxbury, Mass., steel castings, \$5652.
 Hendey Machine Co., Torrington, Conn., crank shapers, \$86,802.
 International Nickel Co. Inc., New York, piston rods, \$17,441.
 Kensington Steel Co., Chicago, steel tank tracks, \$239,496.
 Knight, W. B., Machinery Co., St. Louis, milling machines, \$19,965.
 LeBlond, R. K., Machine Tool Co., Cincinnati, lathes and equipment, \$16,325.
 Link-Belt Co., Chicago, gun mounts, \$349,800.
 Machinery Mfg. Co., Los Angeles, milling machines, \$11,447.
 Mack Mfg. Corp., New Brunswick, N. J., gages, \$56,710.
 McReynolds Die & Tool Co., Detroit, dies, \$2920.
 Micromatic Hone Corp., Detroit, honing equipment, \$4308.
 Midvale Co., Nicetown, Philadelphia, forgings, \$9065.
 Modern Tool & Die Co., Philadelphia, gages, \$4569.
 Munitions Mfg. Corp., Poughkeepsie, N. Y., guns, \$9,300,000.
 Neff Kohlbusch & Bissell, Chicago, milling and centering machines, \$20,322.
 Niles-Bement-Pond Co., Pratt & Whitney Division, West Hartford, Conn., machine tools, drilling machines, die slinkers, \$358,892.
 Norma-Hoffman Bearings Corp., Stamford, Conn., ball bearings, \$14,857.
 Ohio Steel Foundry Co., Lima, O., castings, \$825,000.
 Pullman-Standard Car Mfg. Co., Hammond, Ind., gun carriages, \$950,300.
 Scully-Jones & Co., Chicago, cutting tools, \$6418.
 Somerville Machine & Foundry Co., Somerville, Mass., castings, \$3922.
 Springfield Stamp & Die Co., Springfield, Mass., steel stamps, \$7345.
 Stamford Rolling Mills Co., Springdale, Conn., discs, \$1,028,595.
 Sunnen Products Co., St. Louis, honing machines, \$16,224.
 Thompson Grinder Co., Springfield, O., grinding machines, \$18,560.
 Thompson, Henry, & Son Co., New Haven,

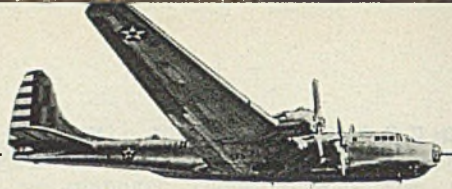


Conn., saw blades, \$13,868.
 Timken-Detroit Axle Co., Detroit, adapters, \$173,339.
 Union Forging Co., Endicott, N. Y., drop forgings, \$4304.
 United Shoe Machinery Corp., Beverly, Mass., guns, \$1,725,000.
 Universal Power Corp., Cleveland, gas welding rods and arc welding electrodes, \$4566.
 Van Dorn Iron Works Co., Cleveland, shields, \$420,525.
 Van Norman Machine Tool Co., Springfield, Mass., milling machines, \$339,815.
 Wellman Engineering Co., Cleveland, barbette carriages, \$3,485,420.
 Western Austin Co., Aurora, Ill., gun carriages, \$1,609,019.
 White Motor Co., Cleveland, spare parts for scout cars, \$105,452.
 Wisconsin Steel Co., Chicago, steel bars, \$3586.
 Wollaston Brass & Aluminum Foundry, North Quincy, Mass., castings, \$17,578.
 Worrell Machine Co., Westfield, Mass., nut blanking machines, \$22,644.
 Worthington Pump & Machinery Corp., Holyoke, Mass., gun mounts, air compressors, \$6,222,843.

Yoder Co., Cleveland, guns, \$7,000,000.
 Young, L. A., Spring & Wire Corp., Detroit, steel springs, \$2399.

Engineers Corps Awards

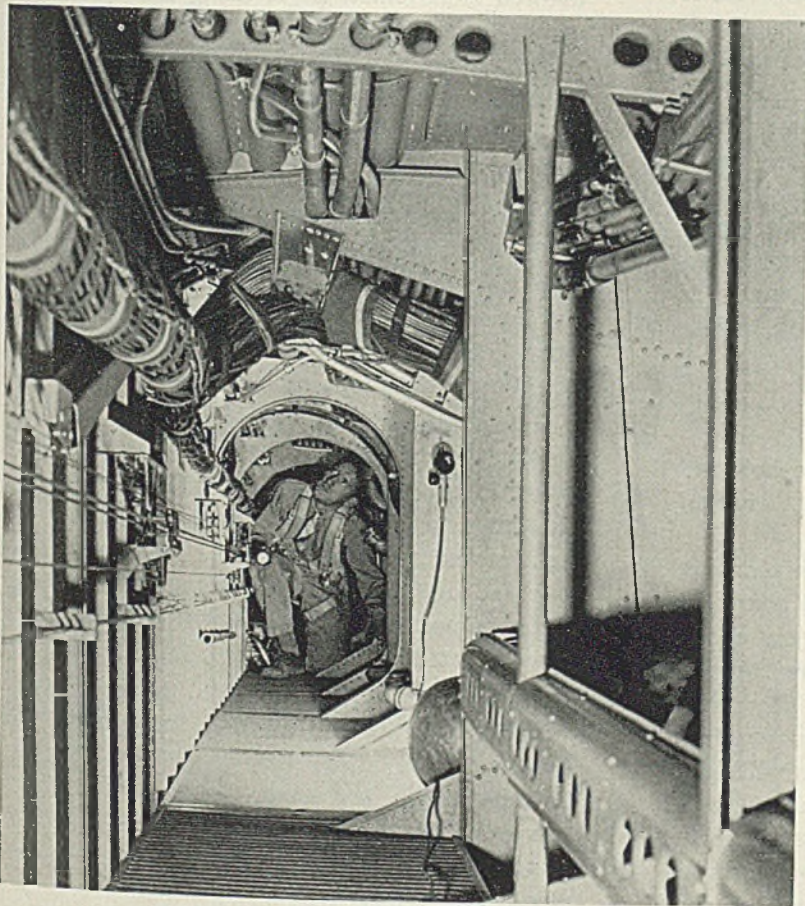
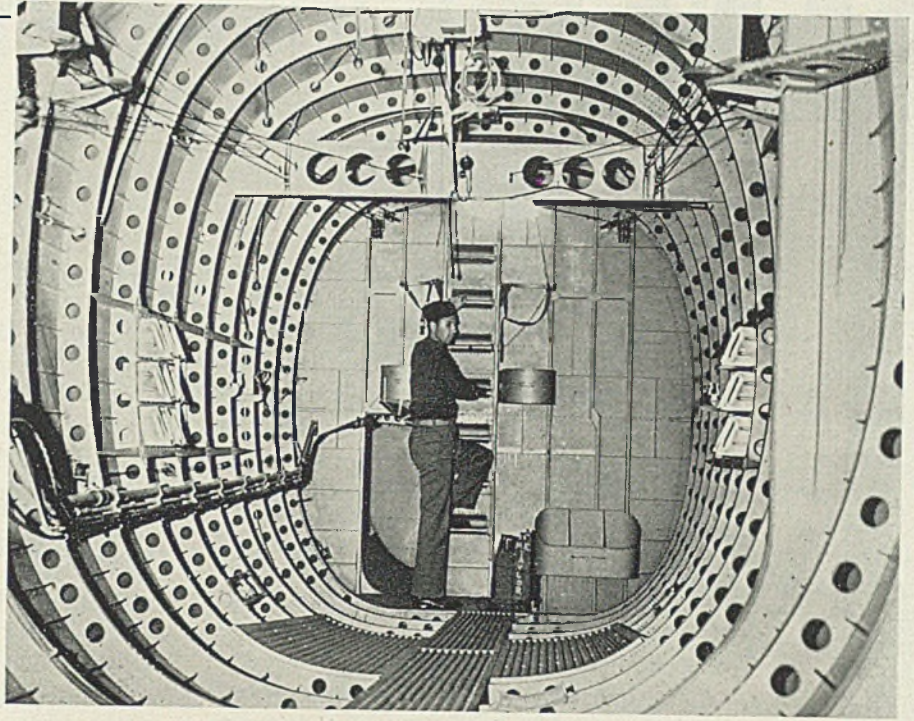
Albert & Davidson Pipe Corp., Brooklyn, N. Y., pipes and fittings, \$18,534.
 American Steel & Wire Co., Cleveland, fencing for Langley field, Virginia, \$18,672.
 Aqua Systems Inc., New York, gasoline fueling system, \$128,186.
 Bethlehem Steel Export Corp., New York, structural steel I-beams, channels and H-pilings, \$5154.
 Carnegie-Illinois Steel Corp., Pittsburgh, airplane landing mat, \$276,000.
 Century Fence Co., Waukesha, Wis., wire fencing, posts and gates, \$5722.
 Chicago Pneumatic Tool Co., New York, riveters, \$6881.
 Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati, milling machines, \$9517.
 Converse Bridge Steel Co., Chattanooga, Tenn., head blocks, sheaves, hook block housings and one space sheaves, \$5000.
 Dorr Co. Inc., New York, primary clar-



Inside "World's Largest Bomber"

Snapped during a recent 3½-hour test flight over southern California, these photos show the interior of the Douglas B-19 bomber, 82-ton flying battleship, powered by four 2000-horsepower engines and reputedly capable of carrying the heaviest bomb load over the longest ranges of any plane built.

Left, two views of bridge deck or cabin. Right above, crew member at ladder in rear part of fuselage which leads to escape hatch. Below, a view into the wing as an officer inspects engine and wiring during flight; at center, where hand phone is seen, is an opening to engine where minor repairs and adjustments can be made during flight. NEA photos



filters, distributors and secondary clarifiers, \$6514.
Dougherty, W. F., & Sons Inc., Philadelphia, coffee urns and bakers tables, \$5829.
Fargo Motor Corp., Detroit, automobiles, \$8115.
Hamilton-Huster Machinery Co., Dallas, Tex., precision shear and notching machines, \$10,972.
Harnischfeger Corp., Milwaukee, mechanical shovels, parts for excavators, pile driving attachment, light plants and stoves, \$96,245.
Hevi-Duty Electric Co., Minneapolis,

electric furnaces, \$25,290.
Ingersoll-Rand Co., New York, air compressors, wagon drills, drilling tools and supplies, \$62,210.
Inland Steel Co., Chicago, reinforcing steel, \$32,868.
Interstate Electric Co., New Orleans, electrical supplies, \$5087.
Kay-Zee Mfg. Co., Cleveland, coffee urns, \$29,577.
Keystone Driller Co., Beaver Falls, Pa., drilling machines, derrick cranes and tools, \$15,240.
Leeds & Northrup Co., Philadelphia, tempering furnaces, \$4597.

LeTourneau, R. G., Inc., Peoria, Ill., scrapers, angledozers, power control units and bulldozers, rooters, parts, \$135,393.

Link-Belt Co., Los Angeles, targets and target conveyors, \$16,518.

Machine Tool & Supply Co., Tulsa, Okla., grinders, \$17,162.

Mahoney-Clarke Inc., New York, drill presses, wire rope, hose, wrenches, cables, splicing tools, construction equipment, nails, rivets, washers, nuts and other supplies, \$16,975.

Moore-Handley Hardware Co., Birmingham, Ala., plumbing supplies, \$5354.

Noland Co. Inc., Montgomery, Ala., boilers, pumping units and blow-off tanks, generators, \$6043.

Osgood Co., Marlon, O., shovels and parts, \$88,184.

Palma Motor Sales & Service Corp., West Brighton, Staten Island, N. Y., station wagons, pick-up trucks, fog lights and heaters, \$8944.

Penn. H. O., Machinery Co. Inc., New York, replacement parts for construction equipment, \$17,025.

Penn Yan Boats Inc., Penn Yan, N. Y., utility power boats, \$103,440.

Read Machinery Co. Inc., York, Pa., puree mixers, \$3950.

Republic Steel Corp., Berger Mfg. Division, Canton, O., steel shelving, grating, hand railing and stairs, \$175,200; Cleveland Division, steel reinforcing bars, \$10,200.

R-S Products Corp., Philadelphia, furnaces, \$8190.

Smith, David, Steel Co. Inc., Brooklyn, N. Y., steel bars, \$3962.

Sterling Motors Corp., Long Island City, N. Y., dump trucks, \$45,980.

Studebaker Corp., South Bend, Ind., automobiles, \$2652.

Taylor-Wharton Iron & Steel Co., Easton, Pa., oxygen cylinders, \$2176.

Tinius Olsen Testing Machine Co., Philadelphia, testing machines, \$1850.

Uniflow Mfg. Co., Erie, Pa., water coolers, \$2537.

United Hoisting Co. Inc., New York, single drum hoist, \$2125.

United States Pipe & Foundry Co., Birmingham, Ala., cast iron pipe, \$4793.

U. S. Electrical Motors Inc., Los Angeles, vari-drive aero test stands, \$4952.

Wallace & Tiernan Co. Inc., Knoxville, Tenn., chlorinators, \$2848.

Webber Motor Car Co. Inc., Westwood, N. J., trucks and motors, \$4268.

Westinghouse Electric & Mfg. Co., Dayton, O., transformers, \$4090.

A 5% Alibi for 100% Menace

■ IN CONSIDERING the problem of defense strikes, one should try to avoid the mistake of thinking that the only issues involved are those pertaining to labor relations.

Much more is at stake than the mere decision as to whether 95 per cent or 100 per cent of the employes in an establishment shall belong to the union.

That question is extremely important. It is important to the employes, because it involves the principle of their right to work. But it is not important enough to the professional managers of unions to justify Mr. Lewis to defy the United States government in a time of national emergency.

Something more vital than a margin of 5 per cent in the unionization of an industry is prompting him to risk the loss of his tremendous gains in recent years on his present unpopular stand.

• • •

What is it that causes him to hold out against the President and against enraged public opinion?

It is the dream of power—the economic and political power that would accrue to anyone who can obtain a monopoly on the choice racket of controlling the right of men to work in key industries.

John L. Lewis is so close to grabbing this priceless leverage that he is willing to gamble everything in his final effort to win it.

If he succeeds, generations of employes will pay tribute to him and to his successors before the strangle-hold of his powerful organization upon American employes can be broken. If he succeeds, he

and his associates will be more powerful than any other pressure group in the nation. If he succeeds, more senators and congressmen than now abjectly do his bidding will cringe under his lash. If he succeeds, the President will have forfeited the sovereignty of the federal government.

Success for John L. Lewis is unthinkable. He has permitted unscrupulous Communists to do his dirty work. As an avowed isolationist, he is using his influence to sabotage the defense program, notwithstanding the fact that CIO generally repudiates his isolationist tendencies.

• • •

Congress is threatening to enact anti-strike legislation. The Lewis menace is important enough to justify legislation—not necessarily to outlaw strikes, but to provide checks against abuses of the growing power of unions.

Robert S. Binkerd, writing in the November issue of *The Atlantic Monthly*, presents convincing data to indicate that the unions of the United States will collect in dues and assessments in 1941 the amazing sum of \$500,000,000. Only a quarter of this amount, he declares, will be "properly reported and audited."

This money is the key to the power which Mr. Lewis and other reckless union leaders crave. Congress, as well as the President, has just cause to restrain the abuse of this power. It should take this opportunity to legislate fairly and effectively against further racketeering.

Simple laws, aimed only at assuring democracy in union functioning, will do the trick.

E. L. Shaner
 EDITOR-IN-CHIEF

The BUSINESS TREND



Output for Defense Tending Upward

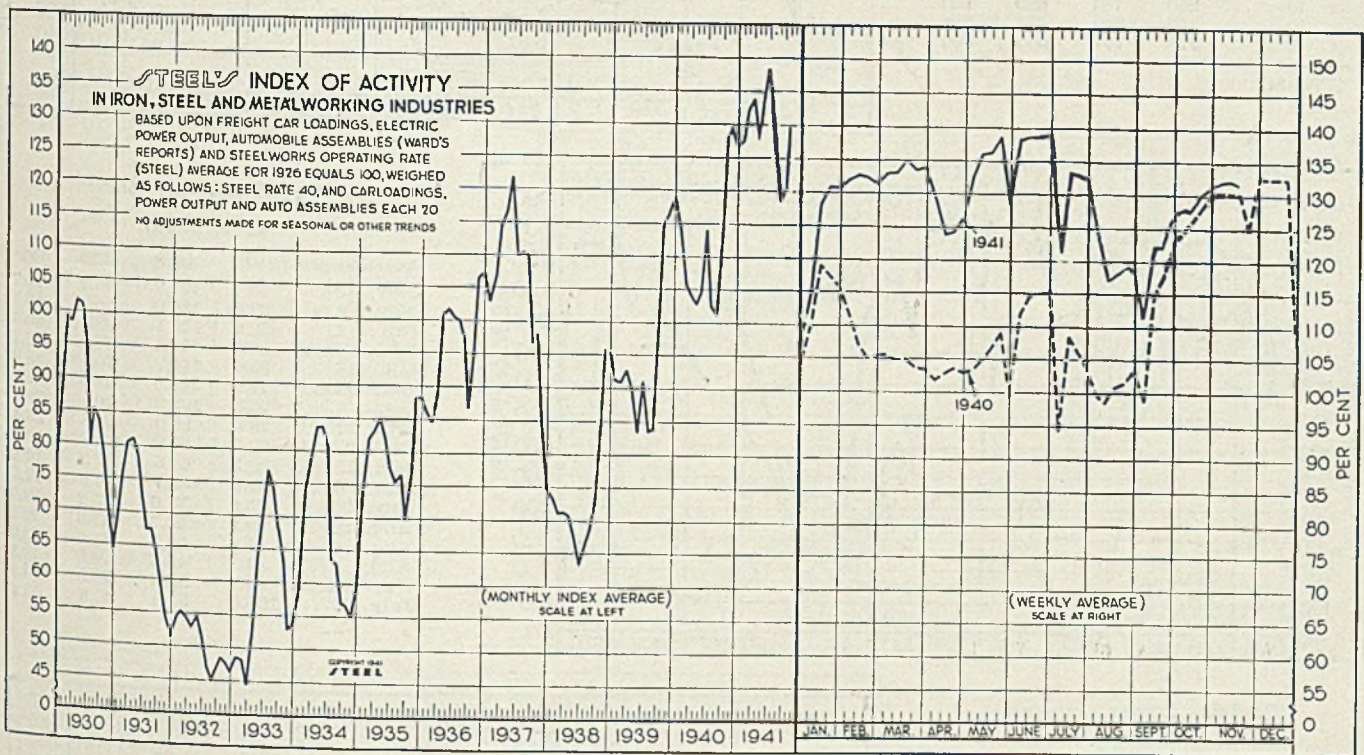
■ OUTPUT of those industries directly or indirectly tied in with the defense program continues to increase but at a substantially slower rate than earlier this year. Scarcity of raw materials and limited plant capacities are the chief factors retarding the upward movement. Further gains in production of durable goods await only completion of increased operating facilities.

Sharp curtailment in output of consumers' goods over coming months is definitely forecast as the transition from civilian to defense output gains momentum. Indicative of this trend are OPM orders

curtailing output of automobiles, certain types of trucks, refrigerators, washing machines, ironers, non-mechanical ice boxes and metal office furniture.

STEEL'S index of activity eased slightly during the week ended Nov. 15 to 131.5. This compares with 132.3 in the preceding week and 130.3 in like period a year ago.

The national steel rate averaged 97 per cent of capacity for the week ended Nov. 15, a decline of one-half point from the preceding period and compares with 96 per cent in the corresponding 1940 week. Automobile assemblies were off to 92,990 units.

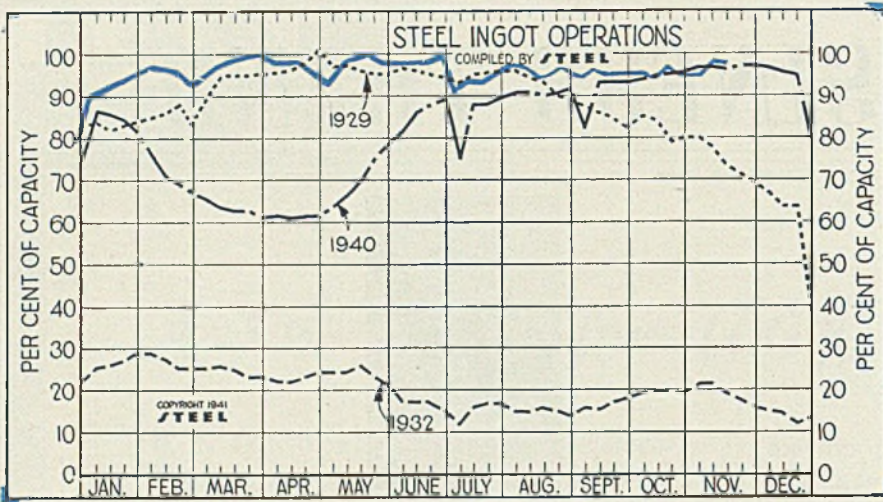


STEEL'S index of activity declined 0.8 point to 131.5 in the week ended Nov. 15:

Week Ended	1941	1940	Mo. Data	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930
Sept. 6	111.8	98.7	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
Sept. 13	122.3	114.9	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
Sept. 20	122.9	124.4	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
Sept. 27	127.5	122.8	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
Oct. 4	128.0	124.4	May	134.5	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2
Oct. 11	127.9	126.0	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
Oct. 18	130.2	128.3	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
Oct. 25	131.4	129.9	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
Nov. 1	131.9	130.2	Sept.	121.1	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7
Nov. 8	132.3	130.3	Oct.	129.9	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8
Nov. 15	131.5†	130.3	Nov.	.....	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.6
			Dec.	.....	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3

†Preliminary.

November 24, 1941



Steel Ingot Operations

(Per Cent)

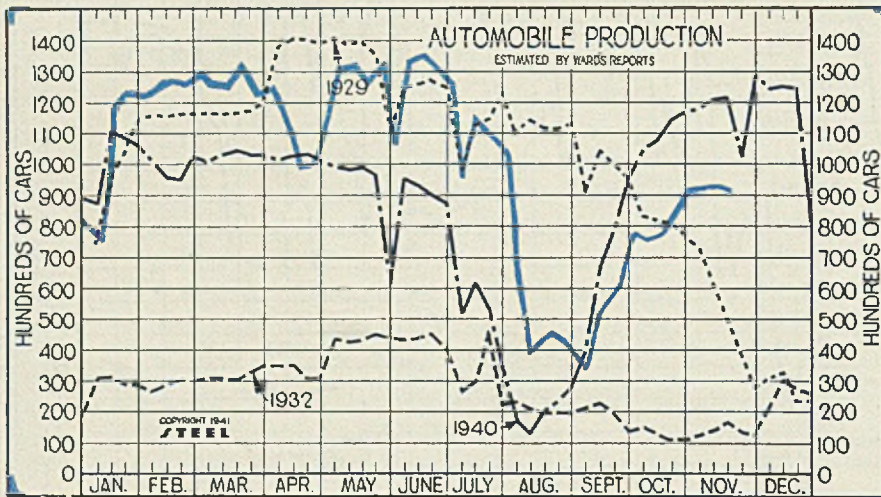
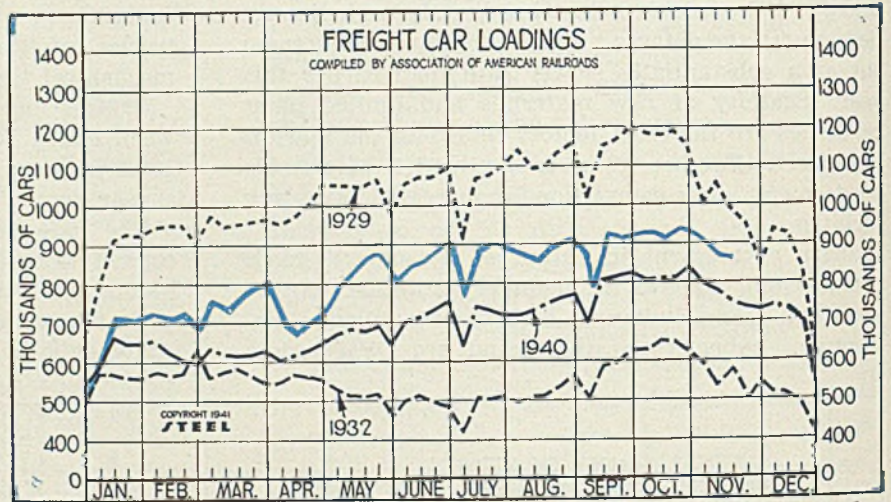
Week ended	1941	1940	1939	1938
Nov. 15	97.0	96.0	93.5	63.0
Nov. 8	97.5	96.5	93.0	61.5
Nov. 1	95.5	96.5	93.0	57.5
Oct. 25	95.5	95.5	92.0	54.5
Oct. 18	96.5	95.0	91.0	51.5
Oct. 11	94.5	94.5	89.5	51.5
Oct. 4	96.0	93.5	87.5	48.5
Sept. 27	96.0	93.0	84.0	47.0
Sept. 20	96.0	93.0	79.5	48.0
Sept. 13	96.5	93.0	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

Freight Car Loadings

(1000 Cars)

Week ended	1941	1940	1939	1938
Nov. 15	865†	745	771	657
Nov. 8	874	778	786	637
Nov. 1	895	795	806	673
Oct. 25	914	838	834	709
Oct. 18	923	814	861	706
Oct. 11	904	812	845	727
Oct. 4	918	806	835	703
Sept. 27	920	822	835	698
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

†Preliminary.



Auto Production

(1000 Units)

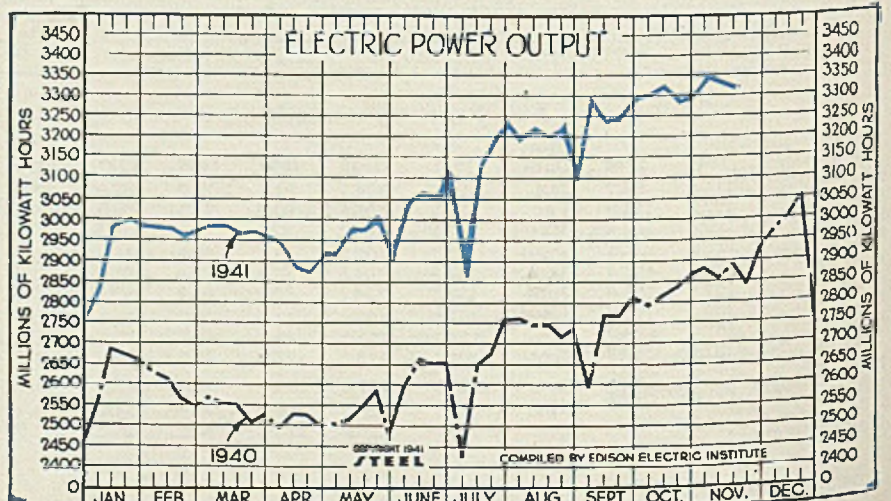
Week ended	1941	1940	1939	1938
Nov. 15	93.0	121.9	86.7	96.7
Nov. 8	93.6	120.9	86.2	86.3
Nov. 1	92.9	118.1	82.7	80.0
Oct. 25	91.9	117.1	78.2	73.3
Oct. 18	85.6	114.7	70.1	68.4
Oct. 11	79.1	108.0	75.9	50.5
Oct. 4	76.8	105.2	76.1	37.7
Sept. 27	78.5	96.0	62.8	25.4
Sept. 20	60.6	78.8	54.0	20.4
Sept. 13	53.2	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

Electric Power Output

(Million KWH)

Week ended	1941	1940	1939	1938
Nov. 15	3,304	2,890	2,587	2,325
Nov. 8	3,339	2,858	2,589	2,277
Nov. 1	3,339	2,882	2,609	2,271
Oct. 25	3,299	2,867	2,622	2,284
Oct. 18	3,273	2,838	2,576	2,281
Oct. 11	3,315	2,817	2,584	2,251
Oct. 4	3,290	2,792	2,554	2,229
Sept. 27	3,233	2,816	2,559	2,208
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

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

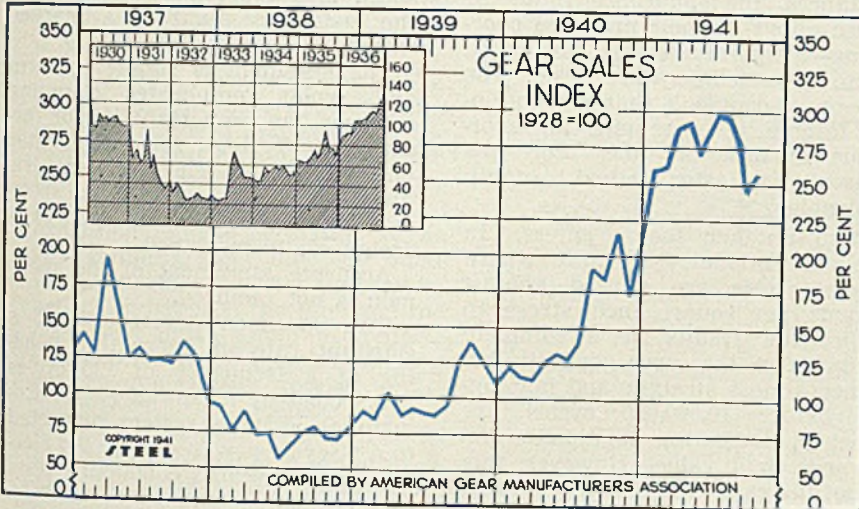
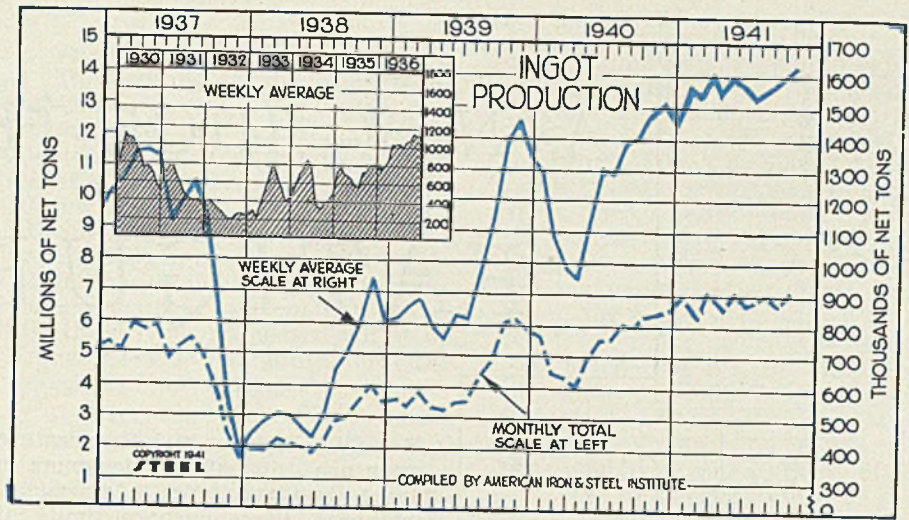


Steel Ingot Production

(Unit 100 Net Tons)

	Monthly Total		Weekly Average	
	1941	1940	1941	1940
Jan.	6,928.8	5,764.7	1,563.9	1,301.3
Feb.	6,237.9	4,525.8	1,559.5	1,093.2
Mar.	7,131.6	4,389.2	1,609.9	990.8
Apr.	6,756.9	4,100.5	1,575.0	955.8
May	7,053.2	4,967.8	1,592.2	1,121.4
June	6,800.7	5,657.4	1,585.3	1,318.8
July	6,821.7	5,724.6	1,543.4	1,295.2
Aug.	7,001.0	6,186.4	1,580.4	1,396.5
Sept.	6,819.7	6,056.2	1,593.4	1,415.0
Oct.	7,242.7	6,644.5	1,634.9	1,499.9
Nov.	.....	6,469.1	.....	1,507.9
Dec.	.....	6,495.4	.....	1,469.5
Total	66,981.7	66,981.7	1,281.2†	1,281.2†

†Weekly average.



Gear Sales Index

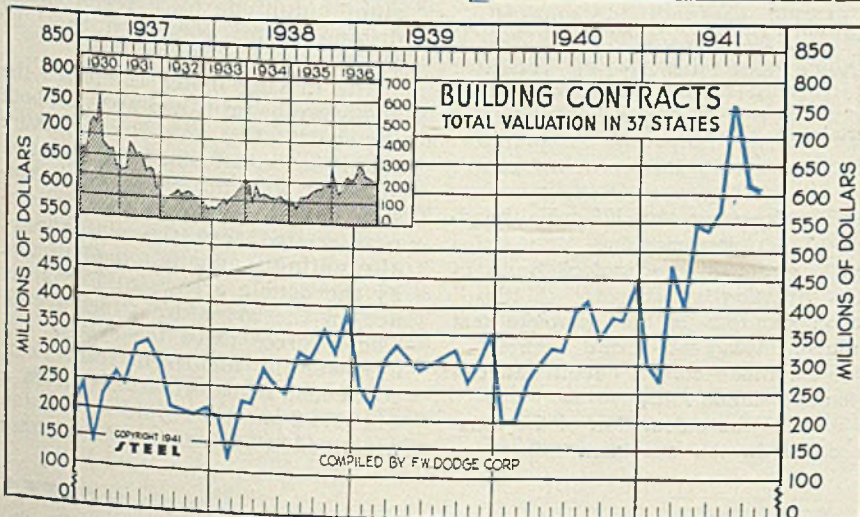
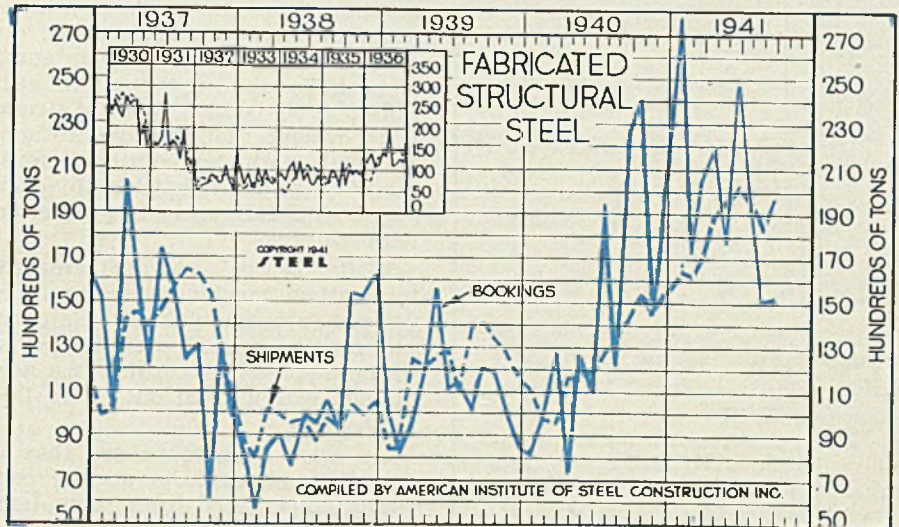
(1928 = 100)

	1941	1940	1939	1938	1937
Jan.	259	123	91.0	93.0	144.0
Feb.	262	116	86.0	77.0	130.5
Mar.	288	114	104.0	91.0	195.0
April	292	128	88.0	74.0	164.0
May	273	133	93.0	70.0	125.5
June	299	129	90.0	58.0	134.0
July	298	141	89.0	67.0	124.0
Aug.	276	191	96.0	76.5	125.0
Sept.	243	183	126.0	80.5	123.0
Oct.	261	216	141.0	72.5	139.5
Nov.	...	173	126.0	72.0	127.5
Dec.	...	208	111.0	81.0	97.0
Ave.	...	155.0	103.0	76.0	135.5

Fabricated Structural Steel

(1000 tons)

	Shipments			Bookings		
	1941	1940	1939	1941	1940	1939
Jan.	164.6	110.9	84.3	281.2	81.7	101.7
Feb.	161.4	97.2	84.4	173.6	98.9	82.7
Mar.	170.2	95.9	125.3	206.1	128.3	95.1
Apr.	189.8	116.3	120.9	218.0	73.8	118.3
May	191.9	115.6	125.9	179.9	126.8	156.9
June	200.5	119.1	130.1	246.9	109.7	111.6
July	195.1	127.1	110.5	205.2	194.9	114.1
Aug.	182.4	134.9	139.7	152.9	122.5	100.9
Sept.	199.2	142.8	140.8	153.2	225.5	121.4
Oct.	.....	153.2	133.8	.....	233.1	118.8
Nov.	.....	147.0	128.2	.....	141.9	99.3
Dec.	.....	155.5	116.2	.....	203.1	84.4
Tot.	1515.5	1440.1	1440.1	1748.1	1305.0	1305.0

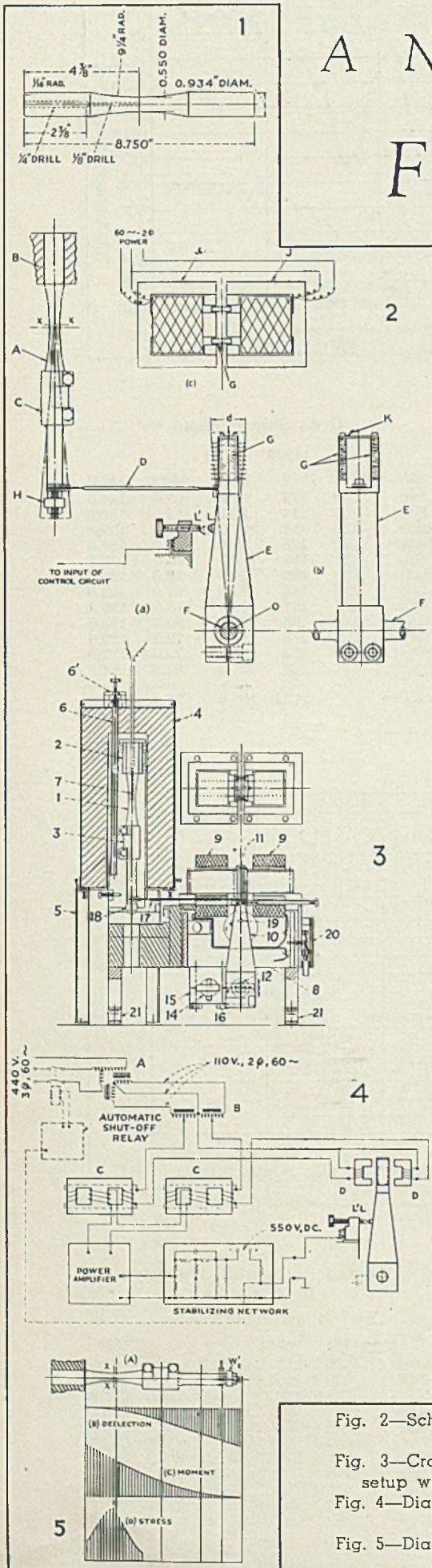


Construction Total Valuation In 37 States

(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.	760.3	414.9	312.3	313.1	281.2
Sept.	623.3	347.7	323.2	300.9	207.1
Oct.	606.3	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

A NEW HIGH-TEMPERATURE FATIGUE TEST



■ NEW alloys for high-temperature work are being offered designers in great abundance. Yet in almost all instances, the endurance limits of these alloys at their proposed operating temperatures are estimated from room-temperature tests. The reason, of course, is that conventional fatigue tests require an enormous amount of time. For this reason some faster method is highly desirable.

Also another factor enters. In the conventional S-N curve where stress cycles are plotted against pounds per square inch stress to depict the results of a complete fatigue test, the curve generally becomes almost straight and horizontal before 10,000,000 cycles are reached, indicating a definite endurance limit value. However, this is not the case at high temperatures as evidence has been accumulated to show that the curve continues to fall even beyond 100,000,000 cycles. As a matter of fact, some tests have shown the curve still falling at 500,000,000 cycles of stress. It is evident that effective fatigue tests at high temperatures must therefore be somewhat lengthy compared with fatigue testing at room temperatures.

While several elevated-temperature fatigue machines have been developed in recent years, these operate for the most part at low or medium speeds. Accordingly, a new method was worked out to fill this need.

Its chief advantages are that it permits making tests at any constant temperature from room tem-

perature to 1000 degrees Fahr. The speed is high—120 cycles per second or 7200 cycles per minute. Yet this speed is not so great as to affect the endurance limit to a marked extent.

perature to 1000 degrees Fahr. The speed is high—120 cycles per second or 7200 cycles per minute. Yet this speed is not so great as to affect the endurance limit to a marked extent.

The specimen is simple in form and avoids complicated clamping schemes, an important factor because of the high relaxation rates encountered at elevated temperatures. As shown in Fig. 1, the specimen is of generous size and is a design easily machined.

Accurate alignment of the specimen is not required.

The specimen is stressed at a constant rate in alternating bending at a frequency of 120 cycles per second by means of an electromagnetic driving system connected to a 60-cycle power supply. An electric furnace allows conducting tests at any temperature up to 1000 degrees Fahr. under accurate automatic temperature control.

Alternates Bending Stress

The machine may be classed as a fixed-cantilever constant-deflection type designed primarily for the application of alternating bending stress to the specimen. Means are provided also for the superposition of a steady bending stress to the specimen, but as yet no operating experience has been acquired with this feature.

Fig. 2 shows the moving parts of the machine and operating principles. The specimen A is clamped at the top to the stationary frame B and at the bottom to the lower clamp C. This specimen-clamp system is flexed in bending at a constant amplitude by a reciprocating driving motor connected to C by the drive rod D.

The driving motor comprises the armature beam E and a stator, both shown in Fig. 2. The armature beam is constrained to rotation about an axis through O by the torsion bar F. When alternating current is fed into the stator coils, alternating magnetic force indicated by the double arrows at Fig. 2 (a) act on the armature punchings G. These forces drive the system.

Power is furnished from Scott connected transformers fed from a 440-volt 3-phase 60-cycle system and arranged to give 110-volt 2-phase

Fig. 1—Specimen for 120-cycle bending machine

Fig. 2—Schematic diagram of mechanical parts in the vibrating system

Fig. 3—Cross-section diagram of the complete test setup with furnace, driving motor and controls

Fig. 4—Diagram of amplitude control circuit and automatic shutoff relay

Fig. 5—Diagrams used in the calculation of the maximum stress in the specimen

60-cycle current as shown in the schematic diagram Fig. 4.

The electromagnetic forces, since they depend only upon the magnitude and not the direction of the current, vary at twice the line frequency or 120 cycles per second. To reduce the magnitude of the driving forces required, the armature specimen system is tuned to nearly 120 cycles by small tuning weights. Furthermore, the vibrating system itself is tuned.

This also means that small changes in line frequency will cause large changes in the amplitude so an electronic control is provided, see Fig. 4. The control circuit input connects to the two contacts L and L', Fig. 2. Normal driving power is 40 watts.

The electric furnace shown in Fig. 3 is a belt-type unit 4 which slips over the frame 2 and rests on the furnace supporting stand 5. The furnace is maintained at constant temperature by means of a differential expansion relay 6 consisting of an 18-8 stainless steel tube surrounding a quartz rod. The differential expansion between the tube and rod opens and closes a pair of contacts in the relay head 6' which in turn controls the voltage applied to the heating coil of the furnace. A thermocouple 7 is inserted into the 1/4-inch diameter axial hole in the specimen to measure the temperature continuously at the midpoint of the specimen.

Limits Heat Output

Frame 2 of 18-8 stainless is thermally insulated from the main frame 8 by the intermediate insulating blocks 22. This limits the outflow of heat to the main frame, so maintenance of a constant temperature in the furnace is relatively easy.

On the main frame 8 (Fig. 3) is mounted the reciprocating driving motor consisting of the stator 9, and the armature beam 10 with its punchings 11. The beam 10 is clamped to the torsion bar 12 at the middle, while the bar in turn is clamped at its end by the clamp blocks 13. These blocks are attached to the frame 8 through the bar 14 and the clamp 15. Lateral motion of the armature beam at the axis of the torsion bar is prevented by the flexible strut 16.

The driving rod 17 connects the lower end of the specimen clamp 3 to the armature beam. The system is tuned by the weights 18 and 19.

Operating procedure is quite simple. No accurate alignment of parts is necessary. After the lower clamp is attached, the specimen is clamped in the machine, the furnace dropped down and allowed to come to temperature. Temperature equilibrium at 850 degrees Fahr. is reached in about 90 minutes. When furnace temperature becomes stable,

specimen is tuned to resonance.

The striking of the contacts introduces a nonlinear spring constant into the vibrating system, which results in an instability. However if the driving frequency is below the system natural frequency, the system will be quite stable, even when the contacts strike. Therefore before beginning the test, the system is detuned to about 120.6 cycles so the driving frequency will at all times be less than the natural frequency of the system.

A microscope and target check the amplitude. Number of elapsed cycles are indicated by the movement of a total time meter. Upon

frequency, the inertia loading diagram is constructed. From this loading diagram, the moment diagram for unit deflection at the drive rod is computed. Fig. 5 a, b and c illustrates the cantilever under consideration, the deflection diagram and the moment diagram respectively. Using the conventional formula for the maximum section stress in a beam, the stress diagram 5d is derived from the moment diagram.

A battery of six of these machines has been in constant operation at the Westinghouse research laboratory for over a year. Fatigue tests have been run on many different types of steels and also on cast

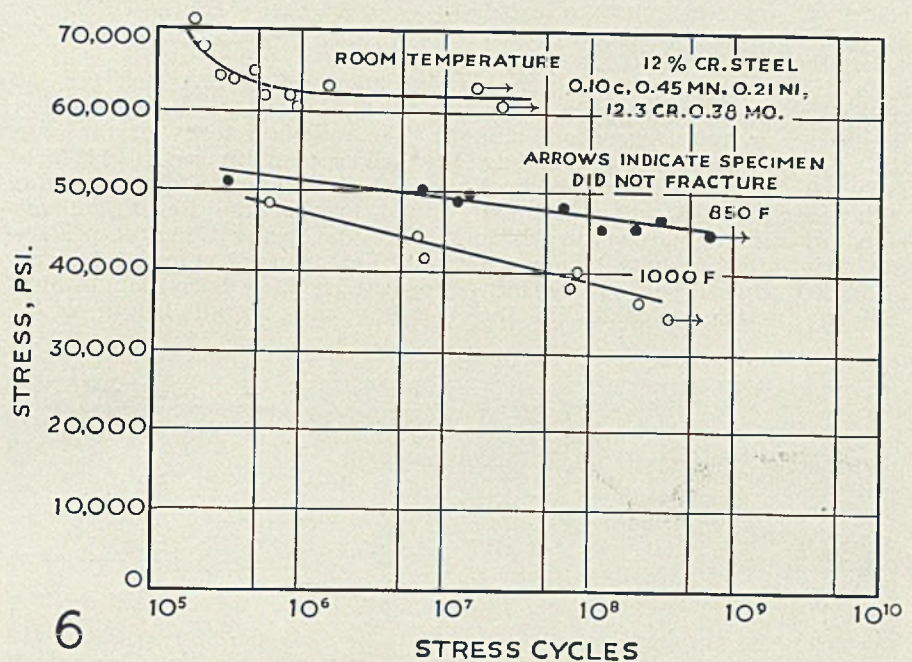


Fig. 6—S-N diagrams for 12 per cent chromium steel at three temperatures. These results were obtained with the equipment described in the accompanying text

failure of the specimen, stiffness is reduced by the existence of a crack, in turn reducing the amplitude so the control contacts cease to strike. This in turn opens the main power switch through a thyatron tube. See diagram Fig. 4.

To calculate the stress accurately, the moment diagram due to the inertia loading on the cantilever during vibration is calculated, and the maximum stress in the specimen computed from this moment diagram. Knowing the dimensions and the material of all sections of the cantilever (consisting of A, C and H, Fig. 2), it is possible to calculate the mass distribution and the stiffness distribution along the length. Assuming the cantilever is built in at the top and knowing the natural frequency, the deflection diagram or normal curve is graphically determined by the Stodola method. From the deflection curve, the mass distribution and the fre-

copper alloys. Several specimens have been run out to nearly a billion stress cycles.

Fig. 6 is a representative S-N diagram showing results of fatigue tests on a 12 per cent chromium steel at three different temperatures. At room temperature this steel appears to have an endurance limit of 62,000 pounds per square inch, as evidenced by flattening of the curve above 2,000,000 cycles. However at 850 degrees Fahr. and higher temperatures, there is no flattening of the curve up to 500,000,000 cycles. Therefore if we assign a value to the endurance limit, the corresponding number of cycles at which this value was read off the curve must be stated.

Rotating beam specimens 0.273-inch in diameter of this same material run at 1725 revolutions per minute gave a room temperature endurance limit of 56,800 pounds per square inch.

The SEDGLEY Sub-Machine GUN

ANOTHER gun of the sub-machine variety in which this government, in common with others among the combatant nations, is exhibiting increasing interest for military purposes is the weapon manufactured by R. F. Sedgley Inc. of Philadelphia. This gun is of the straight blow-back type, the coiling parts being of sufficient mass to avoid appreciable opening of the breech before the bullet has left the muzzle. Such an arrangement is only possible with guns of this type in which the barrel is relatively short and the chamber pressures not unduly high. It is obviously impractical with long-barreled rifles of the standard military pattern, in which the barrel pressures may be upward of 38,000 pounds per square inch and the muzzle velocities in the

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neighborhood of 2700 feet per second.

The muzzle velocity of this gun, which uses 9-millimeter (0.3543-inch) parabellum ammunition, is higher than that of the Reising sub-machine gun, being 1210 feet per second as compared with 920 feet per second. It has a barrel length of 11 inches and overall length of 35

inches and weighs 7 pounds. The cyclic rate of fire is comparable with that of other guns in this class, being given as 450 to 500 rounds per minute with 20 shots in the magazine. The muzzle energy is 403 foot-pounds, and the bullet will penetrate 6.75 inches of white pine at 100 yards.

In the Sedgley gun, the magazine is placed at the front end of the forestock as compared with a position about midway between the front of the trigger guard and the tip of the fore-end as in the Reising sub-machine gun. Simplicity of construction is a pronounced feature, there being only four moving parts. In common with many successful modern arms, assembly and disassembly are carried out with ease and speed, even by an unskilled operator.

Lieut. Col. Calvin Goddard, in making reference to the Sedgley arm in a recent article in *Army Ordnance*, notes that the perforated sleeve surrounding the barrel is reminiscent of that employed by the Bergman (German) and Solothurn (Swiss) weapons but approves the positioning of the magazine underneath the stock as compared with the clumsy arrangement of the German gun, in which the magazine projects sidewise, to the discomfort of the operator, who must apply a resisting torque about the axis in order to neutralize the moment of the weight of the ammunition.

In action, the breech block is first moved to the rear, where it engages the sear by pulling back on the handle. Pressure upon the latter locks the mechanism and so prevents the firing of the gun; while a slight pull causes release. When the trigger is pulled, the breech block moves forward, feeding the cartridge from the magazine into the chamber, and closing the breech before the firing pin acts. The simplicity of blow-back actions in gen-

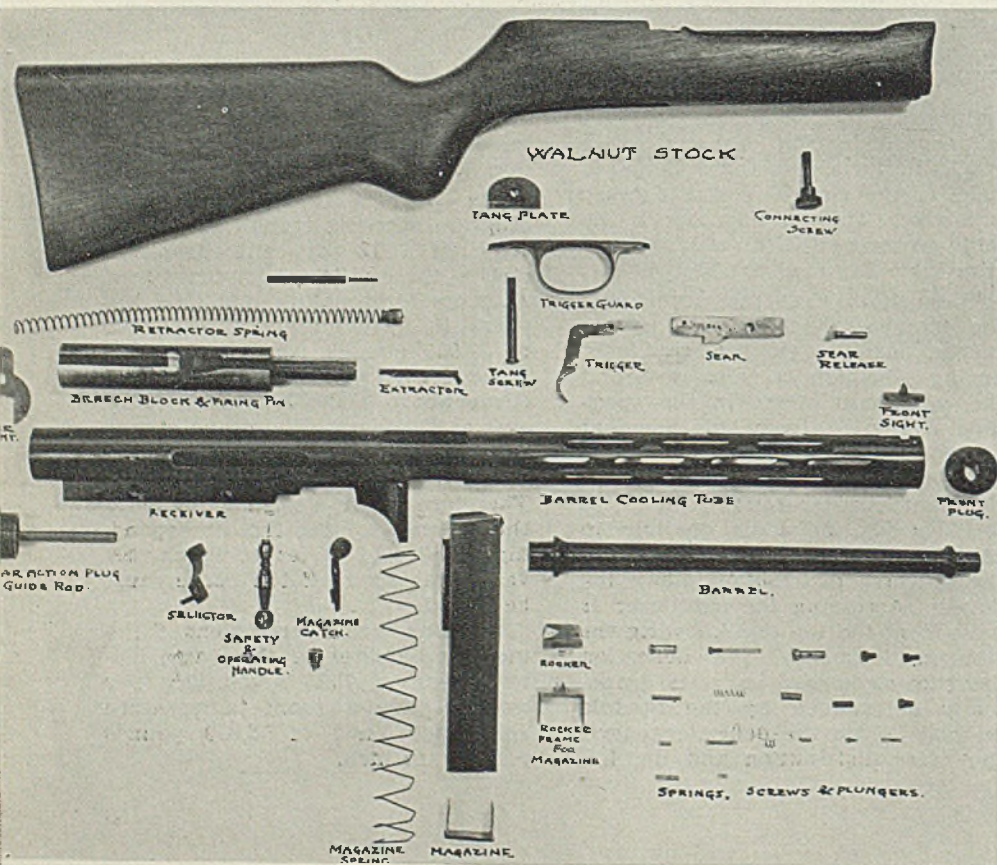
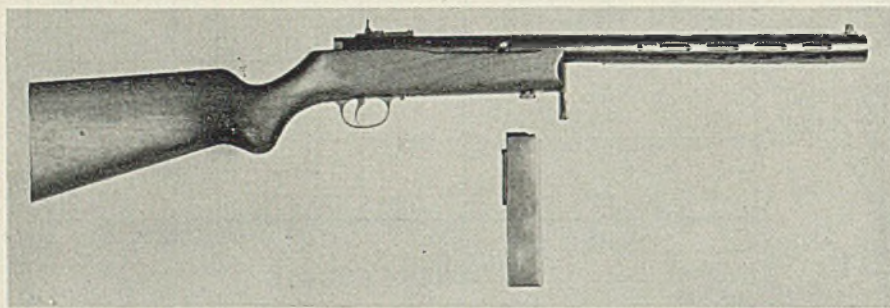
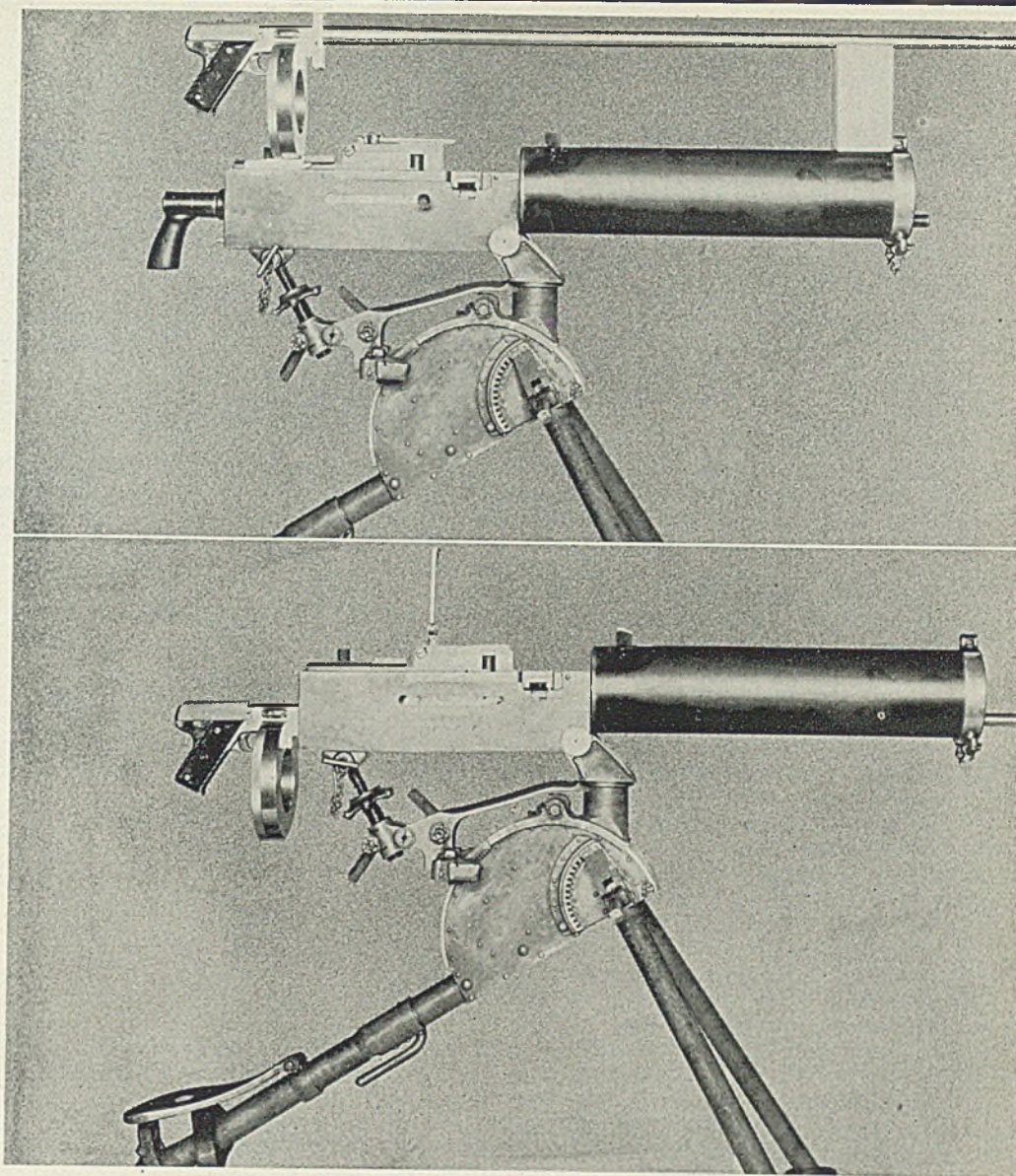


Fig. 1. (Upper)—Assembled view of Sedgley semi and full automatic sub-machine gun with 20-shot magazine; barrel length, 11 inches; overall length, 35 inches; weight 7 pounds; rate of fire, up to 450 per minute

Fig. 2. (Lower)—Sedgley disassembled. Gun has only four moving parts, thus is one of simplest yet designed

Fig. 3. (Upper)—Sedgley sub-caliber attachment with 50-shot magazine for semi and full automatic operation in Browning .30 and .50-caliber heavy and air-type machine guns. Sedgley attachment is shown here resting on top of Browning

Fig. 4. (Lower)—Here Sedgley attachment has been substituted for corresponding parts of the Browning for use in target practice



eral is attended by a certain vibration resulting from the reciprocation of the relatively heavy bolt—a process which is scarcely conducive to accuracy of fire in semi-automatic operation. In fully automatic fire other conditions, such as the tendency of sub-machine guns to “climb” mask the effects of breech action to the point where the latter assumes relatively little importance.

For the sake of easy comparison, the characteristics of the Sedgley arm, the Reising and the German Bergman are listed in Table I.

In combat operations, the “shock power” of bullets of varying weight, velocity and cross-sectional area has been defined as the product of the kinetic energy of the bullet and its cross-sectional area. Since the sub-machine gun, in the hands of the soldier, is commonly employed in rather desperate situations, the knock-out characteristics of the missile are of prime importance. On this basis, the Reising appears the superior, even though the Bergman has considerably higher muzzle velocity, the ratio being about 308, 141 and 135 for the Reising, Sedgley and Bergman, respectively.

Further since the Luger, according to some authorities, loses about 20 per cent of its original velocity at 100 yards as compared with a loss of only 11.7 per cent on the part of the 0.45 at the same range, the disparity becomes even more pronounced at ranges in the neighborhood of those at which the sub-machine gun would commonly be employed. *However, these comparisons are not to be taken as criticisms of the guns having the lesser man-stopping powers since it would appear that all are well adapted to the larger caliber bullet which gives that effect.*

Among other design features of the Sedgley arm, the absence of any flat springs and any intricate machining operations is to be noted—an advantage whose importance in the event that these guns should be required quickly in large numbers, will readily be appreciated. The front sight is of the conventional patridge type; while the rear sight is properly located to avoid blurring. This latter element is made from one piece and has one adjustment for elevation. Full protection of the working parts against the entry of sand and dirt is afforded by the sleeve.

To satisfy himself that the gun is actually as simple in construction

as indicated, the author recently spent half a day at the Sedgley plant. Examination at first hand shows there is a simple reciprocating bolt which weighs 1½ pounds, with the firing pin set solidly in the face. The action is nothing more than this. On release of the bolt by the sear, the bolt moves forward under the impulse of the main spring, picking up a cartridge from the magazine in its path, delivering same to chamber and firing the cap the instant the breech is closed. Upon explosion of the cartridge, the bolt commences its return journey, but not quickly enough to tear the cartridge circumferentially as might happen were the breech opened too quickly. There is no lubrication of the cartridge or working parts other than the occasional attention which a careful operator might give.

There is a simple spring-type extractor claw with ejector of familiar style which throws the cartridge out through the slot in the side of the receiver. The action of the gun is completely satisfactory, as the author can testify from first-hand acquaintance. The better part of an hour was spent on the Sedgley range firing this gun without a single mal-

(Please turn to Page 96)

TABLE I—Characteristics of Typical Sub-Machine Guns

Characteristic	Reising	Bergmann
Weight, pounds	7 (8" barrel) 7½ (11" barrel)	6½ 9.35
Barrel length, inches	8 and 11	7½
Overall length, inches	35	32.28
Mag. capacity, rounds	20	50
Cyclic rate of fire	450 to 500	600
Action	Straight blowback	Delayed do. Straight blowback
Sighted to	300 yards	1000 meters
Caliber	9 mm. (Luger)	9 mm. Luger
Bullet weight, grains	124	124
Muzzle velocity, ft./sec.	1210	1185
Muzzle energy, ft. lb.	403	431

Where To Use The AUTOMATIC CARBON ARC

POSSIBLY the primary consideration that determines whether or not it would pay to install an automatic carbon arc welding setup (such as the Lincoln Electronic Tornado) is whether or not the volume of work is sufficient. However, before getting into that, there are a number of other important factors that must be completely understood before deciding to install automatic equipment.

First of these is the matter of uniformity. Unless the welding operation is more or less repetitive, nothing is likely to be gained by use of automatic equipment. The reason for this is that if a job is not repetitive and each piece of work requires more or less an individual setup, so much time will be consumed in setting up the work for welding that the actual high-speed operation of the automatic welder itself will still give longer overall time for the operation than manual welding. In such a case, of course, costs would also be excessive.

Second consideration is the matter of continuity of the weld bead. In an automatic setup, either the automatic welding head is traversed over the work at a constant rate or the work is traversed under the head at a constant rate. This means that if there are many intermittent welds to be made, much time will be lost while traveling from the end of one bead to the start of the next section of bead. It is not practicable to put fast traverse mechanisms into such equipment, so the space between welds must be traversed at the same rate as when welding.

This simply means that it is not

In addition to certain technical considerations, specified here, a certain volume of work must be involved. How to check to determine if your volume of work is sufficient is explained, examples given

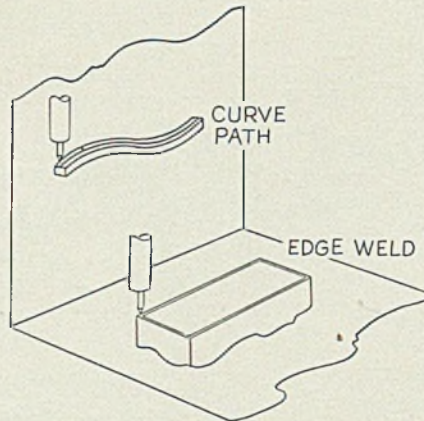


Fig. 1—Work must be such that metal can be deposited in downhand position but path of weld may be curved vertically, horizontally or in three dimensions

mately the same time is consumed in starting a bead manually, so this factor cancels out of the consideration.

The third essential condition for automatic welding is that the joints be so located that the metal can be deposited in a downhand position—that is, the automatic carbon arc process operates with the weld below the carbon and with the weld metal fed into the arc at an angle. This limitation however, simply means that inside corner welds cannot be made nor other types as inaccessible to the welding head. Almost all types of outside welds can be handled on automatic equipment either by moving the head or by moving the work underneath a stationary head.

While the easiest type of work to set up for automatic welding is that in which welds are in a straight line in a flat plane, it is possible to build fixtures to accommodate work in which the line of weld may be curved either in a horizontal plane or in a vertical plane or in three dimensions. In either case, of course, proper jigs and fixtures must be provided to traverse the work under the head or the head over the work, maintaining accurately the proper space relation between head and work.

For example, Fig. 1 shows in the lower view how an edge weld can be made around the top of a tank or similar structure. Upper portion

practicable to use an automatic welder for skip welding. The automatic can best be utilized for long, continuous welds.

Of course, another factor is the necessity of stopping the machine for two or three seconds to allow a dwell period for striking the arc and starting a bead. However, approxi-

Fig. 3—Representative production speeds and costs for lap and corner joints

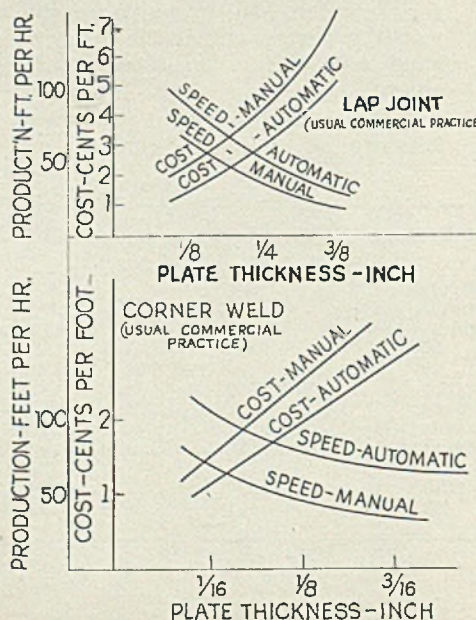


Fig. 4—Representative production speeds and costs for edge welds

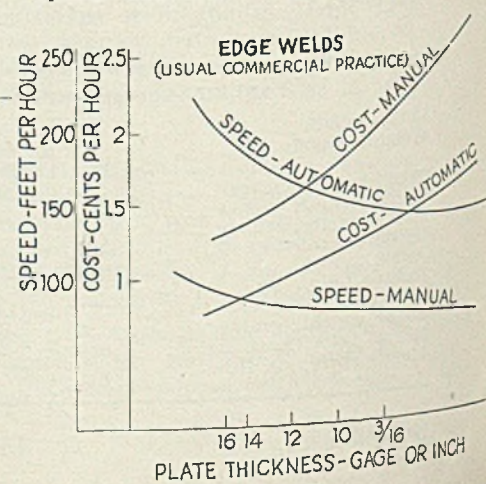
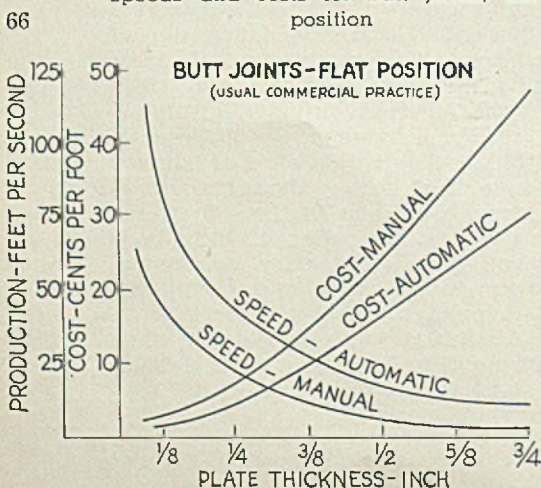


Fig. 2—Representative production speeds and costs for butt joints, flat position



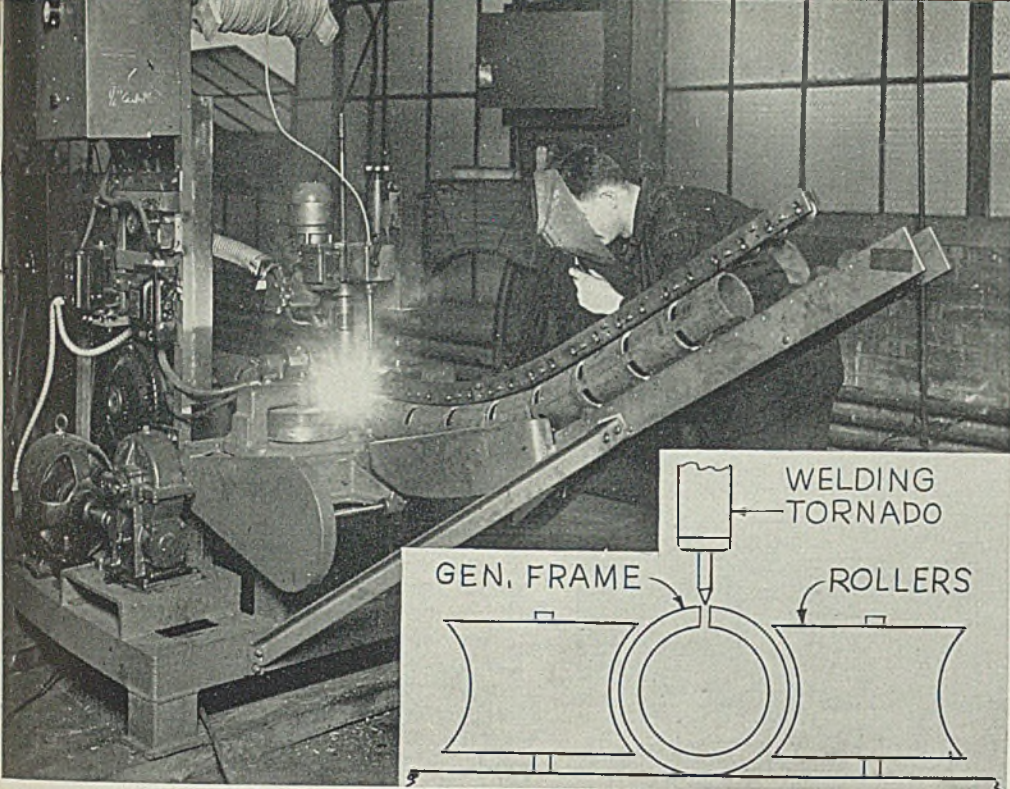


Fig. 5—Automatic shielded carbon arc process employed in welding motor and generator frames, often with adding filler metal. Inset shows position of welding head, rollers and work

shows how a weld can be made following an irregular or curved path in two dimensions. Similarly, a properly designed jig to present the work to the welding head will also allow making a weld in a curved or irregular path in three dimensions. The only limitation is that the work be presented to the automatic welding arc for downhand or flat position welding.

Now suppose it has been found that the work is largely repetitive, that much of the welding consists of long, continuous beads and that it is practicable to make fixtures to present the work to the welding head for flat position welding. Now there remains the final and possibly the most important question—"Is the volume of production sufficient to warrant the installation of automatic equipment?" Even though a job may appear ideally suited to automatic welding from a technical angle, unless there is sufficient volume of work to be done, it will not pay to install the automatic equipment. But how to determine what volume is sufficient—that is the question.

The approach to this problem is based on the fact that the speed of

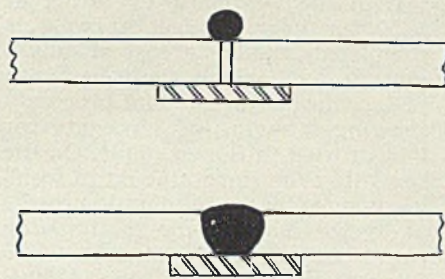


Fig. 6—This type of butt weld with filler metal added is utilized for automatic welding of tanks, range boilers, pipes and similar items

automatic welding is greater and operating costs per foot weld thus lower than manual welding. Therefore it becomes a matter of determining how long it would take to make sufficient savings from operating economies to pay off the investment in equipment. One way to make this calculation is as follows:

This study will be based on the assumption that the same amount of welding is to be done in either case whether manually or automatically. As will be shown below, the cost per hour of operating the automatic

equipment is the same or only slightly greater than the cost per hour of manual welding. On the other hand, the production in feet of completed weld may easily be two or three times as great. Translating these costs into cost per foot, a completed weld will show a certain saving for the automatic equipment per foot of weld. Multiplying this by the total feet of weld to be made per year shows the total amount available for paying off the investment in automatic equipment. If this is sufficient to pay the equipment off in two to four years or sooner, it may be advisable to make the automatic installation.

On the other hand, if the payout period runs five years or longer, it may be advisable for the shop not to go completely to automatic welding but first to install complete sets of jigs and fixtures. Then these will increase the efficiency of manual welding and so produce a saving to pay off the investment in jigs over a period of time. At the end of that period, it often becomes possible to justify the purchase of the automatic machine since the expenditure for jigs and fixtures will already have been written off and possibly the production will have increased due to greater efficiency.

Let's follow through an example to see how this operates. Assume a shop now has 36,000 feet of welding per year. Using the manual process, this welding is done at a rate of 20 feet per hour. Automatic equipment can show a speed of 50 feet per hour on the same work. The cost of manual welding including labor, overhead, power and material is approximately \$2.50 per hour on this job, which at 20 feet per hour shows a cost of 12½ cents per foot of weld. To make this example apply to your own case it is only necessary to substitute the figures which apply in your work in your shop.

The cost per hour of automatic welding can be assumed to be the same as for manual welding. In either case the labor charge will be the same, important because labor is approximately 80 per cent of the total cost per hour of operation. Also, the automatic process will consume anywhere from none up to at most two or three pounds per hour

Fig. 7—Section through type of weld made in Fig. 5 without filler metal

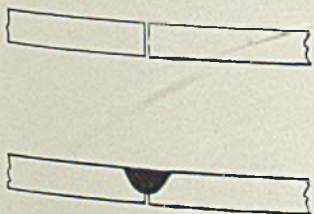


Fig. 8—Here filler metal is added to same joint as in Fig. 7 to produce a somewhat stronger product

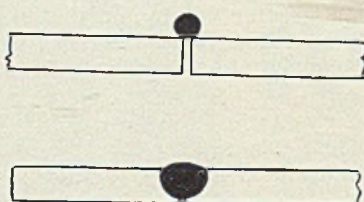


Fig. 9—Type of edge weld shown here is extremely economical as no filler metal is needed, yet a strong weld is produced



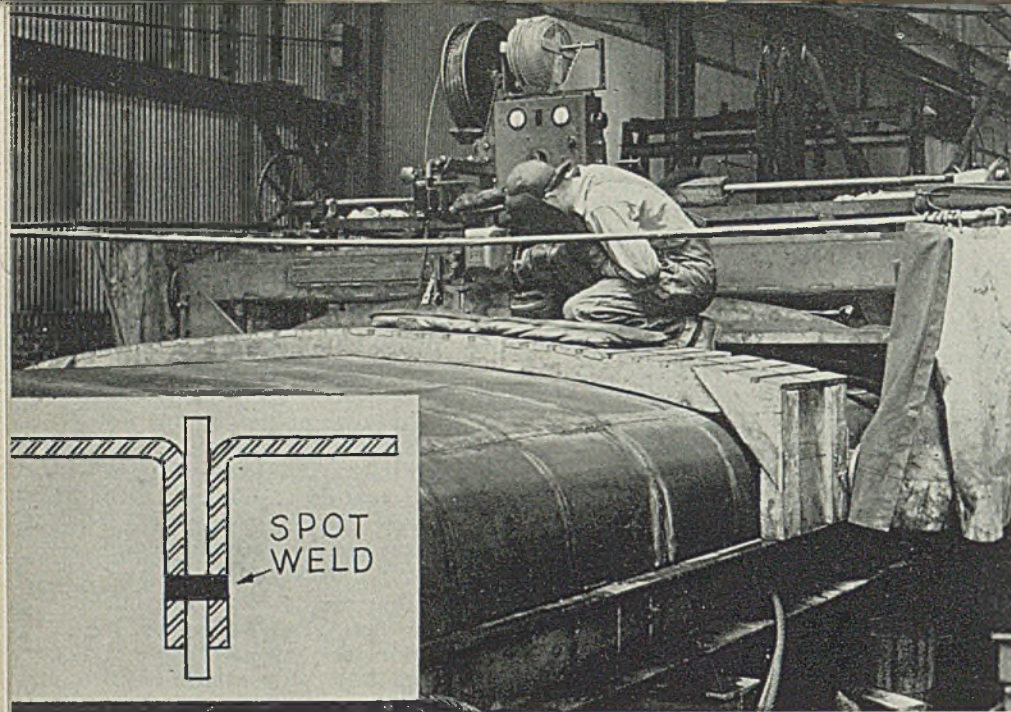


Fig. 10—Here is an unusual setup. A filler strip is spot welded between the flanges of sheets that form a railroad car top. The automatic head then melts down this filler strip to produce a smooth joint flush with car top. Head traverses the work here. Inset shows arrangement of filler strip before finish welding

of wire as against nine to ten pounds of coated rod on a similar manual job. It is easy to see how cost of material would be lower for the automatic. The reason for the low consumption of wire by the automatic process is that the carbon arc will melt some metal, if not all of it, from the material alongside the weld. What wire is used is uncoated and so is low in cost. Also, there is no waste from stub ends.

Cost of power for automatic welding may be double that for manual welding, but in either case the cost of power is only from 4 to 7 per cent of the total cost per hour of welding so the saving in material usually balances the higher power cost for

the automatic.

With the automatic operating at \$2.50 per hour, 50 feet of weld is completed, making a cost of only 5 cents a foot, which compares with 12½ cents for the manual process—showing a saving of 7½ cents per foot of weld in this example. On the basis that the same amount of welding is done by the automatic process as by the manual, the total saving per year will be 36,000 feet times 7½ cents or \$2700 per year. At this rate, the equipment would pay for itself in less than two years.

If the rate of automatic welding had been 40 feet per hour, the cost per foot would have been 6¼ cents; savings would have been 6¼ cents, and savings per year would have been \$2250, which simply means that it would take slightly longer for the equipment to pay out under these conditions.

Of course this analysis is based on a total annual production of 36,000 feet of weld. Many shops are manually welding much greater footage than this. In one case of changeover, a plant was welding manually some 1,200,000 feet per year. Obviously the greater the production, the more important are the economies in favor of automatic welding.

Too, since the automatic welds 2½ times faster in our example, it reduces the welding time to only 40 per cent of that previously needed, thus making the equipment available for either a greater volume of the same work or added volume of new work since capacity of the weld-

ing operation has been increased 150 per cent.

For most companies considering installation of automatic equipment, it is possible to take steps in connection with present manual procedure which will produce savings that may be applied against the purchase of the automatic equipment at some future date. For example, such steps might include the installation of jigs and fixtures, utilization of larger electrodes, installation of modern welding machines of higher capacity. The installation of a complete set of jigs and fixtures is usually the most advantageous since these can subsequently be utilized with the automatic equipment if designed with that purpose in mind.

Accompanying charts show welding speeds obtainable in commercial practice based on welding general purpose steel analyzing 0.15 to 0.25 per cent carbon, 0.35 to 0.60 manganese, 0.07 maximum silicon, 0.05 maximum sulphur, 0.045 maximum phosphorus, with aluminum not over 2 ounces per ton added to the steel unless it has been semikilled with silicon, in which case the aluminum addition should be as low as practical.

When certain other types of steel of poor welding quality are welded, the speed of welding may be as much as 35 per cent slower than that given here. Even these comparatively slow speeds, however, are still faster than possible with the usual manual welding.

Table I lists speeds and costs of automatic arc welding by the carbon arc process as compared with manual process for butt welds in various thicknesses of material; the automatic weld being made from one side only with backup plate, the manual weld being made from both sides. This brings up the point that the automatic weld often can be made from one side only while adding little or no filler metal, further reducing the cost.

Fig. 6 illustrates the type of butt welds used in automatic welding of tanks, range boilers, pipes, and similar products. Here the work is clamped in position on a copper backup strip and filler metal is fed automatically into the arc.

Type of butt weld used in the automatic welding of rear axle housings, tubes, ship channels, safes, generator frames (see Fig. 5) is shown in cross section in Fig. 7. No filler metal is added in making this type of weld. The seams are clamped tightly together without backing, and the welds have 70 per cent average penetration.

In making the type of butt weld shown in Fig. 8, the seams are

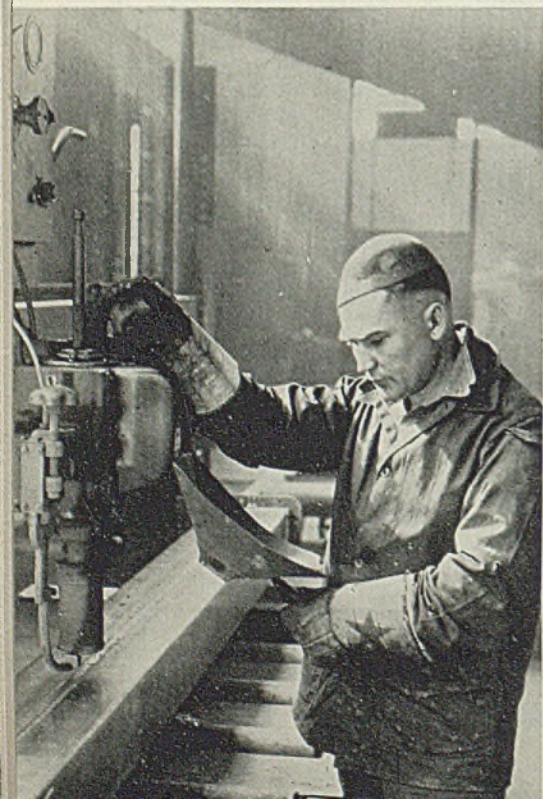


Fig. 11—In welding this rectangular tube from channel sections, the work is moved along underneath the welding head by power driven rollers of the conveyor table



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clamped tightly together without backing up the material, and filler metal is fed automatically into the arc. The use of filler metal in welding this type of joint provides a reinforced weld that is somewhat stronger than the one shown in Fig. 7. The type of joint in Fig. 8 is used in making tubes, automobile rear axle housings and many other products.

Where butt welds showing 100 per cent penetration are desired, as in production of pipe, pressure vessels and similar products, the welding is done from both sides of the joint without the use of backing and with filler metal fed automatically into the arc.

Many lap welds are used in the manufacture of tanks, range boilers, automobile wire wheel hubs and disk

TABLE I—Speed and Cost Data
(Butt welds—automatically from one side only with back up; manually from both sides.)

	16 ga.	14 ga.	12 ga.	10 ga.	$\frac{3}{16}$ "	$\frac{1}{4}$ "
Welding speed, ft./hr.						
Automatic	188	180	165	140	113	90
Manual	130	130	90	80	47	45
Cost per linear foot of weld, cents						
Automatic	1.3	1.4	1.9	2.2	2.7	3.4

wheels. In making this type of weld on automatic equipment, the work is clamped or tacked into position without the use of backing.

Fig. 9 illustrates the type of edge weld used in automatic welding such fabrications as mufflers, range boiler bottoms, brake cross shafts, tanks, etc. No additional filler metal is required, the parts to be welded simply being fused together by the

shielded carbon arc.

The fact that automatic welding does speed production and cut costs in applications for which it is suited is evident by its utilization in many fields where speed and economy are paramount. Automotive manufacture is a striking example. Here the process is utilized to weld up to 240 starter and generator frames per hour as shown in Fig. 5; 350 mufflers per hour; rear axle housings completed one every 43 seconds. Other fields for the process include welding rotors for fractional horsepower motors; pipe manufacture; steel barrels; refrigerator compressors; large and small cylindrical tanks; range boilers; steel cabinets; railway coaches and ships.

For such applications the automatic head can be traversed over the work as is shown in Fig. 10, where the process is utilized to melt down a filler strip spot welded between the flanges of the sheets which will form the top of a railroad car.

Or the head may remain stationary while the work is moved underneath it as shown in Fig. 11 which shows making a longitudinal seam and forming a tube from two pieces of thin plate, bent in a U-section. Here the work is moved along underneath the head at a constant speed by a conveyor table equipped with power driven rollers.

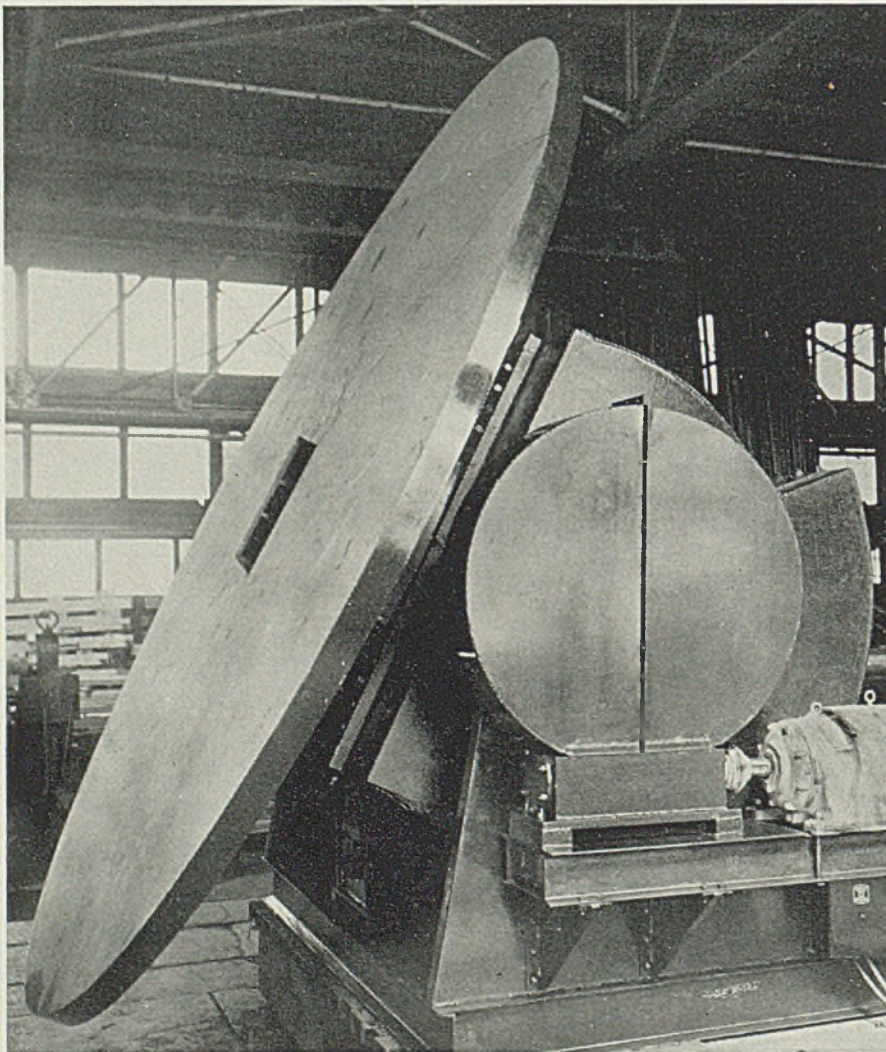
Latest Revisions on Roof Ternes Up for Approval

■ Revision of simplified practice recommendation R30-37, "Roofing Ternes," was approved recently by the standing committee in charge, and the Division of Simplified Practice, National Bureau of Standards, Washington, has mailed copies to all interests for consideration and approval.

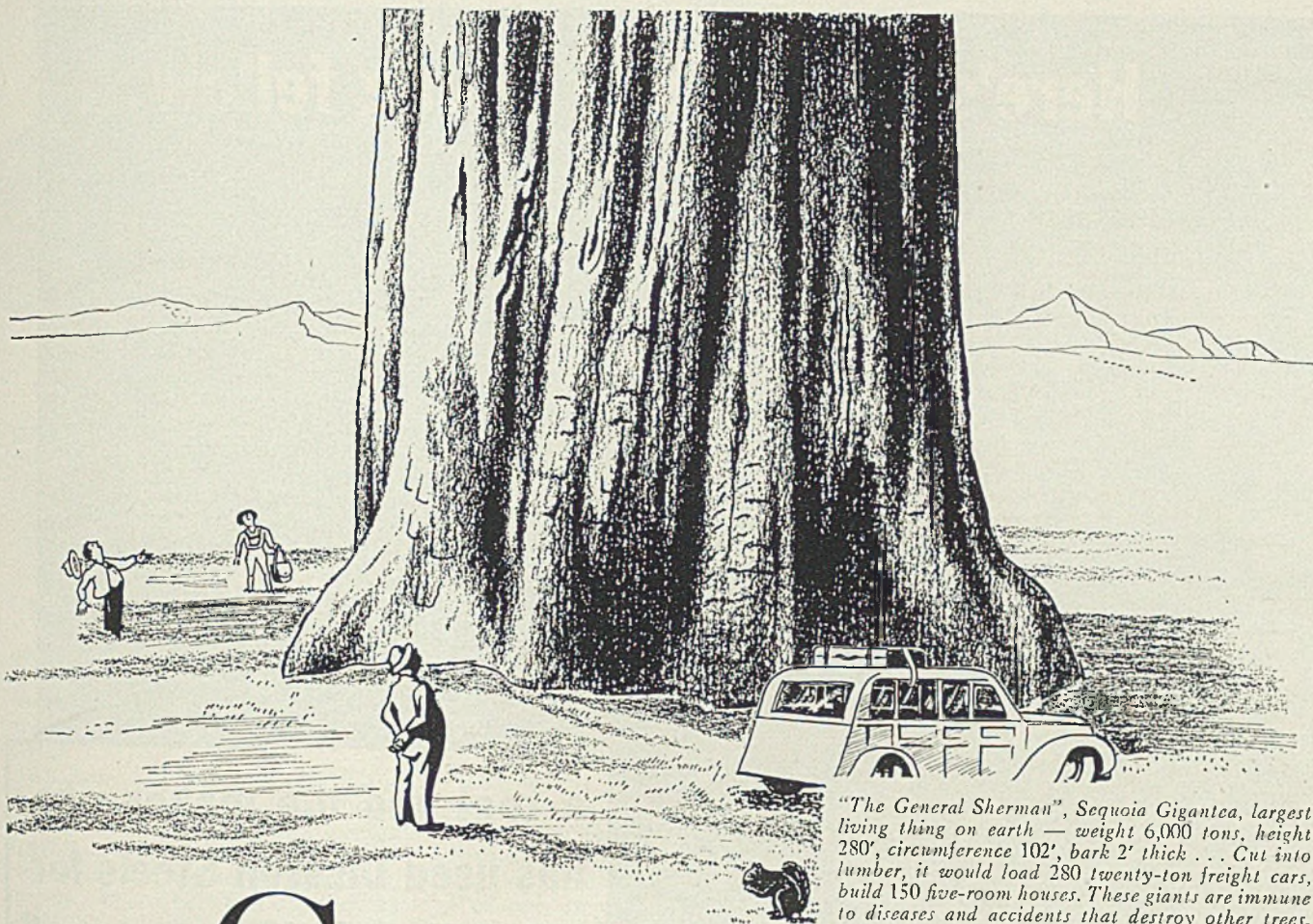
Four weights of coating are eliminated in the proposed revision—15, 25, 30 and 32 pounds per double base box. This will leave the 8, 20 and 40-pound coatings as the simplified list. The standard coating weights are to be embossed on each 14 x 20-inch and 20 x 28-inch sheet.

Following approval of those interested in roofing ternes, the revised recommendation will remain in effect until it is again revised by the standing committee of the industry. Mimeographed copies of proposed revision may be obtained without charge.

Welded Unit Hastens Other Welding Jobs



■ This steel welding positioner, manufactured by Mississippi Valley Structural Steel Co., Melrose Park, Ill., expedites welding of heavy machine parts by permitting downhand welding. Its table measures 13 feet 11 inches in diameter and tilts to an angle of 90 degrees. The table's revolving action positions work for best welding angles, the various movements being governed by push buttons. Although built to hasten welding of parts, the positioner itself features welded construction. Machinery & Welder Corp., 312 North Loomis street, Chicago, furnished the electrodes for its fabrication



"The General Sherman", Sequoia Gigantea, largest living thing on earth — weight 6,000 tons, height 280', circumference 102', bark 2' thick . . . Cut into lumber, it would load 280 twenty-ton freight cars, build 150 five-room houses. These giants are immune to diseases and accidents that destroy other trees.

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Help for tool makers: Disston metallurgical engineers will be glad to help you in selecting the best tool steels for each job...for more "mileage" per tool. Also, there's valuable information in the 73-page catalog, "Disston Tool Steels." If you haven't received your copy write today to Henry Disston & Sons, Inc., 1126 Tacony, Philadelphia, Pa.

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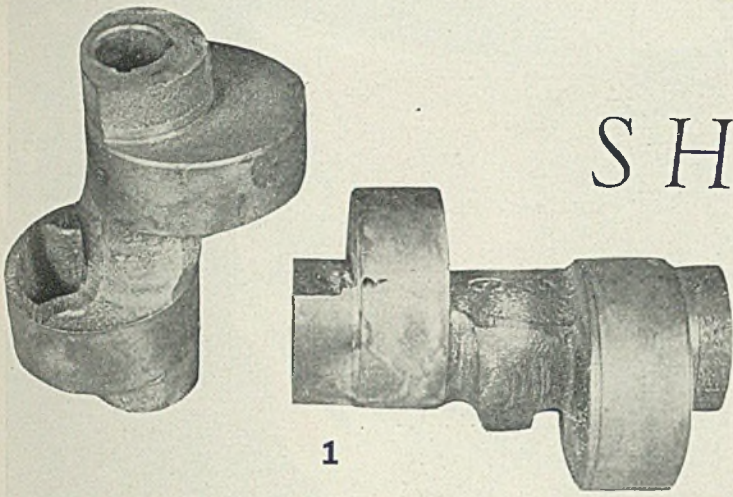
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SHORTCUTS

in Making Air-Conditioners



■ SPECIFICATIONS for eccentric cams used in the crankcase of small air-conditioning units require that certain areas have a hard, wear-resistant surface. Cams, Fig. 1, are quench-hardenable cast iron with 3 per cent carbon, 1.7 silicon, 0.85 manganese, 1.50 nickel and 0.3 chromium. Flame hardening has been an efficient and economical means of providing the needed hardness without affecting toughness and shock resistance of the core metal.

All cams are now treated in the special flame-hardening setup shown in Fig. 2. The flame-hardening operation takes place in three cycles, controlled by an operator who merely operates certain levers while he follows automatic light signals for correct timing. During the first cycle, the cam is held stationary for 9 seconds under the oxyacetylene flames, with the heating heads directed upon those areas that have the greatest depth of metal. During the second cycle, the cam is spun beneath the flames 1500 revolutions per minute for 13 seconds to distribute the heat evenly over the thinner sectioned areas. Flames then are extinguished and

By J. S. GRAHAM
The Linde Air Products Co.
New York

the cam spun for about 1½ minutes beneath a water quench. An even, flame-hardened case of between 0.05 and 0.06-inch results.

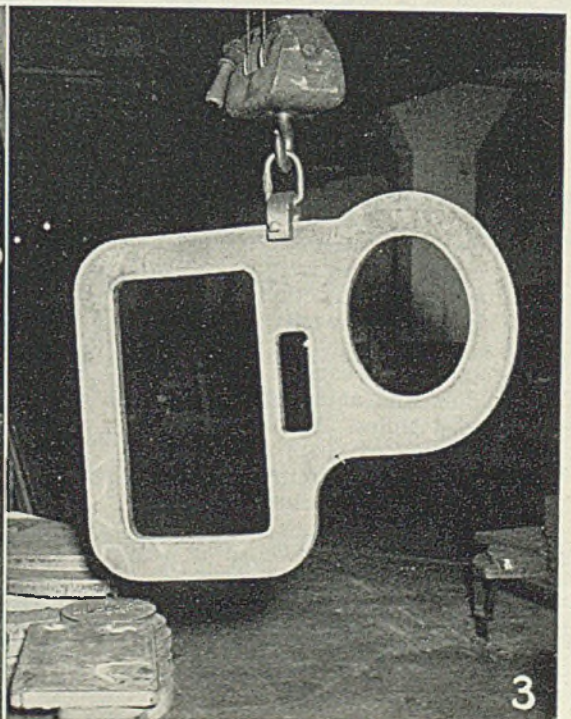
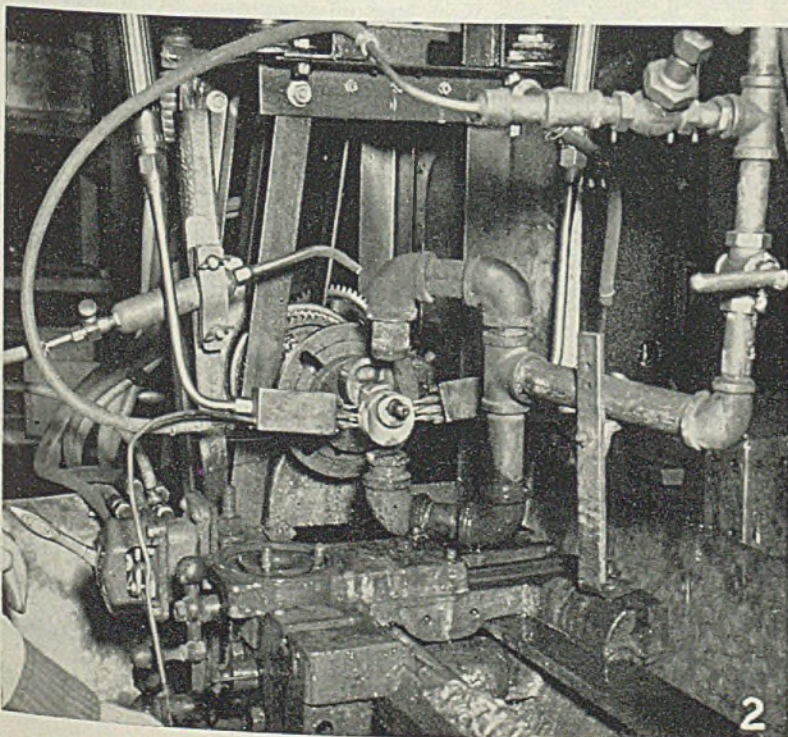
This selective hardening is particularly valuable as several small holes which have to be drilled in the eccentric before use can now be drilled after hardening rather than before. Formerly holes were drilled before hardening, but cracks in the vicinity of the openings often resulted.

Also, no difficulties are encountered now in drilling the shaft hole since the core remains soft. Formerly it was necessary to send the hardened cams out of the plant for a special grinding operation to remove the hardened case from the surface of the hole before diamond drilling. Breakage sometimes occurred during this operation. All this is now eliminated. A third advantage is a reduction in the tendency toward warpage. Rejections which formerly ran as high as 80 per cent for all cases now

amount to only about 1 per cent.

Oxyacetylene machine cutting is used to shape cut large equipment parts from steel plate. A typical operation is cutting flanges, 44½ inches in overall length from 1½-inch steel plate. These connect the compressor to the cooling unit of large air-conditioners. Since the same shape is flame-cut repeatedly, a templet is used to guide the cutting-machine carriage so that the blowpipe moves automatically to make the desired outline of cut. Speed of cutting is 8 inches per minute. Cut edges, as shown in Fig. 3, are clean and accurate and require only a light grinding to fit them for use.

Oxyacetylene welding provides a rapid and dependable means of joining pipe and tubing in the cooling units. All joints must be leak-proof and maintenance-free for the life of the pipe or tubing. A typical cooling unit contains 14 welds in ¾-inch diameter tubing with a wall thickness of 1/16-inch. These welds are made at the end of each length of tubing where a welding fitting is used to join them into a continuous system for circulating refrigerant gases or liquids. A copper-plated steel welding rod is used. Each welding operator completes 12 of these units, containing a total of 168 welds, per day.



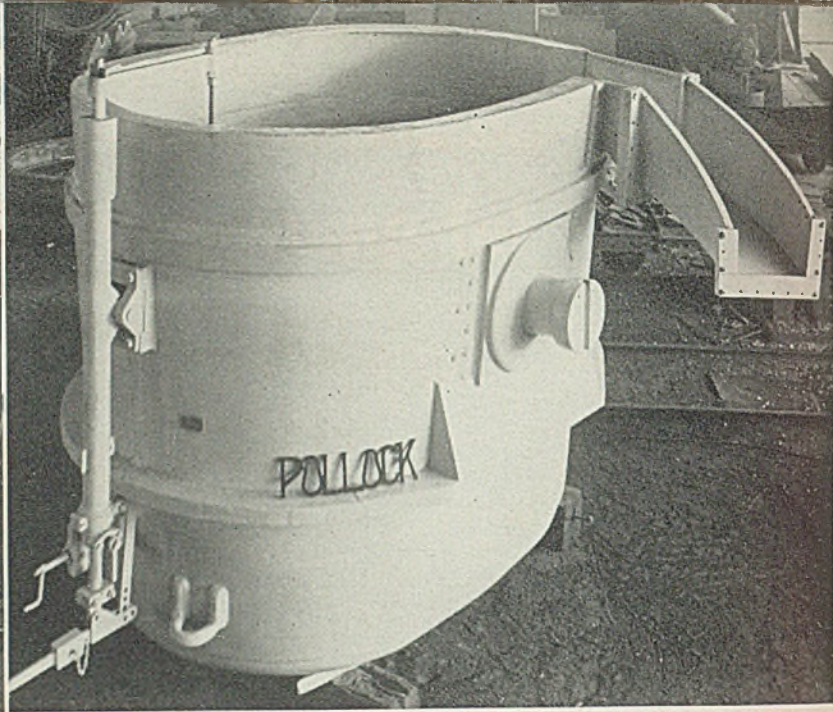
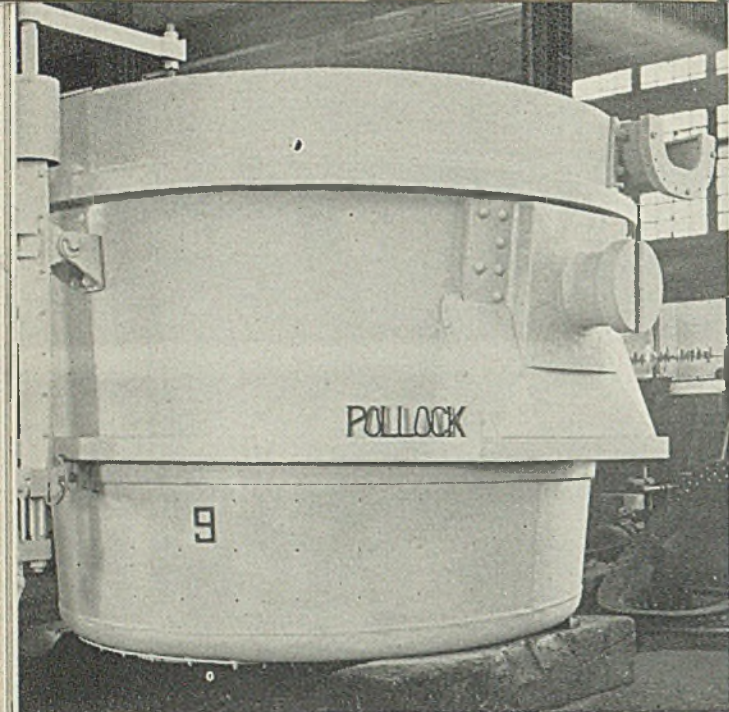


Fig. 1—Round ladle of 160 tons capacity, 11 feet high and 13 feet 2 inches diameter

Fig. 2—Elliptical ladle of 125 tons capacity with one diameter 40 inches longer than the other. Sides are curved for better lining life

WELDED LADLES

For Open-Hearth Service

Curving the sides of elliptical ladles affords longer life of linings. Low-carbon steel recommended as safest material for shell construction. Stability of vessel while in crane hooks depends upon location of trunnions. Details of ladle design are presented

■ THE FIRST large welded ladles built in the United States were placed in service early in 1932 at the plant of the Lukens Steel Co., Coatesville, Pa., having been furnished by the William B. Pollock Co., Youngstown, O. They were of 285 tons capacity and had a major advantage over the riveted ladles then in use by being decidedly lighter in weight. Some of the minor advantages included a smoother inside surface which facilitated laying up the brick lining, and a smoother outside surface which was easier to keep clean and which made a better appearance.

The comparative weights of the two kinds of construction for ladles of 60 or 70 tons capacity and larger is about one-fourth the weight of the molten metal carried for the riveted ladles, and about one-sixth for the welded ladles. In old plants in which the size of heats has been increased up to the limit of capacity of the cranes and buildings, welded ladles make possible a further increase of about one-twelfth in the size of heats for the cost of new ladles only. It was found savings from the increased size of heats

often paid for the new ladles in less than a year.

The lighter weight of welded ladles compared with riveted ladles occurs only with ladles of 60 to 70 tons capacity and over. For these capacities riveted ladles are generally made with cast-steel spacers extending from trunnion casting to trunnion casting. The spacers are used because there is a practical limit of size and strength which can be obtained by this construction alone. In the welded construction, it is possible to fabricate much heavier and more economical sections of rolled steel, and spacers are not required. Below these capacities there is little difference in weight between the two types of construction.

The weight given previously, that is, about one-sixth of the weight of molten metal carried, is fairly constant with welded ladles of ordinary

proportions in all capacities from about 50 tons and up, and does not vary much between different manufacturers of ladles who use different methods of design and fabrication.

The preferred proportions of a ladle, if there are no limiting conditions, is a round ladle with a height slightly greater than the diameter up to a height of 11 or 12 feet, which is a capacity of about 125 tons. For larger ladles, to keep down the head of metal while pouring, the height is kept at 11 to 12 feet and the diameter only increased. A 160-ton capacity round ladle, 11 feet high and 13 feet 2 inches diameter is shown in Fig. 1.

Often it is necessary to increase the capacity of the ladles in an existing plant where the center to center of trunnions and height cannot be changed on account of crane dimensions and various vertical clearances. This is the only sound reason for making ladles elliptical. The sides of the elliptical ladle may be either straight, or curved to a comparatively large radius up to 12 or 15 feet. The curved sides will give a better lining life. A 125-ton capacity elliptical ladle with one diameter 40 inches longer than the other, and with curved sides is shown in Fig. 2.

A ladle specially shaped to get the maximum capacity within a limited height, width and length is shown in Fig. 3. This ladle is ap-

By F. L. LINDEMUTH
Chief Engineer
William B. Pollock Co.
Youngstown, O.



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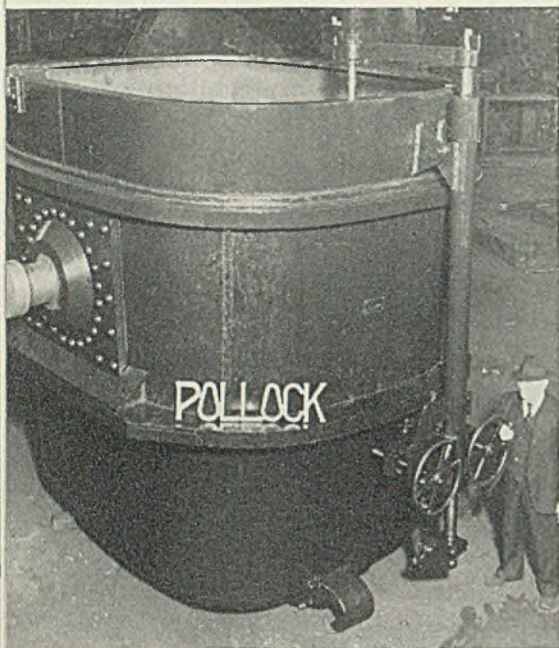


Fig. 3—Specially shaped ladle designed to secure maximum capacity within a limited height, width and length

proximately rectangular in shape with small radii at the corners of the rectangle and large radii at the sides and ends.

The material used in the shell of welded ladles is ordinary soft steel. To make a further saving in weight, it has been proposed from time to time, to use low-alloy, high-strength steels. Due to engineering considerations, the saving in weight made possible by the use of a higher strength steel is much less than the proportionate increase in strength. The cost of these steels is higher, and because of special precautions which must be used in fabrication, the cost of manufacture is much more. Many of these steels are sensitive to abrupt or local changes in temperature such as would occur from the spill of hot metal or slag over the sides, which makes them rather unsafe to use for ladles. The most economical and safest material available for the shells, up to now, is ordinary low-carbon steel.

The trunnions are made by different manufacturers in different ways from various materials. Some use forged steel trunnions which are forced into holes bored in the sides of the shell, the sides of the shell being built up to a sufficient thickness to support them. Others use steel castings, similar to the castings used in riveted ladles, riveted to the shell. Others use steel forged trunnions with gussets or braces all welded to the shell. A good material for the trunnions is ordinary 0.30 per cent carbon steel, annealed. It is strong and is not seriously impaired by spills of hot metal or slag over its sides. Three per cent nickel, low-carbon steel, annealed, has more

strength than ordinary steel and stands up well under spills of hot metal and slag. Quenching and tempering the trunnions has been proposed but is not considered advisable as a spill of hot metal or slag would probably seriously impair its strength and safety. Trunnions should have an ample factor of safety. Recommended trunnion sizes are as follows:

Capacity of ladle, tons	Diameter of trunnions, inches
50	10
80	12
125	14
175	16

Details of the ladle should be considered carefully, not only from the point of strength and safety, but to suit the operating conditions in the particular plant in which the vessel is to be used.

Capacity is the volume inside the lining and below the slag spout. The specific weight of molten steel varies with different grades of steel. If no more accurate figures are available, a ladle volume based on about 420 pounds per cubic foot is a good average. If a layer of the slag is required over the molten steel, the volume capacity must be increased.

Location of the trunnions first must be considered with regard to stability against overturning when carried in the crane hooks, and then it must be determined that there is no interference when the ladle is turned upside down in the crane hooks to clean it after pouring.

Trunnions about 15 inches above the center of gravity of the ladle full for a ladle 12 feet high is satisfactory. Principally on account of the sloping bottom, and to a less extent on the weight and location of the spout and stopper rigging, the center of gravity is generally not on the vertical center line of the ladle, but toward the pouring side, and the distance it is off changes as the ladle is filled and emptied. To compensate for this, the trunnions are set toward the pouring side of the ladle to get the best average conditions. The friction of the trunnions in the hooks, when they fit closely, is then sufficient to hold the ladle steady. If the hooks fit loosely, the ladle may roll backward and forward as it is emptied, the amount of the roll being in proportion to the looseness of the fit. If the trunnions and hooks are lubricated, the ladle will move in a similar manner. This is not dangerous, but is a nuisance when pouring. If this happens and the cause cannot be corrected, a lock can be used. If the trunnions cannot be located sufficiently above the center of gravity to be safe under all conditions, a lock should be used.

The shell of the ladle is built up in various manners, depending on the method of design, to be given the

necessary strength and rigidity when the ladle is in the stands in front of the furnace and when it is being carried by its trunnions in the crane hooks. The details of this varies between different manufacturers and for different capacities of ladles.

The best construction for the bottom is a flanged and dished plate of proper proportions to carry the weight and pressure of the liquid steel with an ample factor of safety. The dished bottom will give the greatest strength for the least weight of material used, and, in addition, keys the brick lining so that there is little danger of it floating up in the molten metal. This bottom is sloped toward the tap hole so that the ladle will drain completely when it is poured. The region of the tap hole is the most vulnerable point of the bottom both because the hole itself is a point from which cracks may start, and because heat is radiated against it from the tops of the ingots as they are poured. For strength, the hole should be reinforced in the same manner as holes in a pressure vessel.

Bottom Is Reinforced

To prevent buckling and cracks from heat radiated from the ingots, a separate plate, bolted to the bottom of the ladle and spaced away from it with washers, will give good protection. This plate is made removable, as from time to time it may be necessary to replace it. It should extend over the area of the ladle which is exposed to heat radiation from the ingots. Depending on the location of the tap hole and how the ingot molds are arranged for pouring, this protection plate should cover approximately one quarter, one half, or the entire ladle bottom. With the dished bottom, a small area may be below the level of the tap hole even with it sloped in the general direction of the tap hole. For this, the brick lining may be thickened over this area, or a steel plate false bottom put in, so that there is a general slope over the entire bottom toward the tap hole.

A good spout is important. A great deal of damage to the sides can be traced to overflows of slag and metal over the top of the ladle because the spout does not carry off the slag properly. The spout should be not only of ample width and depth, but should be located on the ladle so that the slag enters it easily. A spout long enough to discharge directly into the slag pot is preferred to a short spout on the ladle with a trough between it and the slag pot. The spout shown in Fig. 2 is highly satisfactory. One side of the spout is approximately tangent to the shell of the ladle so that the slag enters it with the least change of direction of flow or other dis-

turbance. It is wide and deep enough to carry off the slag, and it discharges directly into the slag pot. If the spouts are properly made and maintained, there should be few spills over the top of the ladle. Spills may not only damage the ladle in time, consequently incurring expensive repairs, but must always be cleaned up.

The lining can be laid directly against the sides of the welded ladle, without the backing course between the bricks and shell required in riveted ladles to cover projecting rivet heads, butt straps, etc. The thickness of the lining used varies in different plants depending on their experience. The average thickness is about 7 inches in the top half and 9 inches in the bottom half of the sides, and from 9 to 11 inches on the bottom.

For smaller ladles, such as blast

furnace hot metal ladles, transfer ladles and electric furnace ladles, where no great saving in weight is possible, welded construction often is preferred and specified.

The largest welded ladles that have been built are some open-hearth ladles of 190 gross tons (213 net tons) nominal capacity.

Various patents on welded ladles have been granted, some covering general methods of design and construction, and others various details.

During the first few years of its existence, the welded type of ladle construction was tried out cautiously by different steel companies. They aimed to get more open-hearth capacity with a minimum expenditure, and welded ladles seemed to be the answer. Two or three ladles were ordered and tried. After satisfactory service, additional ladles were ordered until, in many open-hearth

shops all ladles used are of welded construction. They are specified for new plants where their lighter weight, which was the first reason for their use, is not important.

Announces Treatise on Modern Strip Mills

■ One of the most complete treatises ever assembled, fully detailing design and operation of wide strip mills has just been published by the Association of Iron and Steel Engineers, Empire building, Pittsburgh. Entitled "The Modern Strip Mill," it is being distributed free to members of the association although a limited number of copies are available for sale to those interested. The volume is case bound, 9 x 12 inches, containing 512 pages, with 62 tables and 227 illustrations.

The book is divided into two parts. Strip mill design and practice as followed in the wide strip mills in the United States have been carefully described in the first part, which is divided into nine sections: General, slab heating, hot strip mill, mill parts and accessories, electrical equipment, pickling, cold mills, heat treating, and processing and material handling. Contained within each section is detailed catalog information that has been prepared by the suppliers of steel mill equipment and services.

In the second part of the book, available data on all of the 28 individual installations have been tabulated in a thorough and complete manner. Also included in this section are 33 blue print layouts of all the wide strip mills in this country.

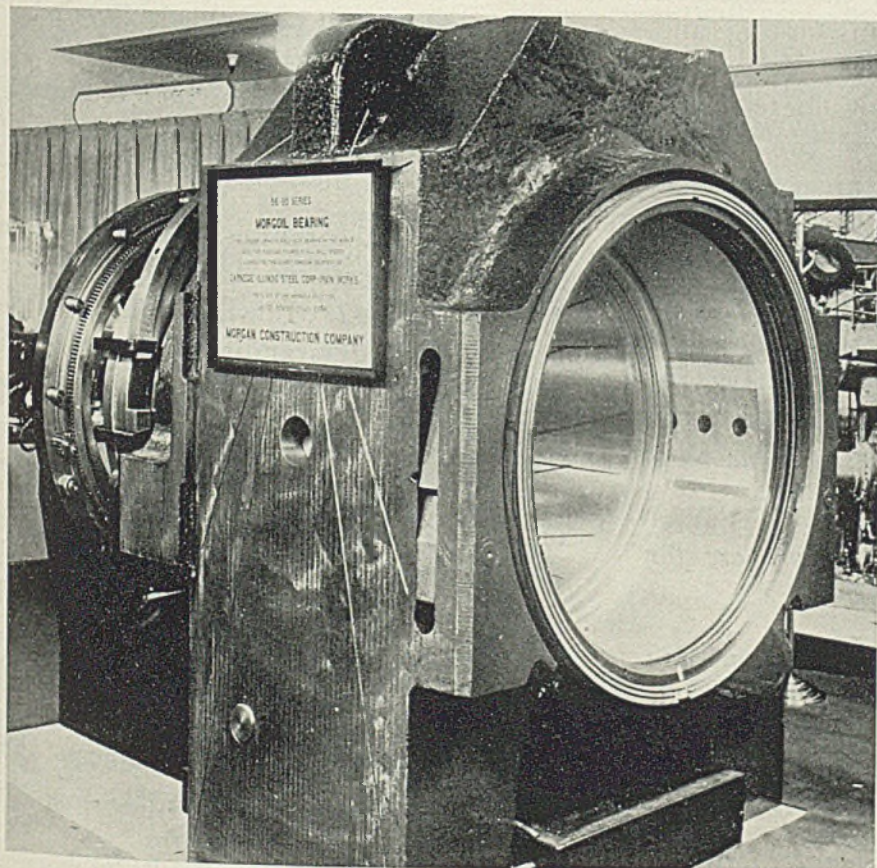
Business "Bottlenecks"

■ *Bottlenecks of Business*, by Thurman W. Arnold; 335 pages; published by Reynal & Hitchcock Inc., 386 Fourth avenue, New York; price \$2.50.

With the increase in prosecutions of monopolies by the government, the field of business should be interested in the economic philosophy of the active head of these actions. This book provides background thinking of the author, the assistant attorney general.

The discussion first treats the basic problem of distribution, and considers in turn the following subjects: How restraints of trade affect the standard of living, how restraints of trade unbalance the national budget, a free market in time of national emergency, an elastic procedure backed by tradition to prevent private seizure of industrial power, procedure under the Sherman act, antitrust enforcement for the benefit of the consumer, bottlenecks between the farm and table.

High-Capacity "Oil Film" Backup Bearings



■ Forty-four Mergoil bearings used on backup rolls of large cold mills in two plants in the Chicago and Pittsburgh districts have now been in successful operation for some time. The first two installations in the Chicago district were made in 1936 and the third in the Pittsburgh district in 1938. The bearings made by Morgan Construction Co., Worcester, Mass., are used on tapered necks 39 inches in diameter and on straight necks 38 inches in diam-

eter. The journal diameter is 44 inches, the length of journal 39 3/4 inches. Continuous full load carrying capacity of each bearing is 5,247,000 pounds, resulting in a total mill separating force capacity of 10,494,000 pounds. This capacity is sustained throughout the speed range of these mills. Each bearing, exclusive of its chock, weighs 12,500 pounds, and with the chock the weight per bearing is approximately 42,200 pounds.

“... a tremendous

SHIFTING the economy of the world's greatest industrial nation from a peacetime to a wartime basis is a tremendous undertaking. It cannot be accomplished without hardship and confusion.

Thus far, the brunt of the transition has fallen upon the metalworking and metalproducing industries. Manufacturers in these fields are beset with serious problems. They are asking questions to which there are no specific answers.

How can I function to the best advantage during the present emergency?

What can I do to participate to the utmost in the defense program and yet preserve my business for the postwar period?

What can I do now to prepare for postwar conditions?

These and many other questions are in the minds of executives in the metals industries. No ready-made answers are available. The substance of the answers is to be found in the day-to-day developments in Washington.

STEEL reports these developments faithfully each week. They form the

groundwork of information from which industry must make its decisions. They are the ingredients from which the right answers must be brewed.

These piecemeal developments ultimately will fit into a definite pattern—a pattern to which our wartime and postwar economy will be molded. To understand how each individual happening fits into the pattern of the whole requires a broad perspective—a long-range view of objectives and methods.

STEEL will provide this perspective in its Yearbook of Industry issue of January 5, 1942. It will furnish a background of understanding against which week-to-week developments, as they unfold, will make sense.



Outstanding in the 1942 Yearbook issue will be an overall analysis of the defense program and its effect upon the metals industries. Other studies will deal with the difficult problem of priorities and allocations, with the impact of the defense economy on small business, and with the probable scope of labor problems in 1942.

How far-sighted companies are preparing for post-war competition will be

undertaking”

the subject of another important study.

In the Yearbook issue, “Mirrors of Motordom”, the widely-read weekly feature of STEEL, will be amplified to present a long-range perspective of the automobile industry’s present status and of its 1942 prospects.

“Windows of Washington” will analyze developments at the national capitol in 1941 and will present a summation of the 1942 docket as it stands revealed at the year’s end.

“Wing Tips” will review the aviation industry and examine its future as an outlet for metals and equipment.

Technical progress in metallurgy and in all phases of metal production, processing and fabrication will be presented in the form of reviews to be contributed by more than 160 outstanding engineers, metallurgists and production men.

A major article will cover steelworks expansion in 1941—the year in which large-scale government investment injected a factor that is bound to be of profound significance.

A review of the iron and steel industry of Europe will recount the extent to which its control has changed hands.

The 1942 Yearbook of Industry issue will, as usual, contain forecasts of activities in the principal branches of the metalworking industries, including railroads and other transportation, shipbuilding, construction, machine tools, tools and dies, automobiles, aircraft, agriculture, home appliances, forging presses, sheet working equipment, cold headers, materials handling equipment, nonferrous plant expansion and so on.

In addition there will be one of Mr. Shaner’s trenchant editorials, an amplified “Business Trend” section, a review of the situation in raw materials, complete statistical information on prices and production, also the usual weekly presentation of market and general news.

EC Kreutzberg
Editor, STEEL

**1942 YEARBOOK
OF INDUSTRY ISSUE**
January 5, 1942

"GRAPHITIC" STEELS

■ IT WAS conceived some years ago that a combination of the most desirable features of steel and cast iron would result in a metal capable of showing improved service life on many applications. The uniformity of structure in steel, its relative freedom from segregation and porosity, its ready response to heat treatment, its good physical properties combined with the easy machining quality, the high resistance to wear and the good frictional and dampening properties of cast iron were regarded as being fundamentally essential to improved service life.

A ferrous alloy that incorporates all of these properties and is, therefore, radically different in principle to any previous metal carries the general trade name "Graphitic Steel." It is produced in five grades—Graph-Sil, Graph-Mo, Graph-Tung, Graph-Al and Graph-M.N.S.—by the Timken Roller Bearing Co., Canton, O., who supplies the following data on the development, manufacture and heat treatment of these steels. A later article will describe typical applications.

F. R. Bonte, a young metallurgical laboratory assistant, was gathering samples of annealed steels in the inspection department of a prominent tool steel manufacturer when he found a fractured cross-section of a bar of steel which was entirely black. Under the microscope it was found to contain free graphite. The particular lot of steel represented by this sample had been scrapped. Bonte, anxious to learn all about this condition and, if possible, find a remedy for it, subjected a group of test pieces from this lot to a variety of heat treatments to recombine the free carbon in the structure, but was only partially successful, and the idea was dropped.

Ten years later, Bonte was studying the problem of lubrication in connection with the use of turned and ground shafting in high speed service, and it occurred to him that a material containing free graphite similar to that observed years before, but with a controlled analysis, might help the high speed shafting

... what they are, how they are made, what they can do, how to heat treat and prepare them for your own particular applications

problem. Within a year he was able to prove that the process of producing such a material was practical. In 1932 he joined the Steel Division of The Timken Roller Bearing Co. to conduct extensive research on free graphite in steel. A number of heats were made and fabricated into the standard sections, such as bars, sheets, strip, forgings and rolled weldless rings. Further ex-

the rate of diffusion of carbon in the matrix.

Graphitized steel parallels malleable iron in that it is necessary to closely control deoxidation and temperature of the melt at the time it leaves the furnace to produce uniform results. In malleable cast iron practice, it is recognized that the higher the temperature of the melt when it leaves the furnaces, the less will be the time required for first stage graphitization.

Like malleable iron, graphitic steel is a more uniform and better steel when produced in the electric furnace, because more satisfactory nuclei are formed and the combined carbon is more easily controlled. Thus technique of producing high grade alloy electric furnace steels is also desirable for graphitic steel production.

Graphitic carbon out of solution goes into solution with reluctance, even at the temperatures normally used for hot working. For this reason, at the lower temperatures used for heat treating, it is present in the hardened part in the same quantity as in the annealed structure. The graphitization which occurs occasionally in the commercial annealing of eutectoid or hypereutectoid steels is malleabilizing in action and leaves the structure with small accumulations of graphite surrounded by ferrite.

In this condition it is practically useless and is invariably scrapped. In graphitic steel, the chemistry is so proportioned that the graphitizing action can be controlled and, therefore, any undesirable structures are guarded against.

These steels are melted in the electric furnace from a good grade of scrap, and poured into 16 inch square, 19 inch, or 21 inch corrugated ingots. After cooling in the molds, ingots are charged into a

By FRED R. BONTE

Development Engineer
Steel & Tubes Division
The Timken Roller Bearing Co.
Canton, O.

perimenting with the hot working of this material disclosed the fact that it could be pierced and made into seamless tubing.

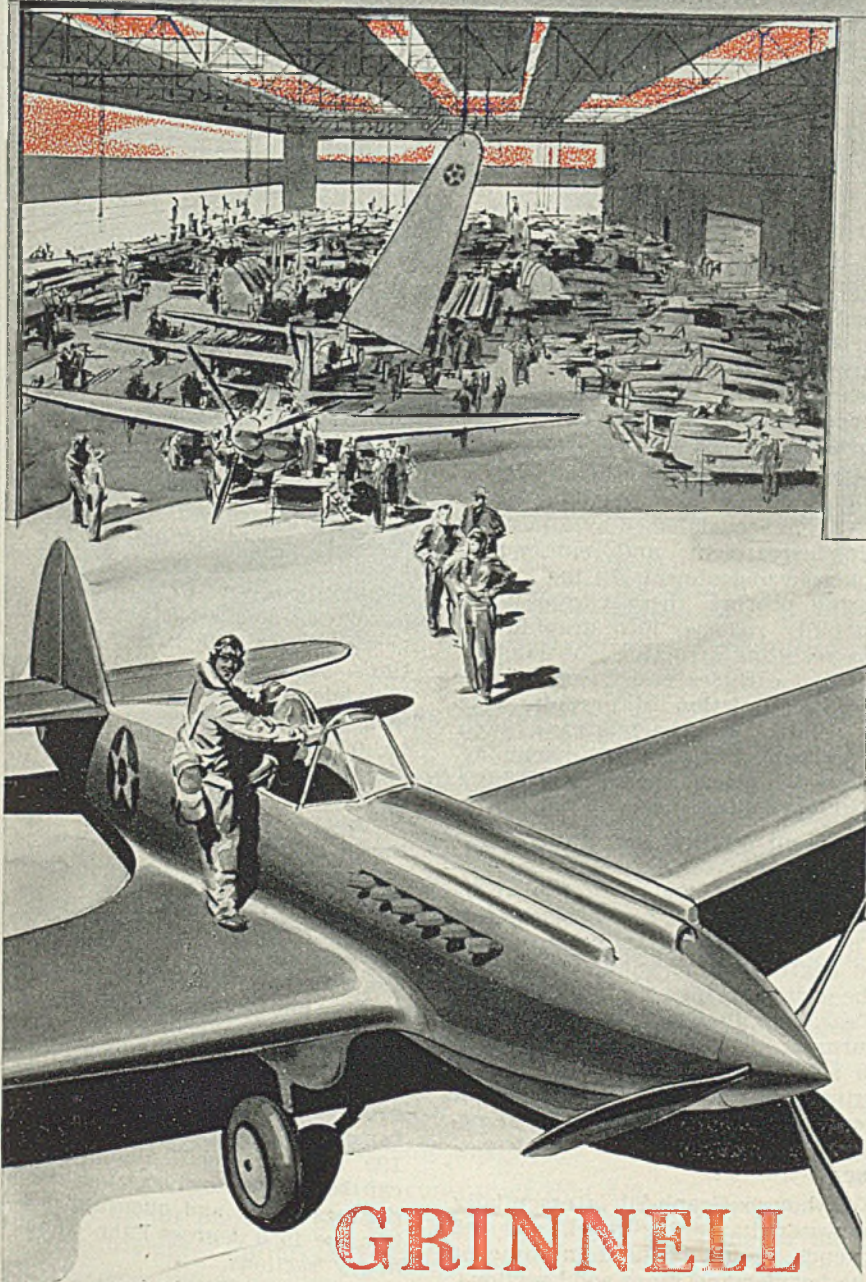
It was found, that a chemical unbalance could be secured, stabilized temporarily by proper methods of melting and hot working and made effective when precipitation of the combined carbon in the form of free carbon was desired. This precipitation can be controlled to definite percentages, it was found. Any combined carbon matrix was now found to be available by applying suitable heat treatment—for instance, 0.00 per cent carbon, 0.20, 0.50, 0.80 carbon, etc.

In any ferrous alloy, a silicon will precipitate carbon, of the combined form into the graphitic form. This is most readily accomplished when the impurities such as phosphorus, sulphur, manganese, etc., are kept at a minimum. Graphitization appears dependent on the number of graphite nuclei present; the rate of decomposition of Fe_3C , or the carbides present in the structure; and

TABLE I—Analyses of Five Graphitic Steels, Per Cent

	Carbon	Mang.	Phos.	Sul.	Silicon	Nickel	Moly.	Cr.	Tung.	Al.
Graph-Sil	1.50av.	.40 max.	.025	.025	.85/.95	.....	.....	.....	.....	.....
Graph-Mo	1.50av.	.40 max.	.025	.025	.75/.85	.....	.25av.	.....	.....	.....
Graph-Tung	1.50av.	.40 max.	.025	.025	.65/av.	.....	.50av.	.....	2.80av.	.....
Graph-Al	1.50av.	.30 max.	.025	.025	.15/.25	.....	.....	.....	.....	12/.20
Graph-M.N.S.	1.50av.	1.25 max.	.020	.020	1.25 av.	1.75 av.	.50 av.	.35 av.	.....	.....

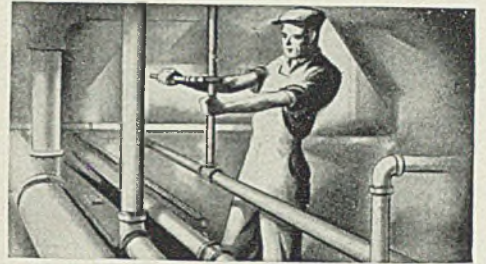
When the piping is in...



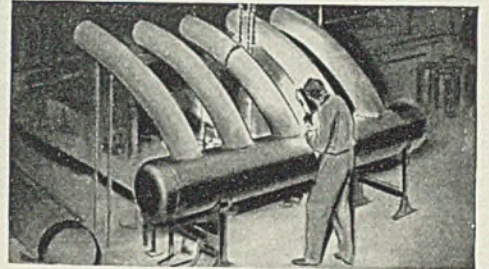
GRINNELL

Wherever PIPING Is Used for Defense

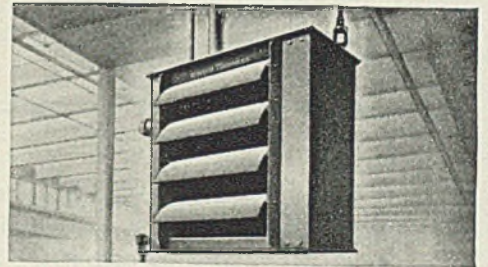
Grinnell Company, Inc., Executive Offices, Providence, R. I. Branch offices in principal cities. Grinnell Company of the Pacific - Grinnell Company of Canada, Ltd. - General Fire Extinguisher Company - American Moistening Company - Columbia Malleable Castings Corporation - The Ontario Malleable Iron Company, Ltd.



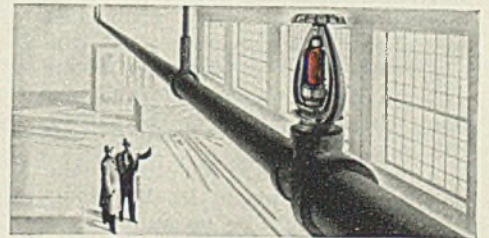
When the piping is in, with Grinnell Fittings, water and air and gas flow through the plane plant's arteries to feed boilers and hammers and furnaces . . .



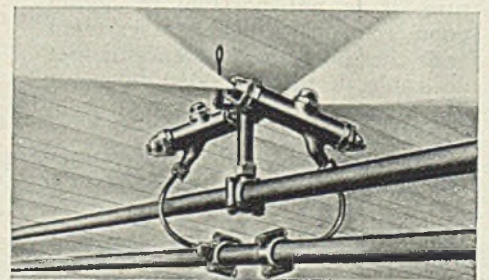
When the piping is in, through Grinnell Prefabrication, power is supplied to plant turbines . . .



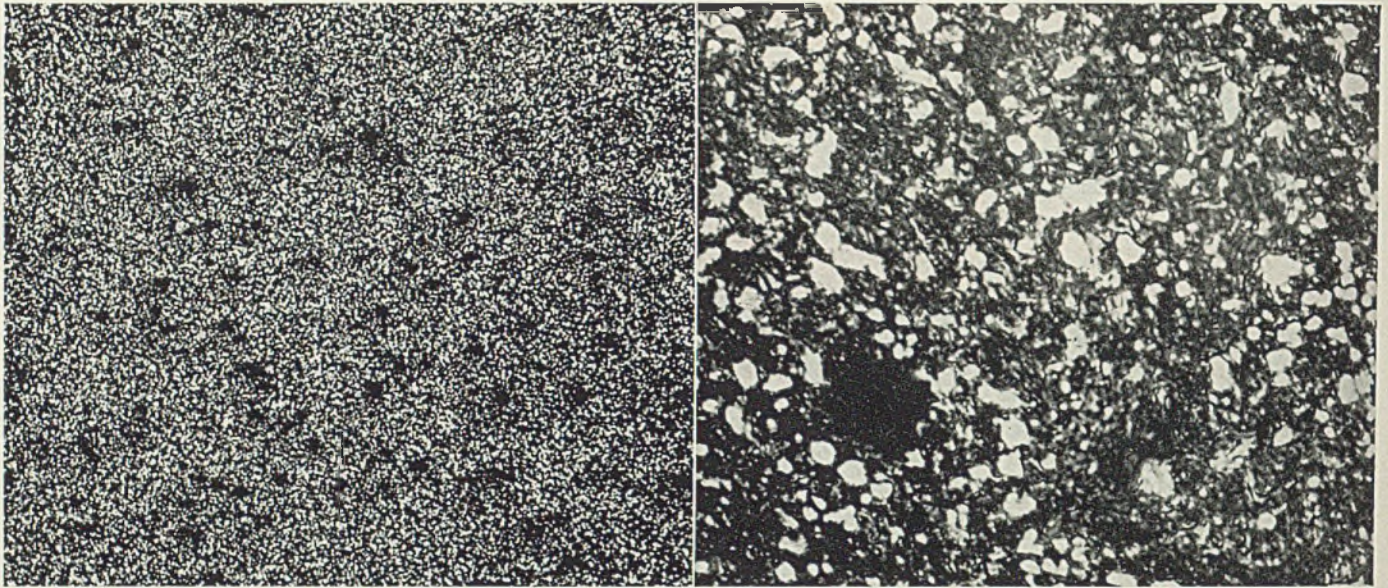
When the piping is in, Grinnell Thermoliers provide heat when and where it's wanted, boosting workers' efficiency, saving steam . . .



When the piping is in, Grinnell Automatic Sprinklers mount guard over precious defense production, stopping fire at its source at any hour of the day or night . . .



When the piping is in, American Moistening Company humidification speeds up textile processes, permits faster delivery of fabrics for uniforms, parachutes, plane fabrics . . .



Left, a micrograph of "Graph-Tung" grade graphitic steel as quenched from 1450 degrees Fahr. in water, tempered at 280 degrees for 4 hours, transverse section at 100 diameters. At right, same steel, same heat treatment but shown at 1000 diameters

soaking pit, or furnace, and heated to not over 200 degrees Fahr. They then are rolled into blooms of various sizes, the surface defects removed, and the blooms later rolled into billets and bars.

The principle involved in the hot working operation is to keep the carbon content largely in the combined form, which is accomplished by controlled cooling of the ingot in the mold. In any of the hot working operations the practice has been standardized to not roll or forge under 1600 degrees Fahr. and not over 2000 degrees Fahr. This is, of course, regular tool steel practice for simple hypereutectoid steels.

The basic analysis, now known as Graph-Sil, finally selected as having the most desirable properties has about 1.50 per cent total carbon, 0.40 max. manganese, about 0.03 maximum phosphorus and sulphur, silicon 0.85/0.95 or the carbon silicon grade.

Annealing also precipitates the desired free graphite. In this structure there should be no appreciable quantity of massive carbides because they tend to prevent good machining properties; also, they can induce brittleness of the structure after heat treatment. Again, if there is any free ferrite in the structure, it is not possible to obtain good response to heat treatment and, therefore, its presence is not desirable in the annealed form, or the structure, preliminary to heat treatment.

Graph-Sil, because of its composition, was found to respond satisfactorily to the annealing and graphitizing treatment, and to harden uniformly to a relatively high hardness by quenching into water or brine.

The structure should contain at least 0.90 per cent combined carbon to obtain this response to heat treatment. The 1.50 per cent total car-

bon then permits the formation of extra accumulations of carbon and ferrite in the matrix. Known as carbides, these contain 6.67 per cent carbon and are intensely hard and wear resistant. However, they must occur without continuity and should be as small in size as possible to insure wide and uniform distribution.

This is accomplished by a normalizing treatment and subsequent spheroidizing anneal. In the graphitizing process, these carbides are partially reduced into graphite in the resulting structure, the intensely hard carbides resist wear, while the accumulation of graphite acts as retainer for the lubricant. Such a structure has excellent machining properties, an outstanding attribute of the graphitic steels.

Present graphitizing practice is to normalize this grade from 1600 degrees Fahr. and then reheat to 1450 degrees Fahr. and furnace cool. The furnace charge is cooled about 40 degrees Fahr. an hour through the critical range to 1100 degrees Fahr. and then removed from the furnace. These treatments result in a hardness range of 170 to 190 brinell, an average combined carbon content of 0.99 per cent and a structure best responsive to heat treatment.

Although Graph-Sil is essentially a water hardening steel, a brine quench should be used in some of the heavier and more solid sections. Quenching temperature ranges from 1500 to 1550 degrees Fahr. Depending on the sections, it is possible to obtain hardnesses after quenching ranging from 64 to 67 rockwell C. Consequently, a relatively high draw can be given the

part without losing too much hardness.

In the hardened condition, this steel suffers from a small amount of distortion, either expanding or contracting, depending on the section and the method of quenching. Resulting structure is finely divided martensite with practically microscopic linear inclusions of graphite, uniformly dispersed.

After a considerable number of applications had been tested with Graph-Sil, it was found that an oil hardening steel of this type would be highly desirable in many applications. An addition of 0.25 per cent molybdenum was made and the silicon content reduced to about 0.70 to 0.80 per cent. Designated as Graph-Mo, this metal, like Graph-Sil, easily machined but it responds readily to an oil quench, giving hardness in excess of 66 rockwell C with practically no change in dimension of the quenched part.

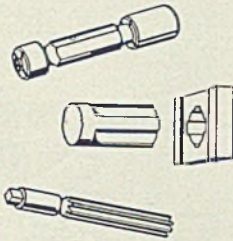
The recommended practice for normalizing and annealing Graph-Mo is to heat to 1600 degrees Fahr., cool in air, then reheat to 1450 degrees Fahr. and cool in the furnace at about 10 degrees per hour to 1200 degrees Fahr., then cool to 900 degrees Fahr. and remove from the furnace. Hardness then ranges from 190 to 207 brinell. Light sections can be satisfactorily heated to 1475 degrees Fahr. and quenched in oil, but use 1550 degrees Fahr. on quite heavy sections.

This grade permits leaving a minimum amount of finishing metal for nonuniform sections, because of its freedom from distortion. When quenching from controlled atmosphere furnaces, it is frequently pos-

(Please turn to Page 96)

How Chromium Plating serves defense

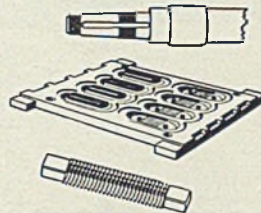
TOOLS AND SALVAGE



Increases service life and results in more accurate work from a wide variety of production tools such as:—Taps, Reamers, Drills, Saws, Milling Cutters, Gauges, Drawing Dies, Mandrels, Files, etc.

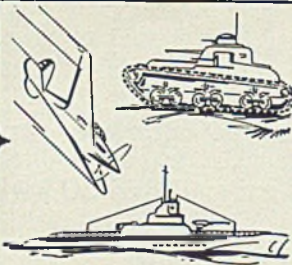
Many worn or undersized tools and parts are being salvaged by replating to size.

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Reduces wear and corrosion, improves performance of essential production machine parts and equipment such as: Plastic and Rubber Molds, Cold Metal Rolls, Pump Shafts, Cylinders, Spindles, Feed Screws, Measuring Instruments, etc.

DEFENSE MATERIEL



Maintains accuracy, increases service life and improves operation of the wide variety of Defense Equipment where it is being specified.

This may be the answer to your problem

Hardly a day passes that does not bring with it some change in the status of metal finishing. New shortages of essential materials. New limitations on non-defense plating. Yes, and new opportunities of plating for defense.

Chromium plating is undoubtedly the most important plated finish in the defense program. It is being used more widely than ever before on gauges, tools and other production parts as well as on the new applications created by the Defense Program.

And it is being used by many companies that are not set up for plating—but place their order with plants that are—and accompany these orders with a preference rating or allocation for material.

For many plants then, here is one answer to today's problem—convert at least a part of your plating facilities to defense work.

That is how United Chromium believes it can be of real assistance. In serving hundreds of licensees, many of whose facilities are devoted 100% to defense work, United Chromium assists in:—

- 1—Adapting plating programs to the requirements of industrial or "hard" chromium plating.
- 2—Plating the new or unfamiliar parts peculiar to defense needs.
- 3—Meeting the specifications called for in Army and Navy work.
- 4—Carrying on non-defense finishing operations—in compliance with government orders and regulations.

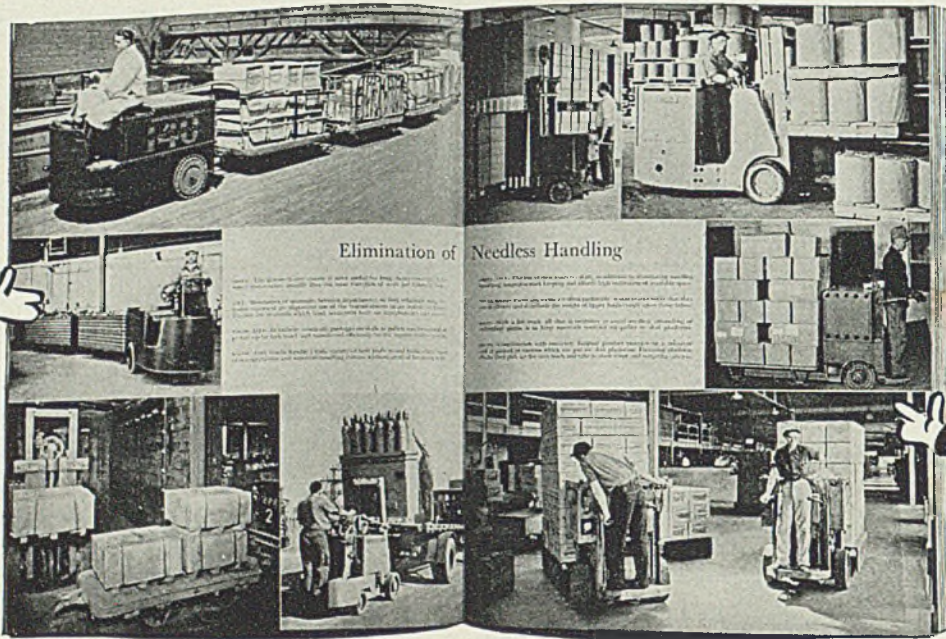
We will be glad to assist in determining whether your present equipment can be utilized in plating some of the applications outlined above.

UNITED CHROMIUM INCORPORATED

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YOURS for the Asking!

Yours for the asking is *Modern Material Handling*, 1941 edition, a 24-page 8½ x 11 illustrated booklet giving you much useful information on the tractor-trailer system, the skid-lift-truck system, the pallet-fork-truck system and various special industrial-truck handling systems. Tells you how to judge which one or combination of these systems is best adapted to your handling operations.

Also included is a condensed description of the advantages of steel-alkaline storage batteries as industrial-truck power units, useful recommendations as to selection of batteries for continuous 24-hour-a-day operation, electrical data and dimensions of trays, steel cradles, and demountable steel boxes for

batteries ranging from below 10 kwh to above 60 kwh of rated capacity.

This booklet is useful not only to users of industrial trucks but also to those who are considering the installation of their first truck. Address Edison Storage Battery Division of Thomas A. Edison, Inc., West Orange, N. J.



SAFER MATERIALS HANDLING

... by reducing dangers that arise from contact with wire rope

By F. L. SPANGLER
Mechanical Engineer

The following specific cases are cited of puncture wounds resulting from handling or touching wire rope:

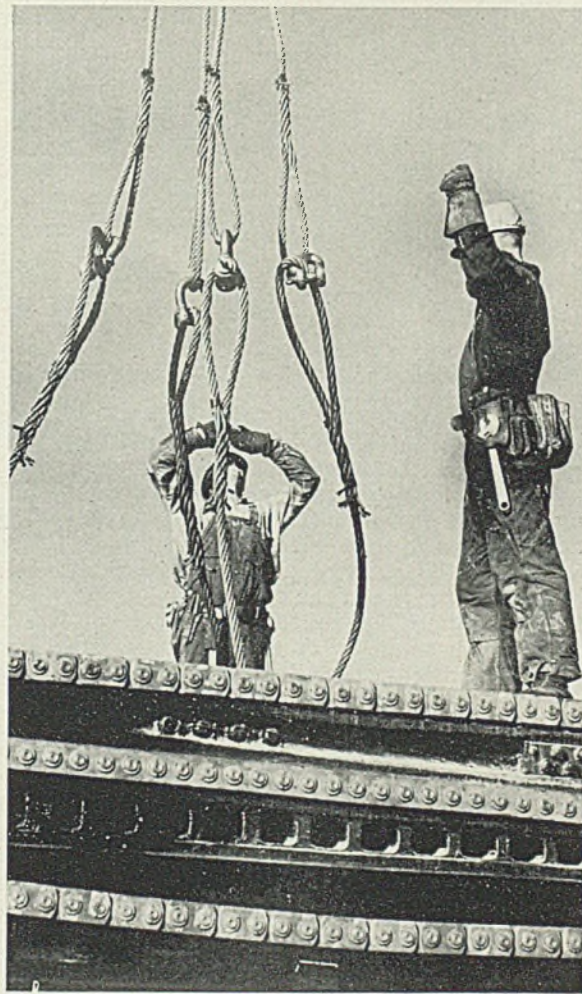
■ MUCH materials handling equipment such as overhead cranes and hoists as well as slings of many types utilize wire rope. On many of these applications the wire rope is subjected to severe punishment. Thus efficient materials handling calls for a knowledge of wire rope and its use. Many of these ropes are subjected to overloads, or to heat, or to corrosive fumes. To make such ropes safe, they must be selected with care, kept well lubricated, and inspected frequently.

But a rope may carry its load safely and still be a source of danger to the workman who has to come in direct contact with it. Puncture wounds or lacerations sometimes result from handling of rope that contains "barbs," or broken ends of wires sticking out from the rope. Also, upon releasing their load or breaking, some ropes are likely to recoil and endanger those standing in their way.

To determine the extent of injuries received from direct contact with wire rope in steel mills, and to learn what these mills are doing to reduce or eliminate such dangers, a questionnaire was mailed to a representative list of steel mills. Nine steel plants returned this questionnaire filled out. Eight of these mills reported that, in their experience, wire rope is a source of danger to those who come in contact with it, while one company stated their belief that no such hazard existed and that they had had no accidents whatever due to contact with rope.

Specifically mentioned as being dangerous to workmen are the following: Projecting ends of broken wires in crane ropes and slings; frayed ends of ropes; recoil of ropes and slings when load is released; falling slings or tackle.

"We recognize the small wire punctures from wire rope as being very dangerous," writes one safety supervisor of a steel mill. "Such minute punctures many times go unnoticed but offer very good conditions for a tetanus infection."



Wire cable should never be allowed to reach the condition shown here—sharp barbs formed by wire ends protruding from the splice tucks can cause punctures leading to infection. These dangerous ends should be burnt off with a torch, brazed with metal to form a smooth surface or completely wrapped. A workman who loses his hand through infection is just as incapacitated as if it were smashed in a punch press. Riggers shown here are hooking on to section of outlet works gate at Grand Coulee dam, Washington

"Blast furnace workman ran an end of a wire from a cable in his left little finger. Infection developed and the man nearly lost his life. Was off work 194 days and recovered with 80 per cent loss of left hand."

"Thumb pricked, infection followed, workman lost use of arm, \$1400 compensation paid."

"Employee claims he was removing a cable sling from the work rolls at the temper mill when a wire at the eye splice punctured his left thumb, followed by infection. Time lost from work was 47 days."

Other companies report on puncture wounds in more general terms, of which the following are typical:

"Numerous minor accidents have been experienced and a few resulted in infections."

"Cases where injuries have been caused by the ends of broken wires sticking out from wire rope have been very few and I can remember no cases of infection. Ours is a large steel plant with excellent medical service throughout the plant."

"Over a period of many years we have experienced some accidents as a result of projecting cable strands inflicting puncture wounds."

"Few minor cases where man slid hand over cable, and broken wires caused small puncture wounds. No doctor cases, not compensable. No lost time."

"Our overhead crane hook-ons frequently receive puncture wounds from wire rope slings. However, none has resulted in infection, as the men report for first aid immediately."

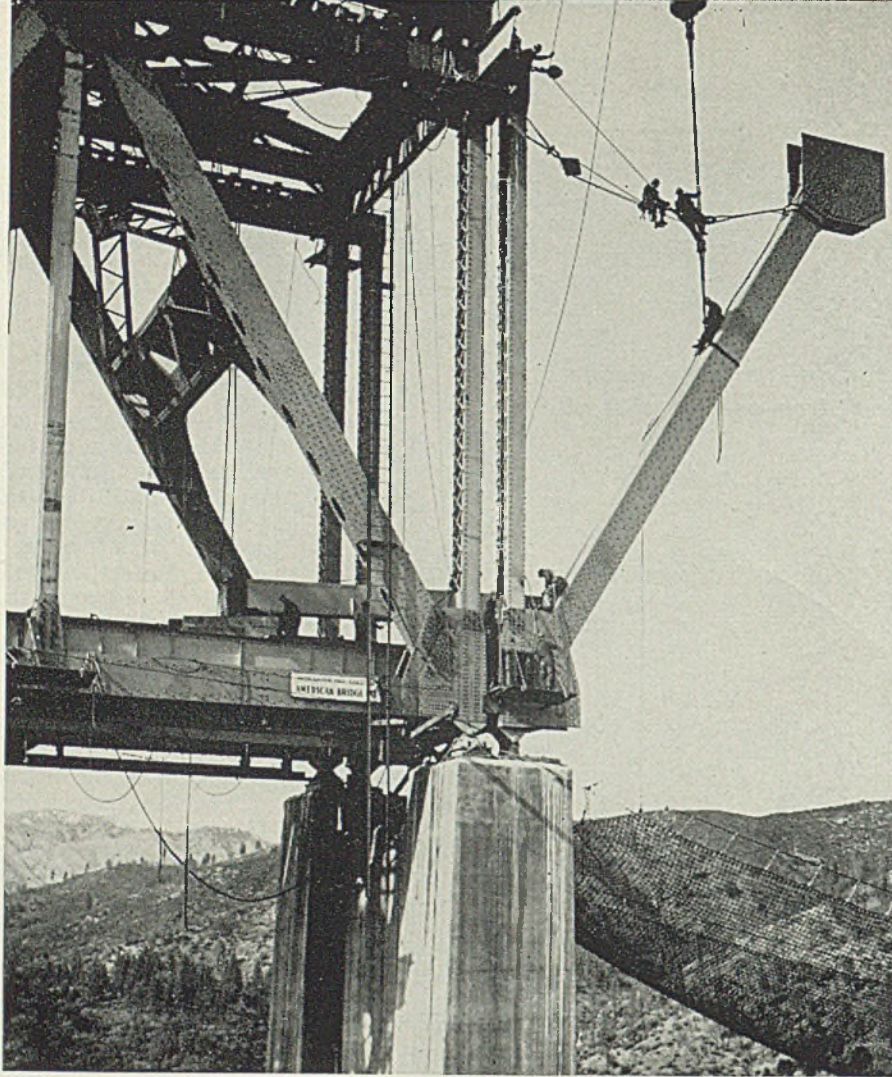
"Quite a number of minor injuries of various types."

Injuries caused by workmen being struck by ropes or slings are commented on as follows:

"Sling sprung, broke man's teeth. No lost time. Dental bill, \$35."

"Sling unhooked because of spring when load released; tackle fell. Workmen received head and shoulder injury. Time lost, 11 days."

"An accident recently occurred



Another girder goes up to form the double-deck Pit River bridge, upstream from Shasta dam near Sacramento, Cal. Workmen perched on cables at right are protected by safety net below. Protruding wire ends could cause much trouble to the workmen here

when the snag rope broke while a car was being moved with the car haul cable."

"Workmen have been struck by the rope while pulling cobbles in the blooming and bar mills."

The replies to the questionnaire indicate that steel mills generally have given serious thought to means for reducing or eliminating injuries caused by contact with wire rope.

Five companies emphasize the need for frequent, careful inspection, and discarding of all damaged rope or rope in which any wires protrude. Much of the danger can be eliminated if the men handling rope would wear heavy gloves, say four steel companies. To avoid the danger from ends of wires where ropes are spliced, one director of safety suggests that the splice be wrapped with soft wire, though, he says, "the wire tends to loosen as a result of repeated strains applied to the cable." One company says, "we follow the practice of beading the protruding edges of cable splices, which eliminates the puncturing effect of the ends of the wires."

The chief safety engineer of one company suggests using preformed rope, which, his company finds, does not tend to form "barbs" that puncture hands of those handling the rope, and therefore materially reduces the danger.

Another company suggests that

cables or slings that are to be handled be welded or taped on the ends to prevent fraying out of the wires at the end, and another steel company recommends that all wire rope be cut with an acetylene cutting torch and the ends brazed after cutting. The action of the cutting torch tends to fuse the wire ends together—especially desirable with nonpreformed rope, the ends of which tend to fly out when cut without seizing. Preformed wire rope is safer and easier to handle due to the absence of internal stresses which make nonpreformed rope "barb," kink, snarl and become unruly. Another suggestion is that all cables or slings that are handled be welded or taped at their ends.

Men should keep their hands off of cables unless it is necessary to handle them, says one company, and another concern suggests using hooks wherever possible to avoid direct contact with the rope.

All medical men will agree that prompt first aid should be given to every puncture wound or scratch, although only one steel company makes such a suggestion. One safety engineer writes, "Supervisors should keep a more watchful eye on this hazard." One company suggests that men be trained to be more careful, while another emphasizes the need for properly trained splicers.

To eliminate badly frayed ends,

as well as to avoid the breaking or pulling loose of the rope at its ends, one steel company recommends that "as ends approach a point where they may be dangerous, cut back to good, safe stock."

To meet the increased demands upon safety organizations brought about by intense industrial activity and by additions of new personnel, eight steel plants report that they have stepped up their safety program accordingly. One says, "We have had a very large force expansion from 12,000 to 24,000. We have expanded our safety organization from four full time safety men to fourteen full time safety men at the present time."

Many users of wire rope contend that it is the safest of all flexible constructions for lifting and suspending loads. The experience of the steel industry indicates that wire rope can be made still safer by proper precautions in selecting, maintaining, and handling rope to decrease the risk to those who come in direct contact with it.

Balances Low-Speed Units on Own Pedestals

■ Low-speed machines, such as waterwheels and diesel-driven generators rotating at as low as 100 revolutions per minute, may now be dynamically balanced on their own pedestals by means of a new vibration pick-up device developed by Westinghouse engineers at East Pittsburgh, Pa.

The instrument indicates vibrations of double amplitude as low as 0.003-inch at 100 revolutions per minute and is used with a standard portable balancing unit and conventional sine-wave generator. It employs a device similar to an inverted pendulum. The frequency of an ordinary pendulum, operated by gravity, can be lowered by lengthening its arm. Similarly, the natural frequency of an inverted pendulum can be made extremely low by weakening the restoring springs so that it is barely stable in a vertical position.

To permit use of this pickup in all directions, the effect of gravity has been eliminated by laying the pendulum on its side, and the force previously supplied by gravity is furnished by a toggle-like spring mechanism attached to the pendulum.

Balance

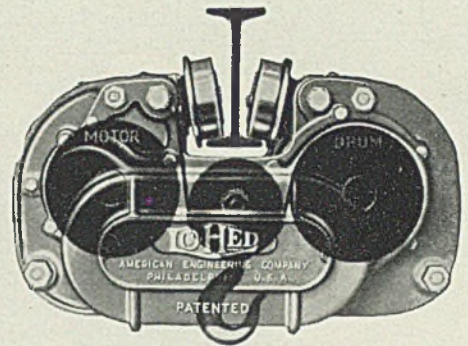
IS IMPORTANT TO US



AMERICAN ENGINEERING COMPANY

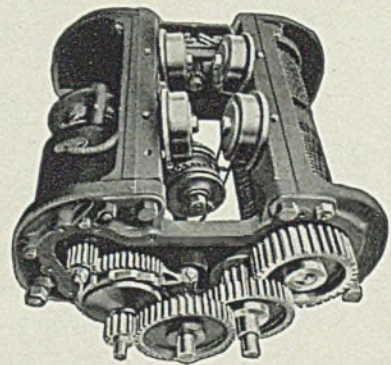
The Lo-Hed Hoist Is Applicable To Any Monorail System
There's A Balanced Lo-Hed Electric Hoist For Every Purpose

OTHER A-E-CO PRODUCTS: TAYLOR STOKERS, MARINE
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LO-HED HOISTS" for your nearest representative.



BALANCE IS IMPORTANT IN HOISTS

LO-HED, the Balanced Hoist. You'll recognize a Lo-Hed hoist at first sight—it looks different. But remember the reason for this difference because it is dollar-important to you. Take a look at the picture above. See how motor and drum are arranged about the beam. Logical, isn't it? Motor and drum are parallel, connected by efficient spur gears. Note carefully how the hook can be pulled up close to the beam—no headroom wasted. Did you ever see a simpler, more practical design? Best of all, the efficiency, durability and accessibility of a Lo-Hed hoist are reflected in low operating and low maintenance costs. Make your next hoist a Lo-Hed. Write for Lo-Hed catalog today.



LOOK AT THE BALANCED LO-HED!

It Costs Less To Operate—All gears are efficient stub-tooth spur gears running in a sealed oil bath . . . gear shafts and trolley wheels are equipped with heavy-duty ball or roller bearings.

It Costs Less To Maintain—Sturdy construction . . . seldom, if ever, requires removal from rail . . . covers of controller, motor, drum and gearing are easily removed.

It's Safe—Factor of safety of over 5 at full capacity. . . 100% Positive Automatic Stop when load reaches upper limit . . . Automatic Holding Brake prevents load from drifting when current is shut off . . . short, strong shafts minimize torsional stresses.

It's Protected—Controller is fire, dust and moisture proof . . . motor totally enclosed . . . gearing sealed in . . . motor and drum covered by easily removable covers.

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- Please send me your complete catalog of LO-HED HOISTS.
- Ask your representative to get in touch with me promptly.

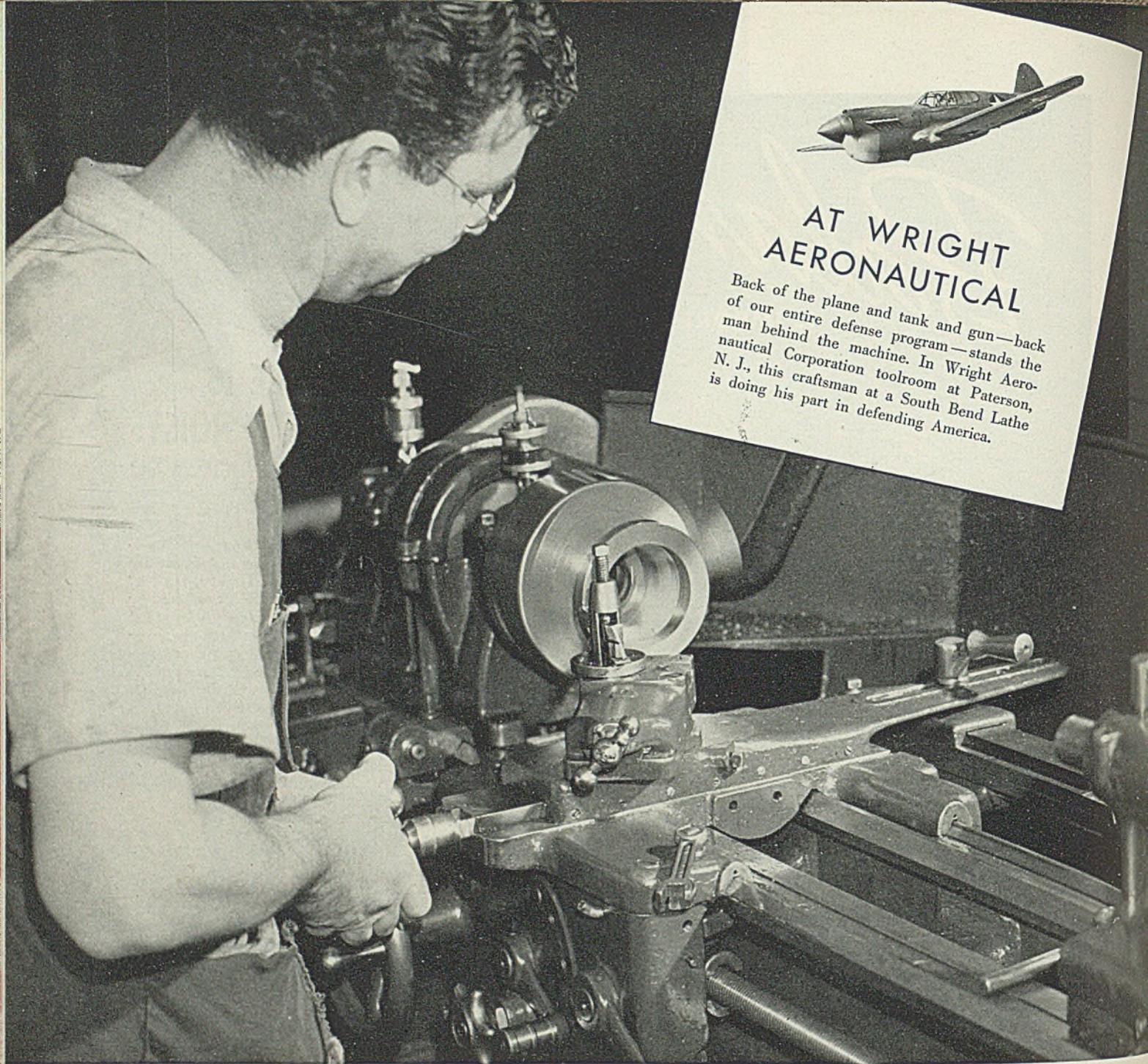
Name _____

Company _____

Street Address _____

City _____ State _____

(Please print plainly)



AT WRIGHT AERONAUTICAL

Back of the plane and tank and gun—back of our entire defense program—stands the man behind the machine. In Wright Aeronautical Corporation toolroom at Paterson, N. J., this craftsman at a South Bend Lathe is doing his part in defending America.

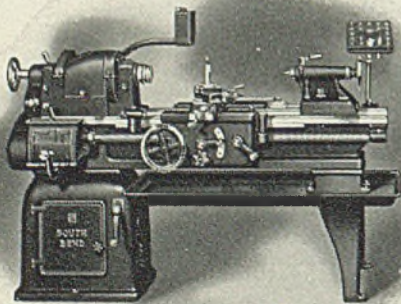
The Man Behind - the Man Behind the Gun!

IN DEFENDING AMERICA, the man behind the machine is just as important as the man behind the gun. Back of the production lines of every defense industry is our *first line of defense*—the toolroom. Here, where precision is of utmost importance—where tolerances are reckoned in split-thousandths—you will find South Bend Lathes.

Modern in design, built with extreme precision, South Bend Lathes are fast and

accurate on the most exacting classes of toolroom work. Their wide range of spindle speeds permits machining with maximum cutting tool efficiency. Their versatility facilitates quick change-over through a minimum of set-up time.

South Bend Lathes are made in five sizes: 9", 10", 13", 14½", and 16" swing, with toolroom or manufacturing equipment. Write for catalog and the name of the dealer nearest you.



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AUTOMATIC MALLEABLIZING CYCLE CONTROL

. . . . steps up output
. . . . improves product

By REGINALD TRAUTSCHOLD
Engineering Consultant

THE TIME for annealing malleable iron castings in oil-fired pot-type furnaces at the Eberhard Mfg. Co. Cleveland division of Eastern Malleable Iron Co., has been reduced 15 to 20 per cent—saving 18 to 24 hours in a 6-day heat-treating cycle. Even more important than this substantial increase in output and capacity is the assurance of a uniformly higher quality product.

An added value is that fuel is consumed with the utmost efficiency consistent with overall economy due to combustion control incorporated to the master control system. All this improvement is attributed to the entire elimination of manual furnace regulation by the application of positive, yet flexible, automatic heating-cycle control.

There are ten annealing furnaces at the plant, each now equipped with its individual control system. While the heating cycles vary with the character of the furnace, expert standardization on specific annealing tasks has been affected. Annealing a typical batch of castings may call for a uniform maximum temperature of 1720 degrees Fahr. over a period of 24 hours. This then is followed by soaking at this top heat for 30 hours. Then, to the minute, the temperature of the furnace may be lowered rapidly over an accurately fixed rate of 4 degrees per hour, until in 40 hours every part of the furnace and its charge is cooled down to 1200 degrees, at which instant the furnace doors are opened to permit accelerated cooling prior to the removal of the softened castings.

Each adjustment of fuel control valves and of draft dampers entailed in following with precision such a set thermal cycle is performed automatically and at just

(Please turn to Page 95)

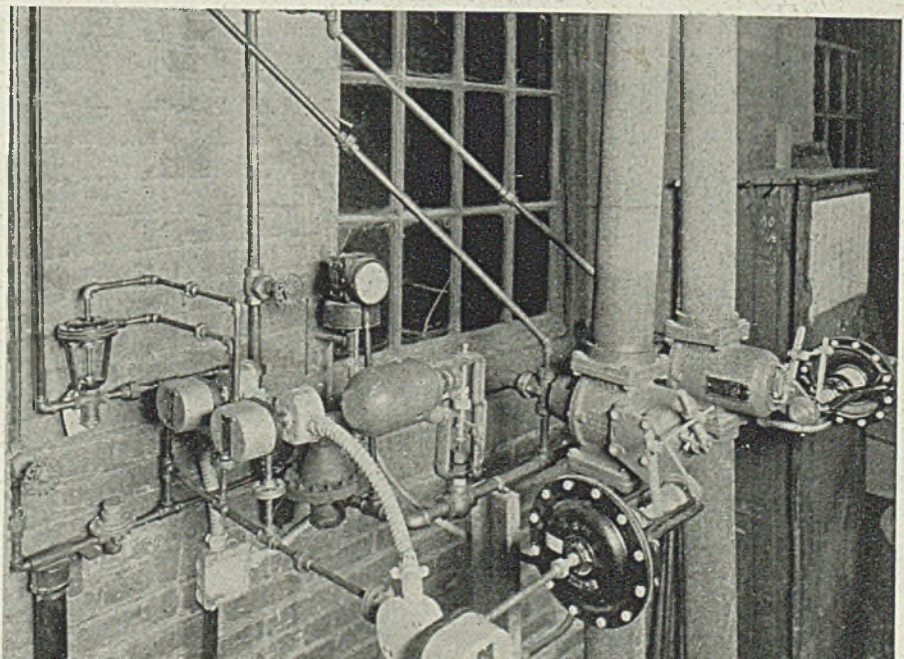
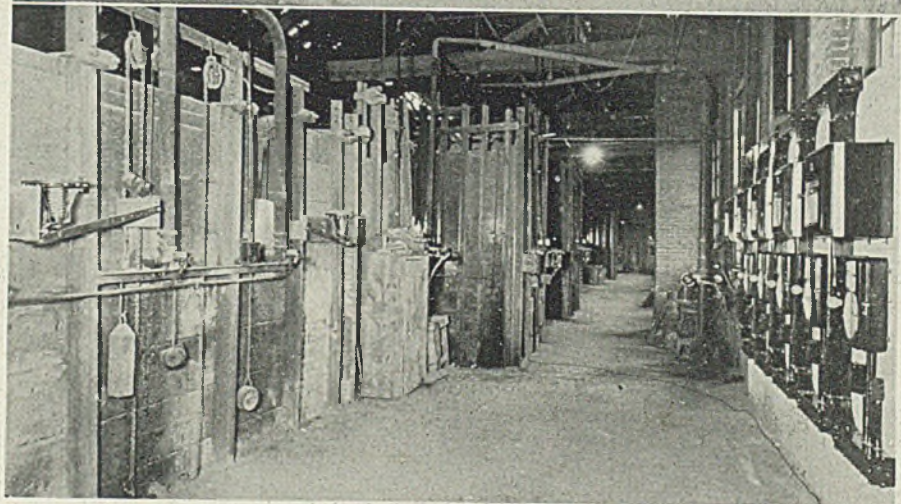
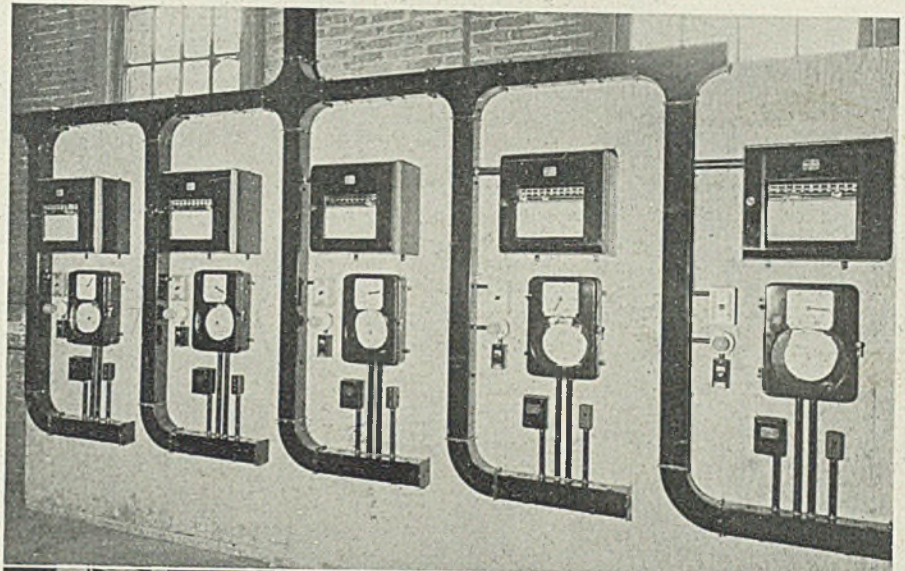
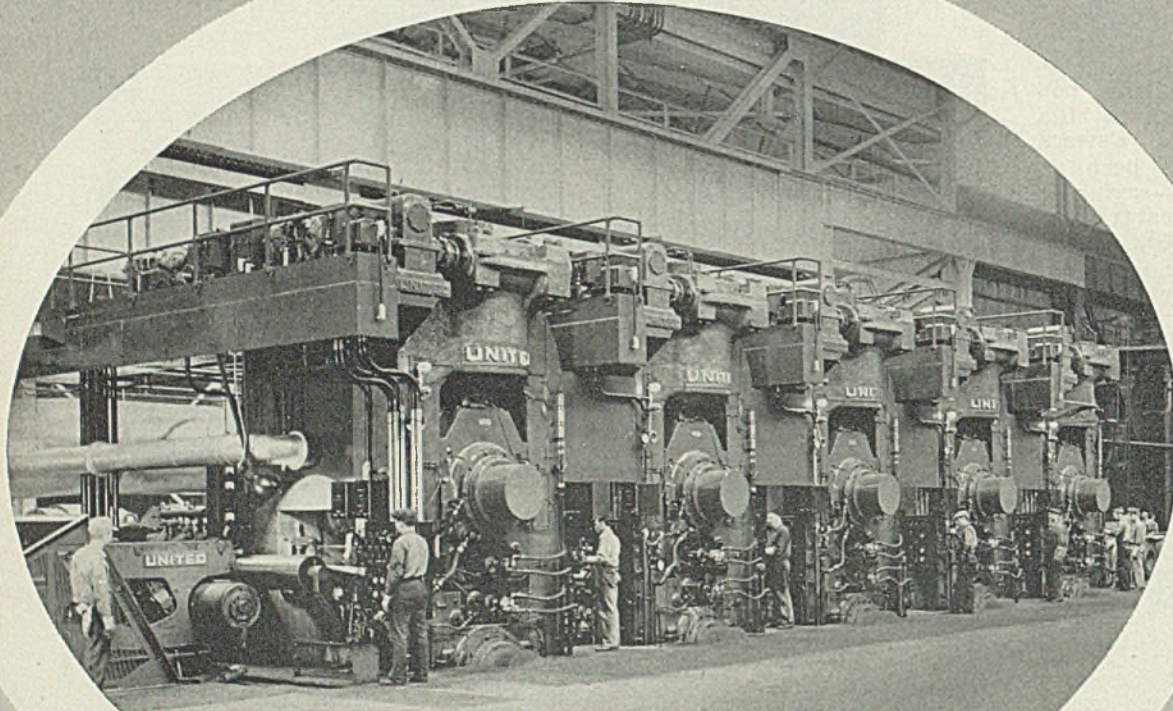


Fig. 1. (Top)—Instrument panel showing five of ten Bristol program control systems installed on malleablizing furnaces at Eberhard Mfg. Co., Cleveland. Illustrations courtesy the Bristol Co., Waterbury, Conn.

Fig. 2. (Center)—View of malleablizing furnaces at the Eberhard plant, showing control panels at right and synchronizing control panels on dampers at left

Fig. 3. (Below)—Diaphragm valves, magnet air pilots on oil-air proportioning valves

UNITED



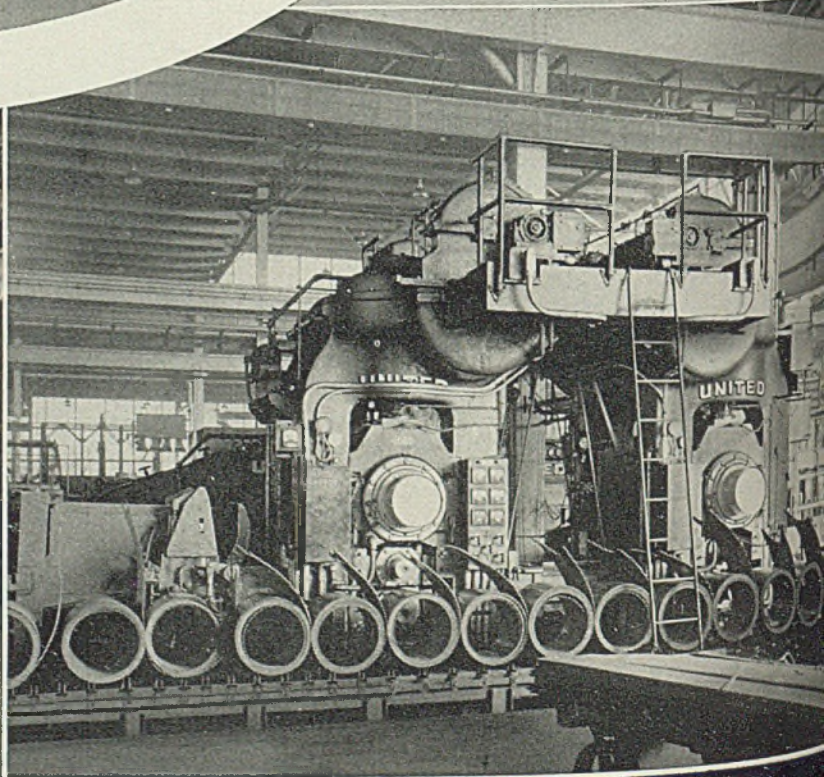
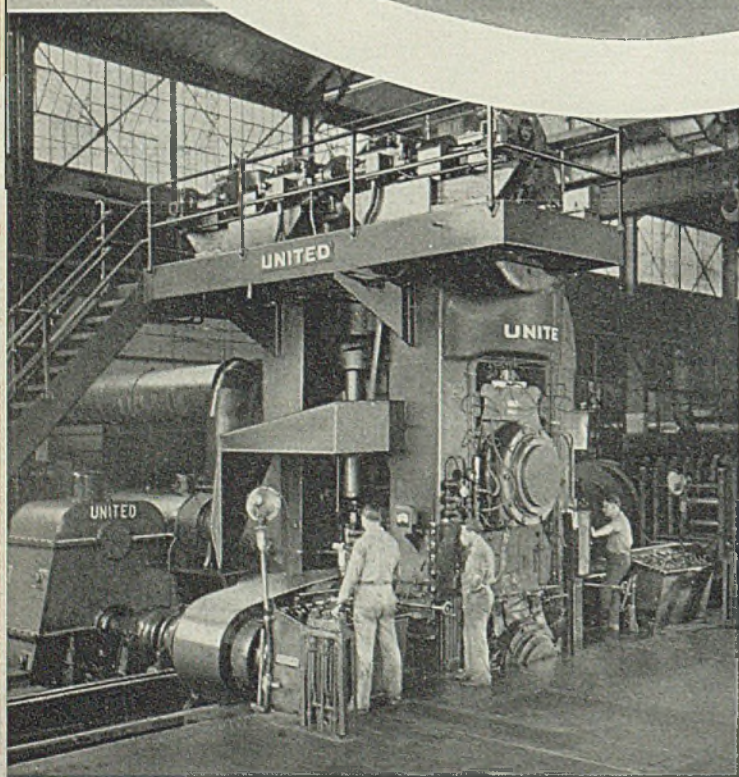
IN ALL TYPES

SINGLE STAND

TANDEM

REVERSING, ETC.

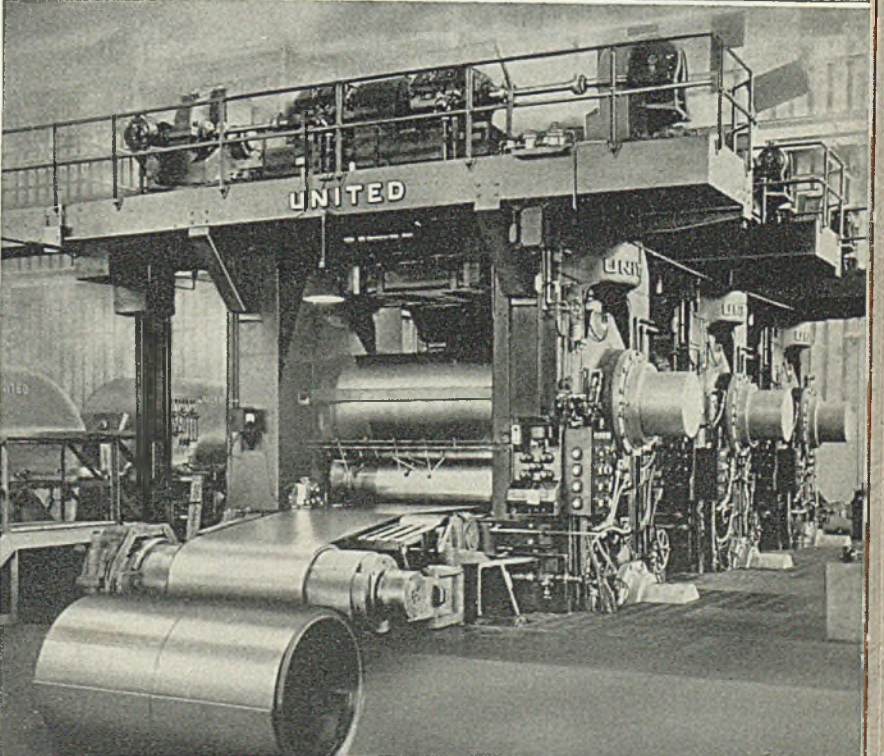
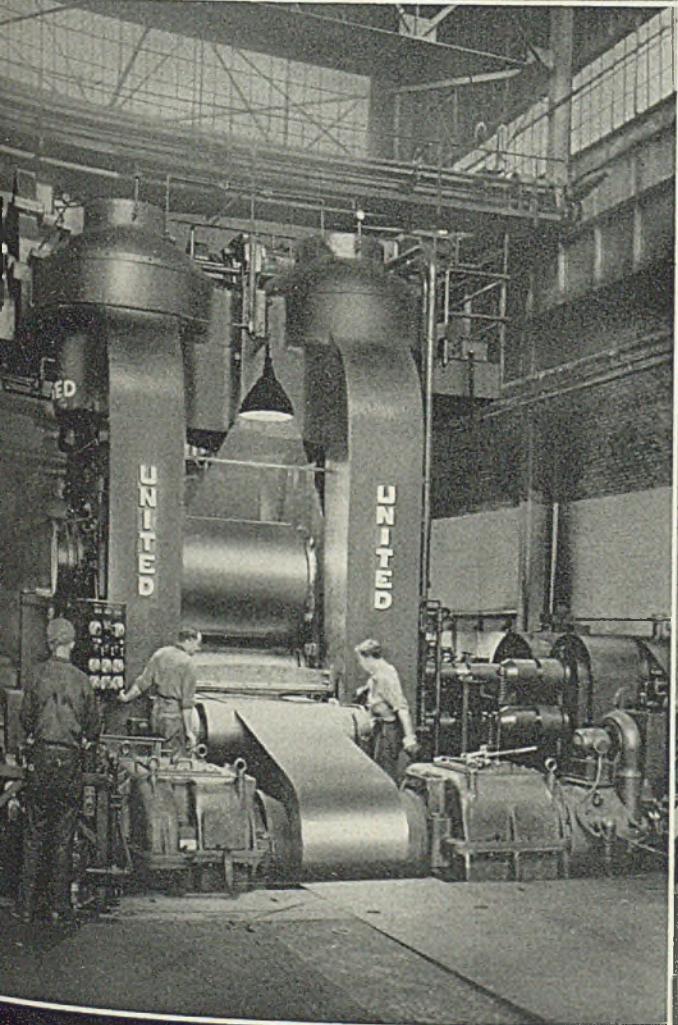
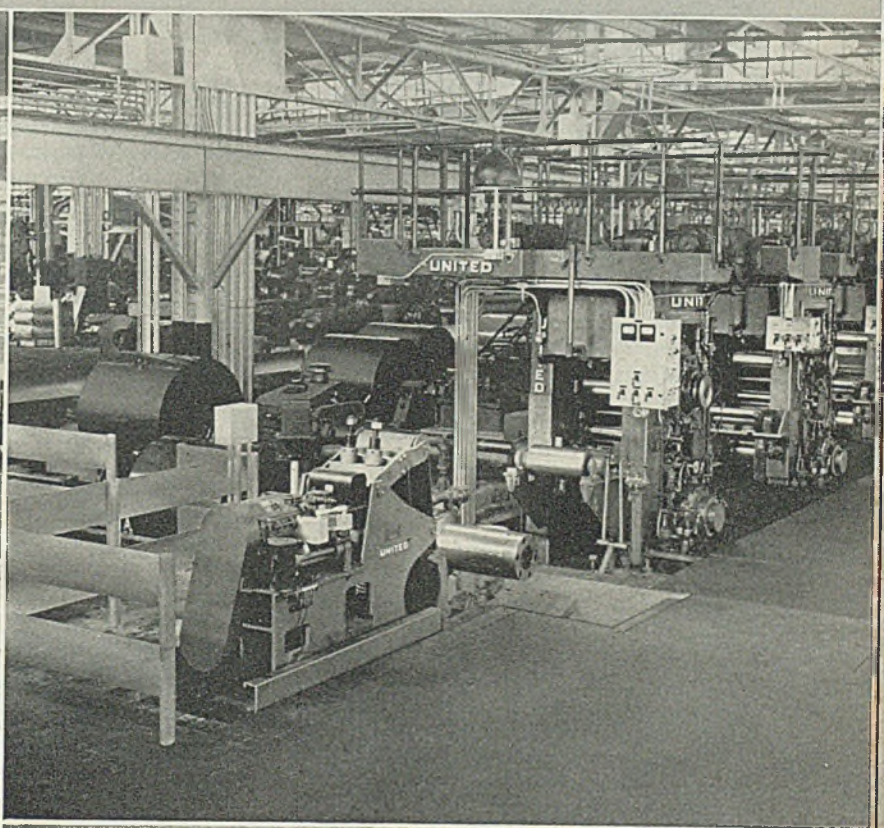
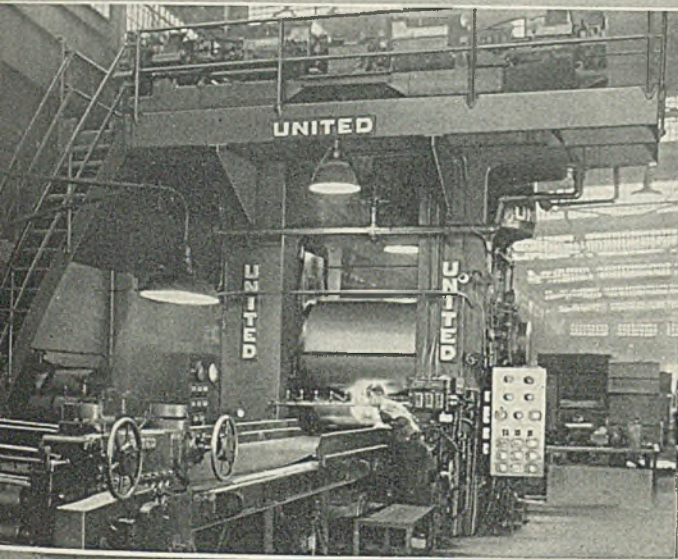
**For Steel, Alloy
Steels, Tinplate,
Copper, Alumi-
num, and Other
Non-Ferrous
Metals**



UNITED ENGINEERING and FOUNDRY COMPANY

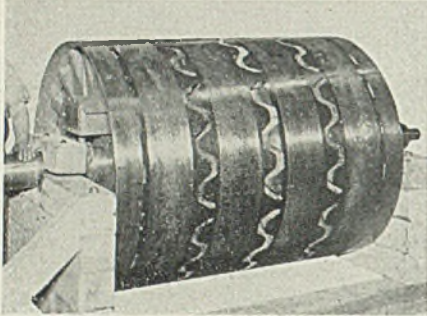
Pittsburgh, Pennsylvania

COLD REDUCTION MILLS



Magnetic Pulley

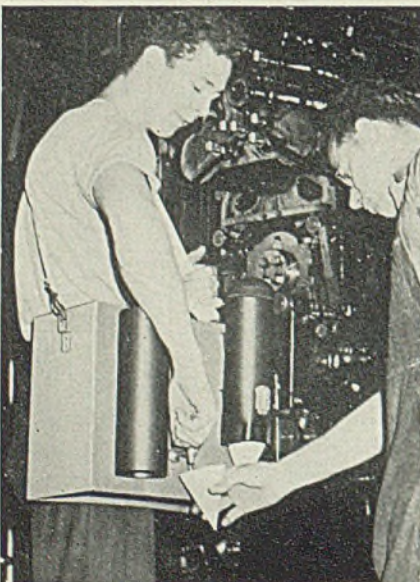
■ Dings Magnetic Separator Co., 675 Smith street, Milwaukee, has recently introduced a 48-inch diameter high intensity magnetic pulley with 63-inch face width for use as a magnetic head pulley of a coal conveyor belt, for the automatic extraction of tram iron, to protect crush-



ers and pulverizers from damage from that source. It is of high intensity, serrated, air-cooled design, incorporating radial and longitudinal ducts to provide maximum air circulation through the coil area. The separator weighs 18,000 pounds, of which 5900 pounds represents copper magnet wire used in winding the coils. Coil covers and end rings are of bronze. This prevents short circuiting of the magnetic lines of force, which are thus free to flow from pole to pole.

Water Tank

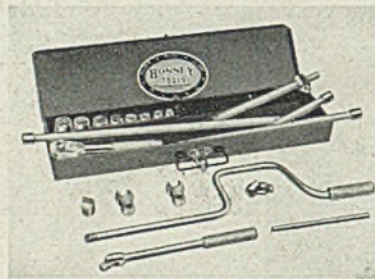
■ Universal Paper Products Co., 823 South Wabash avenue, Chicago, has developed a new mobile water tank unit for use in dispensing water in a sanitary method, on defense construction jobs and in factories. Light in weight, it is offered in two models—one which can be carried on the dispenser's back, and the second designed so it can be carried on his side. Made of light-weight metals, both have adjust-



able shoulder straps, a paper cup dispenser and standard faucet. A large mouth allows quick filling and easy cleaning. Also offered is a canvas hair-felt lined jacket for the tank which serves as insulation, and as a padding for the carrier's comfort.

Socket Wrench Set

■ Bonney Forge & Tool Works, Allentown, Pa., is now offering a new No. TD12 socket wrench set containing 20 pieces for making practically any combination desired. It includes a full set of sockets with 5/16, 3/8, 7/16, 1/2, 9/16, 5/8, 11/16 and 3/4-inch double hexagon open-



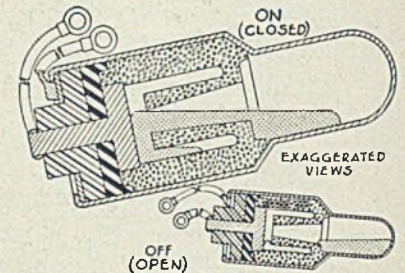
ings; universal joint; 6, 12 and 17-inch extensions; 1/2 and 9/16-inch crowfoot attachments; 17 1/2-inch speeder; drag link socket; 8 1/2-inch hinge handle; 6-inch cross handle; 7-inch reversible ratchet and 8-inch sliding T. The set comes in a strong metal box measuring 18 x 4 1/4 x 1 1/2 inches.

Mercury Switches

■ Durakool Inc., 1029 North Main street, Elkhart, Ind., announces new metal-bodied mercury switches of Double-Flow design for use in hazardous locations or where a great deal of vibration is present. Of tilting type and requiring little power to operate, the new switch tilts smoothly through open or closed positions without any detent spring resistance, delay or obstruction. Two tails of mercury pulling in opposite directions, over a ceramic barrier until severed, prevent double contacting where vibrations exist. When closing, two approaching bodies of mercury pile up a double thick elec-

Industrial

trical conductor. The switch operates either as a slow rolling motion



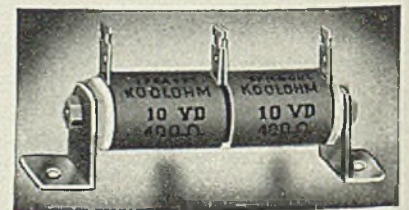
or equally well on a very high speed mechanical snap action.

Snug-Fitting Goggles

■ Kimball Safety Products Co., 7314 Wade Park avenue, Cleveland, announces a line of Face-Fitt composition-frame goggles for workmen. The goggles have a dropeye shape, which suits the contour of the eye socket. Available in three sizes, they are light in weight, ventilated top and bottom with more than 700 holes.

Resistors

■ Sprague Specialties Co., Resistor Division, North Adams, Mass., has placed on the market small type VD individual Koolohms resistors designed for making up tapped re-



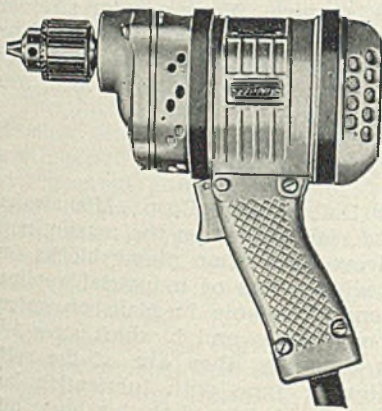
sistor sections. They are supplied in compact 10 or 15-watt sections equipped with ball and recess interlock feature. This prevents turning and automatically connects the units electrically in series when mounted on a threaded steel rod. Overall length of the 10-watt type Koolohm is 1 1/2 inches and diameter is 5/8-inch. The 15-watt sections are 1 9/16 inches long by 11/16-inch diameter. Sections are wound with a 1000 degree Cent. heat-proof mois-

Equipment

ture-proof material permitting layer-wound construction for higher resistance in less space and faster heat dissipation.

Aircraft Drill

■ Independent Pneumatic Tool Co., 600 West Jackson boulevard, Chicago, has introduced a lightweight U14FS ¼-inch Aircraft drill which is said to develop approximately twice the power of ordinary electric drills. Particularly useful for operation in limited space or in unusually difficult positions, it is avail-



able in three different speeds, with side switch style handle for either continuous or intermittent drilling.

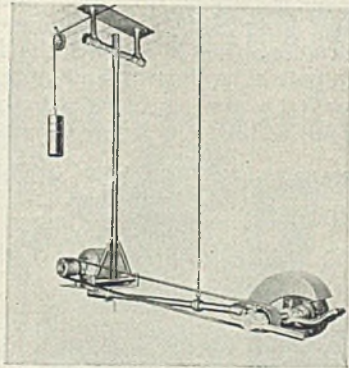
Surface Plates

■ Machine Products Corp., 6771 East McNichols, Detroit, is offering surface plates of improved design, which are said to resist deflection under load and retain their accuracy due to a special ribbing construction. The plate is of heat treated iron. Sizes range from 10 x 15 to 48 x 96 inches. These are carried in stock.

Swing Frame Grinding And Polishing Machine

■ Jefferson Machine Tool Co., Fourth, Cutter and Sweeney streets, Cincinnati, has introduced an improved No. 101 swing frame grinding and polishing machine. It is for use in grinding or polishing sheets, tubing, bars, shapes, etc., too large

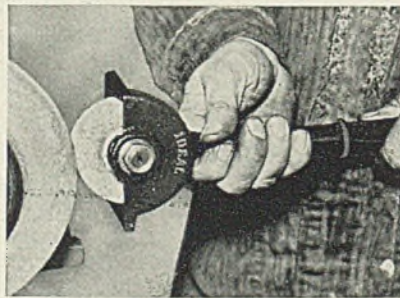
and unwieldy for the usual standard floor lathes. Improvements on this machine—described in STEEL,



July 1, 1940, p. 70—include heavy metal guards at V belts constructed to allow sufficient flexibility for universal movements and hinged wheel guard of heavy sheet metal. Powered by a 3-horsepower, alternating current motor, it will take grinding wheels up to 14 x 2 ¾ inches.

Grinding Wheel Dresser

■ Ideal Commutator Dresser Co., 1032 Park avenue, Sycamore, Ill., announces a new abrasive wheel type grinding wheel dresser said to give a cutting and truing effect almost equal to that of a diamond. Unit's cutting wheel is held in a protective metal housing which deflects the

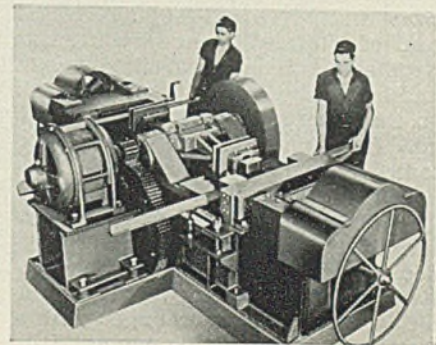


grindings away from the operator. The wheel is replaceable when necessary. Besides general cleaning and truing of a grinding wheel, other uses include the truing of cut-up and uneven sides, dressing out deep grooves and out-of-roundness, restoring out of balance wheels into true rotating ones. It can also be used to

shape wheels into different forms when form grinding is desired. Its overall length is 13 ¾ inches.

Straightening Machine

■ Sutton Engineering Co., Park building, Pittsburgh, announces a new No. 1 double head straightening press which straightens carbon, alloy, heat treated steel and non-ferrous bars, shapes, pipes, tubes, rails, structural sections, etc. in sizes up to 6 inches. It also can be used as a breakdown unit for removing excessive hooks and bends before passing material through a roll straightener. The double head of the machine enables two different sections or sizes of work to be straightened at the same time. This is particularly applicable to the straightening of flats, as one side of the machine can be set for edge straightening and the other side for flat straightening. Operating at a fast rate through use of a 20-horsepower direct or alternating current 900-revolutions per minute motor, the machine provides 28 strokes per minute. In and out adjustment of resting blocks, which increases or decreases amount of deflection, is accomplished through large hand-

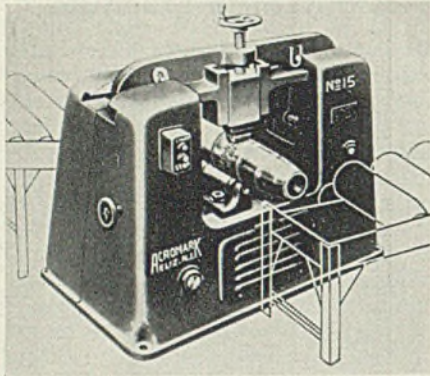


wheels on each end of the machine. Die blocks are dove-tailed in their holders and are easily removed. All gears are completely guarded and flywheel is enclosed in main driving gear. Rollers on each side of machine position material during straightening operation.

Shell Marker

■ Acromark Corp., 251 North Broad street, Elizabeth, N. J., has placed on the market a new No. 15 shell marker adaptable to high production lines. It operates after the principle of a shaper incorporating the entire mechanical construction within its cast iron housing. Shell are brought to the machine and are hand fed or automatically slid onto the ball bearing cradle rolls and marked as the slide die holder passes over. The heavy slide operates steadily in a backward and forward movement, marking a shell at each stroke by rotating it. The

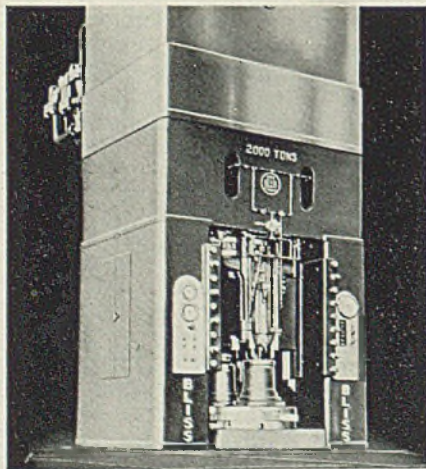
marking type holder is fixed in an adjustable slide block which is adjusted by a hand wheel. Adjustments for various diameters of shell



are made by changing the cradle rolls. The machine also can be used to mark large or small cylindrical parts.

Heading Press

■ E. W. Bliss Co., Fifty-third street and Second avenue, Brooklyn, N. Y., announces hydraulic heading presses of 1500 and 2000-ton capacity for cartridge case heading work. These are offered in the mechanical knuckle joint type or the hydraulic design in tonnages suited for all sizes and types of cases. Presses are of 4-piece frame construction with side housings keyed to crown and bed and with the tierods shrunk so that the press frame is preloaded. Each press is entirely self-contained being operated by a 75-horsepower motor on the main drive, and a 7½-horsepower motor on the ejector drive. The latter which is under the loading and unloading stations is of 38-ton capacity. In addition each press is equipped with a 2-station lower dial pneumatically operated and equipped with hydrau-



lic dash pots to eliminate shock. It also is provided with a fully automatic cycle covering dial, press, punch slide and ejector operation. This automatic operation may be arranged for either one or two pressings per

case by a throw of a small selector switch. Independent pressure control is provided on each individual pressing so a light pressure may be exerted on the first pressing and a heavier pressure on the second or any other combination. With this automatic cycle only one or two operators are required depending upon facilities for handling cases. The cycle together with the operation of the ejector and air hoist has made it possible to obtain production of 300 anti-aircraft cases per hour per press, the case being pressed twice during the cycle.

Polishing Lathe

■ Walker-Turner Co. Inc., South avenue, Plainfield, N. J., announces a new foot-operated speed lathe for use in polishing, burring and lapping

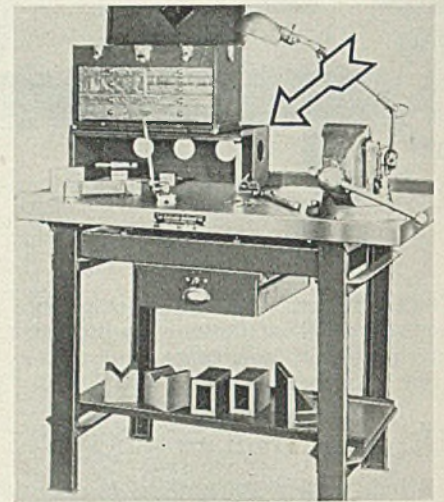


on ferrous and nonferrous metals and plastics. It will chuck rounds, tubing and hexagonal shapes up to 2 inches in diameter. The machine is equipped with a 3-phase motor with choice of either direct or gear drive. A foot pedal controls the motor switch and a synchronized brake, which brings the spindle to an instant stop when motor circuit is broken. The unit is being offered with either Jacobs chuck in ½ or ¾-inch capacity or a 40-inch 3-jaw universal lathe chuck. Its speed ranges from 950 to 7200 revolutions per minute.

Tool Box Shelf

■ Challenge Machinery Co., Grand Haven, Mich., has introduced a new tool box shelf for use on cast-iron top benches. It provides a convenient place for the tool box within easy reach of the worker, yet out

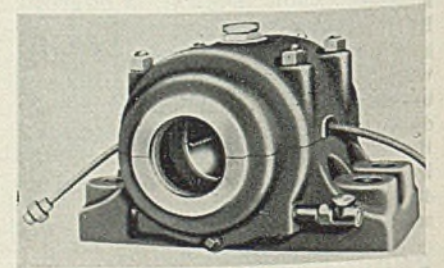
of the way of his work. Being up above the bench, the tool box drawers can be opened without inter-



ference. The shelf can be attached to any new or old Challenge bench. The benches are of iron and steel and solidly braced to remain rigid under heavy pounding, shocks, and pressure. Two full length braces under the table, equipped with leveling screws, assure a level working surface. Four regular sizes of benches and tops are offered. The tool box shelf and a semisteel drawer, with or without lock, are optional.

Pillow Blocks

■ Dodge Mfg. Corp., Mishawaka, Ind., has placed on the market new Sleeveoil precision pillow blocks for a wide range of industrial applications. Available in plain or water-cooled types and in shaft sizes 1½ to 8 inches, they are of the self-aligning type with lubrication being provided by T section brass oiling rings. The bearings also are designed to accommodate an oil gage on either of its sides. Drain holes are incorporated in each end of the bases, and caps are provided with an inspection hole and cover. These units also are available in either



expansion or nonexpansion types. Expansion blocks have no provision for thrust loads but the non-expansion bearings are supplied with two internal split thrust collars. The water-cooled blocks are identical in design and construction as the plain types except for the water cooling feature.

Cycle Control

(Concluded from Page 89)

the critical instant for each temperature change by a cam driven Bristol Pyromaster time-temperature controller. Coincidentally, a continuous graph record of furnace heats is posted on a Bristol wide-strip potentiometer. The contour of the control cam, or disk, of the governing control instrument is in effect the actuating guide for each predetermined best heating cycle. As the cam rotates at a constant speed, it accurately modifies the adjustments of burner fuel supply and furnace draft in accordance with the known heating requirements.

Expert Furnace Control: All the skill acquired in expert malleable iron casting annealing—all the practical experience gained by specialists in the operation—is incorporated in the physical form of the control cam, the contour of which exactly follows the set time-temperature sequence known to be productive of the best results. The cutting of these cams, while a precision task, takes only a few minutes—10 or 15 at most. Once such a cam is cut, its use will always assure identical furnace operation and, for similar furnaces charges, like results.

The furnace conditions as they develop per the set program also are depicted simultaneously by the synchronized postings on the strip chart of the potentiometer as this instrument records the findings of sensitive thermocouples located at strategic points in the annealing furnace chamber.

As more or less furnace heat is required to maintain temperature demands of the annealing cycle, a proportional pressure disturbance is created in a sensitively balanced actuating air line by means of Bristol magnetic air pilots electrically connected to the controller, thus setting up balancing loading pressures on the diaphragms of pneumatic control valves in the fuel-air lines to the furnace burners.

This furnace regulation, conducted entirely automatically and with extreme accuracy, takes place whether the required modifications in furnace temperature are dictated by the set heating cycle for which the control, or program, cam is proportioned or by other considerations. The control includes the automatic setting of the proportioning air valve so the air supply is at all times properly adjusted to the fuel-feed requirements at the moment. Positioning of the flue dampers is done automatically by means of a diaphragm actuated drive motor, also operated by the controller. The thermal changes that occur in the furnace by reason of these fuel and draft adjustments are shown

immediately on the recording chart of the potentiometer serving the particular furnace.

Checks and Safety Features: Sensitive thermocouples are located at three locations in each furnace in protecting wells that each house two independent couples, one of which is connected directly to the wide-strip potentiometer and the other to a three-point switch on the instrument board serving the furnace. These latter supplementary thermocouples enable the furnace operator to connect the controller to an independent couple at any one of the three furnace positions for localized temperature checking

or for automatic heat control.

Each furnace also is equipped with safety devices for protection against possible power failure, loss of adequate actuating head in the air line to the various pneumatically operated diaphragm control valves, and the development of dangerous furnace temperatures by any cause whatever. Should one or another of these improbable mishaps occur, the oil supply to the furnace burners is instantly shut off automatically and the burners cannot be relighted until the cause of the difficulty has been removed—that is, until the necessary adjustments and corrections have been made.

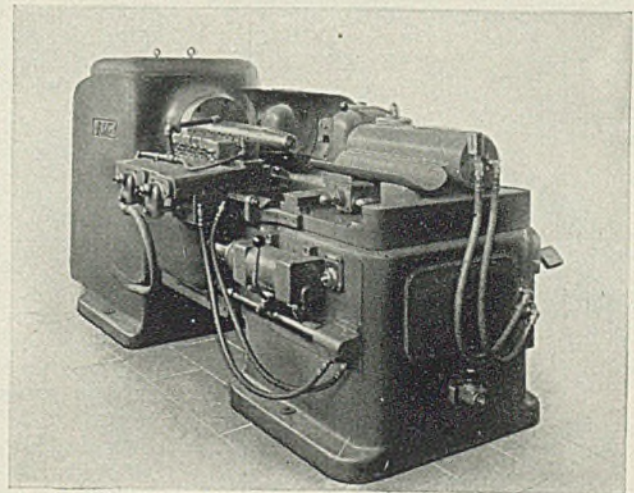
— MOREY "27" —

Semi-automatic Lathe

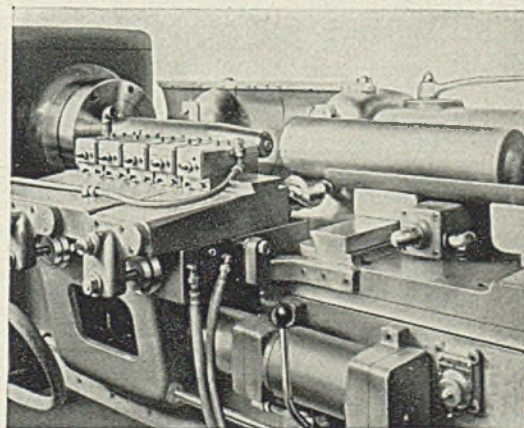
FOR ROUGH TURNING 4.05 to 7.2 SHELL

Designed to operate at the maximum feed and speed that the work and tools will permit. Cutting time is kept to a minimum. Loading from conveyor belt five seconds.

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FOR COMPLETE DETAILS
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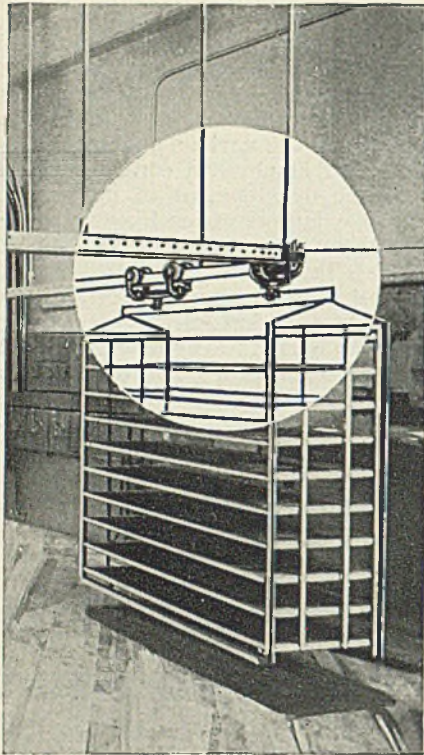


MOREY "27" Semi-automatic Lathe tooled for rough turning, cutting-off, and facing 155 M M Shell. Machine shown with hydraulic arbor and tailstock in loading position.



●
CLOSE-UP shows the "27" Semi-automatic Lathe tooled for rough turning, cutting-off, and facing Shell. Machine shown with rough forging, ready to slide on the arbor.
←

MOREY MACHINERY CO., INC.
410 Broome Street
New York, N.Y.



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MET A PIEMAN**



...WITH A BANG!

YES, collisions and confusion were a daily problem till this California bakery adopted Reading Monorails. No sort of traffic control had proven entirely satisfactory until the racks were hung on overhead tracks.

But then everything smoothed out like magic. No more bumps. No more spilled loaves of bread. No more mashed pies. Aisles were always clear of racks and free movement through the plant was facilitated.

Expensive? Not at all. Hangers were simply welded to the old racks and old wheel assemblies removed. The only expense was this operation and the low-cost monorail equipment.

Is this an idea you might use? Why not see for yourself how little it would cost? Write us the details.

READING CHAIN & BLOCK CORP.
DEPT. 312 READING, PA.

READING

Chain Hoists, Electric Hoists,
Cranes and Monorails

The Sedgley Gun

(Concluded from Page 65)

function or any other trouble whatsoever.

The arrangements whereby the gun is transformed into full automatic from semi-automatic fire are simple in the extreme. On the rear end of the sear arm there is a small plunger with wedge shaped head. The front of this wedge is acted upon by an eccentrically moving pin which presses the wedge shaped head forward for semi-automatic fire. This causes the trigger bar to snap past the lip of the wedge at each shot, thus releasing the sear for engagement with the notch in the bolt.

The safety is also quite simple and completely effective. The bolt handle engages with the bolt by means of a snap spring arrangement which permits the operator to push the cylindrical end of the pin into a corresponding hole in the receiver while the bolt is retracted. This provides a simple and completely effective lock which cannot be disengaged by an accidental blow on the knob. The latter must be pulled with some force in order to unlock the bolt.

Finds Guns Accurate

From several quarters reports have been heard of the tendency of sub-machine guns to "climb" in action. It may be stated that the writer, who had never fired a sub-machine gun before in his life, found little or no difficulty in controlling the gun, especially in bursts of three or four shots at a time. This would appear to be by far the best way to operate this gun, except, of course, where a "mowing" action on an advancing column is desired. Two target cards were fired from standing position without arm rests at 60-foot range. It was easily apparent that a human target would have had very little chance, indeed, even at the author's inexperienced hands.

A third card was fired with the gun set for full automatic operation. Only five out of the twenty shots struck the card, most of those which did not striking below the target rather than above. These first-hand evidences may help to dispose of the notion that the sub-machine gun is completely inaccurate except in highly skilled hands and at very close range.

Figs. 3 and 4 show a Sedgley applied to a .22-caliber barrel together with drum-type magazine and simple blow-back operation. This unit is applicable to the Browning .30 and .50-caliber heavy and aircraft machine gun to permit the soldier to practice at small expense and without wearing the barrel of the larger gun. These photographs are more or less self explanatory. Fig.

3 shows the attachment lying on top of the Browning gun, and Fig. 4 shows the device in position in the gun with the corresponding parts of the Browning of course removed.

Distributes Gage Charts For Defense Training

■ A portfolio of 40 educational gage charts together with a detailed lecture on industrial gaging is being distributed for use in college, university, vocational and defense training class rooms by the Sheffield Corp., Dayton, O.

The charts, a limited number of which are available, are entitled "Dimensional Control, Theory and Industrial Application" and are written for the student, giving an overall picture of precision gaging in modern industry. They include numerous basic definitions covering such topics as dimension, tolerance, limits, clearance, interference. They embody illustrations of different types of gages; an explanation of unilateral and bilateral tolerances; tables of fits and tolerances; micrometer readings of thickness, showing chance variation in reading; various application of gages, and an explanation of selective assembly and interchangeability.

"Graphitic" Steels

(Continued from Page 82)

sible to eliminate grinding.

The physical properties resulting from the various heat treatments are also adequate for severe service requirements. Consequently, the hardness and structure of Graph-Mo, combined with the free graphite, are characteristics which have given this steel entrance into many applications.

Graph-Tung was evolved when it was found desirable to still further improve the wear resistance of the graphitic steels for cold forming metal applications. Additions of 0.50 per cent molybdenum and 2.60 to 3.00 per cent tungsten were made to the carbon-silicon analysis and the silicon content reduced to 0.60 to 0.70 per cent. Normalized at 1700 degrees Fahr., and reheated to 1375, then cooled at 40 degrees per hour to 900 degrees Fahr., the combined carbon is 1.10 to 1.20 per cent; hardness ranges from 229 to 241 brinell, with good machining properties.

Recommended heat treatment of Graph-Tung is to water, (or preferably brine) quench all solid sections from 1450 to 1500 degrees Fahr. and light or nonuniform sections from 1525 to 1575 degrees Fahr. into oil. The resulting hardness from the brine or water quench is 69 to 70 rockwell C and from oil is 64 to 65 rockwell C. The quenched

STEEL

Helpful Literature

1. Universal Grinding Machines

Cincinnati Grinders, Inc.—16-page illustrated bulletin No. G-474 gives complete specifications on new line of "Cincinnati" hydraulic universal grinding machines in 14, 16 and 18-inch sizes. Highlights of design, descriptions of machines and operating features are covered.

2. Convection Furnace

Hevi Duty Electric Co.—2-page catalog section No. HD 1041 gives detailed information on application, operation, construction and features of pit type convection furnace for operation up to 1400 degrees Fahr. Table gives complete specifications for eight sizes.

3. Tool Steel

Bethlehem Steel Co.—8-page data book No. 143, Section D-6, presents information on "H.M." high speed tool steel which contains high alloy content of chromium and molybdenum with additions of tungsten and vanadium. Physical properties, characteristics and detailed instructions for hot working are enumerated.

4. Power Squaring Shears

Niagara Machine & Tool Works—16-page illustrated bulletin No. 71-H describes and presents complete specifications on series 100, 200 and 0 power squaring shears, available in capacities up to 14 gage. Capacities are tabulated and details of machines shown.

5. Cutting Tools

Firth-Sterling Steel Co.—12-page bulletin lists prices and available sizes for standard "Firthlite" sintered carbide tool tips. Ordering instructions, discounts and trade customs are included for both standard tips and for special tips which are sold by weight.

6. Welding Stainless

Arcos Corp.—12-page illustrated folder, technical bulletin No. 5, deals with welding of stainless steel using "Arcos" stainless steel electrodes. Tables show current values, weld metal characteristics, deposition data, heat treatment and applications of stainless and alloy electrodes.

7. Proportioning Control

Brown Instrument Co.—Illustrated bulletin No. 81-18 describes how single record control potentiometer used in combination with Beck mechanism, produces optimum results where there are changes in load, fuel, pressure or heating value. Diagrams show control circuit, proportioning control with reset action, and valve positions at various setter approaches. Photograph depicts system installed on strip normalizing furnace.

8. Welding Contactor

Clark Controller Co.—Six loose leaf pages comprise bulletin No. 7740 which deals with open and enclosed types of alternating current magnetic contactors for high speed resistance welding. Four curves aid in selecting proper contactor for any voltage, frequency and welding speed. Data is offered on construction and operation.

9. Rubber-lined Valve

B. F. Goodrich Co.—2-page catalog sheet No. 9787 gives directions for installation and care of "Vulcalock" rubber-lined valve. Diagrammatic sketches show details of easily replaceable parts and of design features. Data on sizes and shipping weights, as well as description of services to which valve may be put, are included.

10. Iron Products

Logan Iron & Steel Co.—16-page illustrated stock list No. 12 shows and gives dimensions of staybolt iron, engine bolt iron, forging iron, spring hanger iron, chain iron, rivet iron, fender iron, boat iron and special shapes.

11. Waterproofing Concrete

Koppers Co.—4-page illustrated bulletin No. TB-2 discusses products and methods for waterproofing and gasproofing sewage disposal plants. Application and details of various methods are explained in detail.

12. Plate Welding & Forming

Plate & Welding division, General American Transportation Corp.—Illustrated bulletin deals with application of "Fluid-Fusion" welding to manufacture of pressure, temperature and corrosion resisting equipment. Illustrations show tank cars, oil refinery equipment, storage tanks and steel mill equipment fabricated by company.

13. Tool Steels

Carpenter Steel Co.—20 1/4 x 30 1/4-inch chart "The Tool Steel Selector" is for use in tool room. It groups all of company's tool steels into nine general classifications and lists properties of these groups which make them suitable for each of recommended applications enumerated. Detailed instructions for use of chart are included.

14. Worm Gear Speed Reducers

Cleveland Worm & Gear Co.—8-page illustrated booklet, "Background," emphasizes claim of economical operation of worm gear speed reducers by quoting series of letters from manufacturers in various industries who have been using these drives for 15 to 20 years. Conditions under which equipment must operate in each industry are described.

15. Heavy Duty Lathe

Axelson Manufacturing Co.—8-page illustrated bulletin describes 18-inch heavy duty lathe with 24 speed selective geared head. General description and complete specifications are presented together with large 2-page front and rear illustrations of machines. Included is 2-page bulletin No. 4106 which contains supplementary specifications.

16. Carbide Tools

Vascoloy-Ramet Corp.—26-page illustrated general catalog and price list lists 22 typical styles of tantalum-tungsten carbide single point tools, together with grade selector chart giving recommended uses. Included are instructions for ordering tools and blanks, also tables for computing costs of standard tools and blanks and special blanks.

17. Clad Steel Fabrication

International Nickel Co.—12-page illustrated technical bulletin No. T-4 discusses methods for fabrication of nickel, "Monel" and "Inconel" clad steel. Mechanical properties of plate, design, fabrication, flame cutting, welding, riveting and surface protection are covered.

18. Lubrication Coating

Parker Rust-Proof Co.—12-page illustrated bulletin discusses "Parco Lubrizing" process of reducing wear on moving metal parts. Coating mechanism, equipment, method of operating, characteristics of coated products and results obtainable are covered.

19. Fluorescent Luminaires

Westinghouse Electric & Manufacturing Co.—2-page catalog section No. 61-152 describes fluorescent luminaires which use 40-watt, 48-inch lamps. Construction outline gives physical dimensions, and graph shows typical distribution curves. Two tabulations give lamp wattage, circuit volts, prices and installation data.

20. Time-Cycle Controllers

The Bristol Co.—20-page illustrated bulletin No. 572 is entitled "Automatic Timing of Mechanical Operations in Industrial Processes." Text, amplified with diagrams and closeup photographs, explains in detail construction and operation of company's time-cycle controllers. Two-page section explains typical installation of controller for tire molding in pot-type vulcanizer.

21. Rail Clamps

Robins Conveying Belt Co.—20-page illustrated bulletin No. 114 gives complete details of design, operation and application of line of rail clamps for movable structures such as towers, material handling bridges, unloaders and cranes.

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22. Oscillographs

Brush Development Co.—9-page illustrated technical bulletin No. 551 describes direct inking oscillographs for making instantaneous and permanent chart records of low frequency electrical alternations, surges and variations. Covered are description, construction, theory, operation and precautions to be observed. Reproduced on three pages are representative charts of various electrical vibrations and impulses recorded by equipment.

23. Portable Degreasers

Phillips Manufacturing Co.—18-page illustrated catalog on "Portable Degreasers" discusses degreasing methods and describes equipment and materials used. Portable vapor degreasing units for various work are shown and described.

24. Synchronous Motors

General Electric Co.—4-page illustrated bulletin No. GES-2677 presents detailed information on "How to Start and Protect a Synchronous Motor for Best Results." Speed at which field is applied, angle-selective control, prompt pull-out protection and dual protection are discussed.

25. Carbide Tools

McKenna Metals Co.—36-page illustrated catalog No. 42 covers specifications and prices of standard "Kennametal" carbide steel-cutting tools and blanks. Typical applications of each style are shown by drawings, photographs and examples of use. Selection and design of tools for specific purposes, set-ups, and other engineering data are included.

26. Heat Treating

Surface Combustion Corp.—32-page illustrated bulletin, "The Great American Emergency" is devoted to explaining essential differences between today's defense heat treating and application of furnaces to tomorrow's peace time needs. Heat treating of practically all defense product parts are covered.

27. Arc Welding

Hobart Brothers Co.—40-page vest-pocket size booklet is entitled, "Vest Pocket Checking Pad For Cutting Costs, Speeding Work, Improving Quality, Increasing Profits by Arc Welding." It questions reader about his knowledge of 23 possible arc welding applications that might be used profitably in his plant or business.

28. Thread Grinding

Norton Co.—24-page illustrated handbook, "Thread Grinding," is written for operators of "Jones & Lamson" and "Ex-Cell-O" thread grinding machines. Such subjects as burning, root width, thread form, lead error, finish and chatter are discussed. Tables and graphs are given on thread forms, speed conversion, wheel speed, grinding wheels and other data.

29. Metal Fatigue

Nitralloy Corp.—45-page illustrated booklet, "Fatigue of Metals—Some Facts for the Designing Engineer," covers subject of metal fatigue and effect of nitriding. Axial-shear combined, axial-shear alternating, homogeneity-scatter and local stresses are discussed. Details of stress raisers, tensile strength and other data are included.

30. Speed Reducers

D. O. James Manufacturing Co.—48-page illustrated catalog No. 19 is devoted to description, specifications and related data on parallel shaft, continuous tooth, herringbone type speed reducers. Advantages of generated continuous tooth herringbone reducers are explained. Section covers details of various designs of flexible couplings.

31. Bronze Gears

Ampco Metal, Inc.—6-page illustrated bulletin deals with use of "Ampco Metal In Gears." Explained in detail are features which makes alloy suited for gears in printing presses, post hole diggers, shapers and planers, excavators, lathes, locomotives and other equipment. Table lists six grades and physical properties of each.

32. Rivet Heaters

American Car & Foundry Co.—4-page illustrated bulletin on "A.C.F. Berwick" electric rivet heaters explains operation and application of these machines which utilize resistance method of heating rivets. Comparative costs of electric method with other types are shown, and production rates of various units are tabulated.

33. Flow Meters

Cochrane Corp.—52-page illustrated bulletin No. 3010 describes application of flow meters to steam; water; air; gas; and viscous, volatile and corrosive fluid measurement. Special sections are devoted to control applications, dual range recorders, detached instruments and summation meters. Descriptions are given for ten different types of flow measuring instruments.

34. Earthmoving Equipment

Bucyrus-Erie Co.—32-page illustrated bulletin No. 54-B-4 describes No. 54-B diesel convertible shovel, dragline and crane. Story of performance is told by series of photographs showing equipment at work under various conditions. Close-up views give details of construction of power plant and control systems. Tables list detailed specifications.

35. Abrasive Blasting

American Foundry Equipment Co.—16-page illustrated pamphlet, "The Airless Wheelabrator—What It Is and What It Will Do," concisely answers all questions about this mechanical unit which utilizes controlled centrifugal force instead of compressed air for abrasive blasting.

36. Hydraulic Control

Vickers, Inc.—4-page illustrated bulletin on "Flow Control and Overload Relief Valves" explains operation and application of these units which have automatic pressure compensator and overload pressure relief adjustment.

37. Traveling Crane

Shaw-Box Crane & Hoist division, Manning, Maxwell & Moore, Inc.—12-page illustrated catalog No. 202-B discusses low headroom electric traveling cranes ranging in capacities from 1 to 15 tons. Bridge, trolley and hoist details are explained.

38. Vacuum Cleaners

Spencer Turbine Co.—8-page illustrated bulletin No. 102-D describes in detail line of industrial portable vacuum cleaners ranging in size from ¼ to 7½ horsepower and from 1½ to 7½ cubic foot dirt capacity, as well as large units capable of moving 3 to 4 tons of material per hour.

39. Structural Weld Fittings

J. H. Williams & Co.—illustrated data sheet "This Steel Erection Method Saves—" explains seven advantages claimed for "Saxe" welded erection system utilizing welded fittings for locking structural members together.

40. Carbon Tool Steel

Jessop Steel Co.—8-page illustrated bulletin No. 741 gives analysis, heat treatment, forging, annealing, hardening, tempering, application and tool design data on "Lion" carbon tool steel for general tool purposes.

41. V-Belts

Allis-Chalmers Manufacturing Co.—8-page illustrated bulletin No. B-6190 is titled, "More Power To You." Features are explained of new "Super 7" V-belt, which is claimed to provide longer life and increased efficiency. Selection table and list prices of stock belts are included.

42. Welding Positioner

Ransome Concrete Machinery Co.—12-page illustrated bulletin No. 200 describes line of welding positioners which range in capacity from 2500-pound hand operated models to 8-ton heavy duty, motor operated units. Details of construction and operation, as well as dimensional drawings are included.

43. Machine Tools

Sundstrand Machine Tool Co.—16-page illustrated bulletin gives specifications and brief descriptions of hand, hydraulic and mechanical "Rigidmill" milling machines; models 8, 10 and 12 single spindle automatic lathes; centering machines; balancing tools; bench centers; index bases and special machines engineered to meet practically any requirements.

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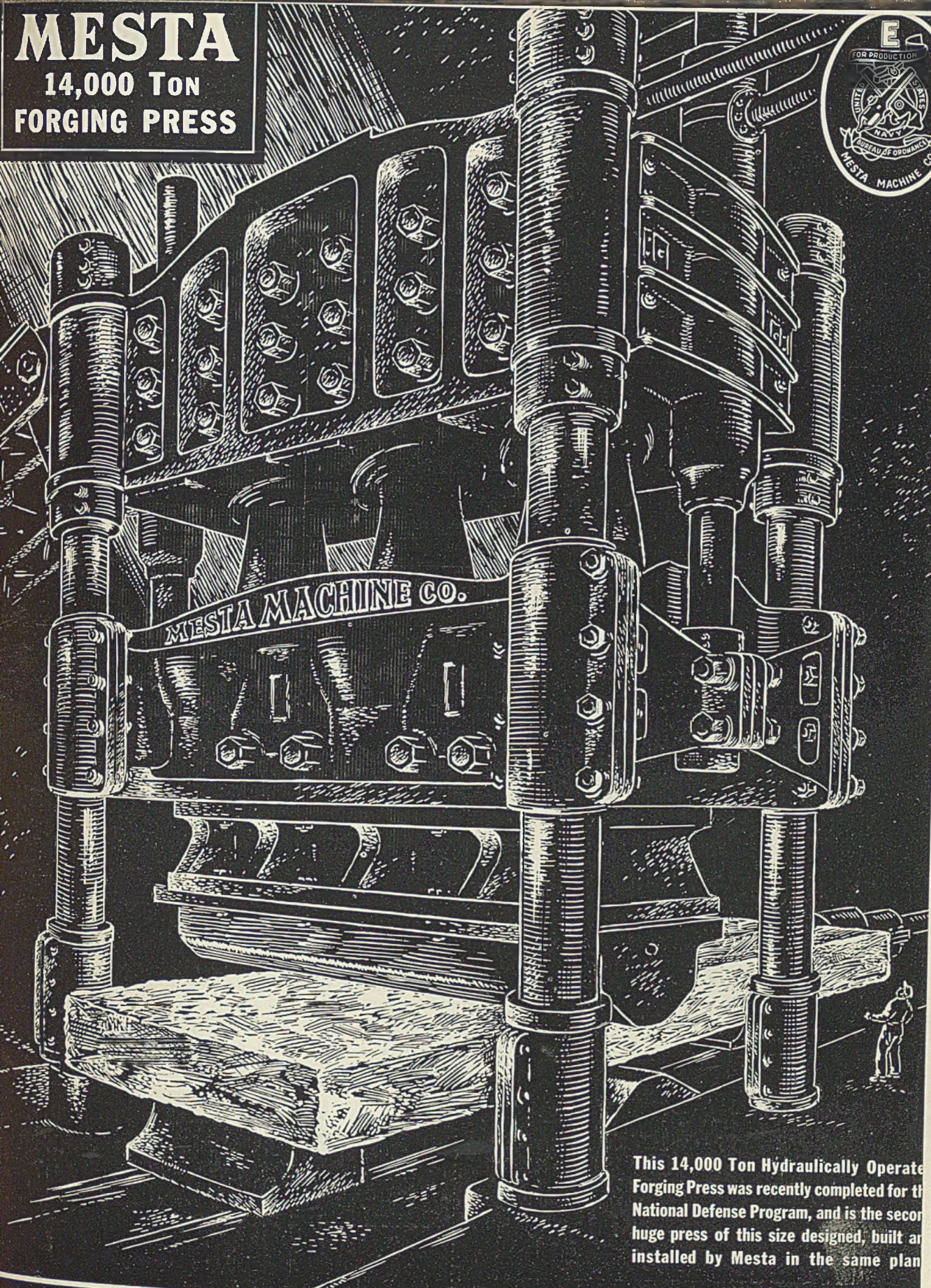
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MESTA

14,000 Ton FORGING PRESS



This 14,000 Ton Hydraulically Operated Forging Press was recently completed for the National Defense Program, and is the second huge press of this size designed, built and installed by Mesta in the same plant.

MESTA MACHINE COMPANY • PITTSBURGH, PA.

structure is extremely dense and wear resistant to the extent that it is not readily finished by grinding except by the use of the proper wheels.

The deep-hardening properties of the carbon-silicon analysis, while quite desirable for many applications, were found to be not too satisfactory for parts subjected to impact. Therefore steps were taken to develop a so-called shallow hardening grade in this series. This was accomplished by using aluminum instead of silicon as a graphitizer. A combination of 1.50 per cent total carbon and 0.20 aluminum

resulted in a most interesting and useful steel—called Graph-Al. It is normalized from 1750 degrees Fahr. and then reheated to 1430 and cooled to 1250 at the rate of about 10 degrees per hour. Combined carbon is about 1.25 per cent and the response to heat treatment is excellent.

Heated to 1450/1500 degrees Fahr., depending on the section, and quenching into brine, the case hardness is 68 to 69 rockwell C and the core from 38 to 40 rockwell C.

For the manufacture of decidedly non-uniform dies or parts of small cross-section and comparatively long lengths, a good many die steel users

prefer an air hardening steel. This preference also applies to plants that do not wish to install costly oil or water quenching equipment. The principal objection to the use of air-hardening steels has been the high temperature necessary for hardening and the difficulty in machining. The hardening problem has been relieved by several tool steel manufacturers by producing steels that air harden at normal temperatures, but with little improvement in machine ability. For several years there has been in development a graphitic analysis that would be useful for hot working applications, it being assumed that the free graphite in the structure would promote freedom from galling or seizing; because of the lower coefficient of friction, the wear would be less.

Valuable Data Available

To the total carbon of 1.50 per cent was added 1.25 manganese, 0.50 molybdenum, 1.75 nickel, 1.50 silicon, and a trace of chromium. This analysis produces an air-hardening steel, using slightly higher than normal heat-treatment temperatures, such as 1550 and 1650 degrees Fahr. Designated Graph-M.N.S., this grade is normalized from 1750 degrees Fahr. and reheated to 1430, cooled to 1250, at 10 degrees per hour, and then at the furnace rate to 900 degrees Fahr. The resulting hardness is 228 to 241 brinell, with good machining properties. For hardening, it is heated to 1650 degrees Fahr., air cooled, and then reheated to 1550 degrees Fahr. and air cooled. Hardness then is 63 to 64 rockwell C.

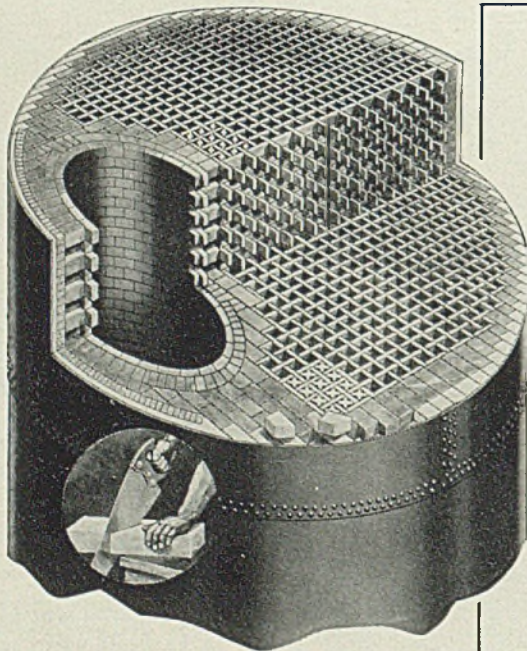
During the past several years a large number of heats have been made by adding to the carbon silicon analysis such alloys as aluminum, beryllium, cobalt, cerium, nickel, chromium, titanium, molybdenum in larger percentages, zirconium and vanadium with interesting results. Consequently, there is available a considerable amount of extremely valuable data which can be used for revision of any of the present grades of graphitic steel now available, or for the production of new grades for special purposes. Photomicrographs illustrate in detail the reasons why the Timken graphitic steels perform so well in service. Plainly visible are the well distributed, wear resisting carbide points, (white) firmly imbedded in a high strength matrix. Just as visible are the numberless small receptacles (black) for the lubricant. The combination of the two in working surfaces accounts for the remarkable service life of articles made from these steels.

A subsequent article will relate some of the most important applications of these steels.

Maintain *PEAK* capacity...

WITH

BRASSERT CONSTRUCTION HOT BLAST STOVES



View of Brassert Hot Blast Stove, showing construction of checkers and checker walls.

Here are four definite advantages you get in Brassert Construction Hot Blast Stoves:

1. High blast temperature when needed.
2. Large capacity for heat storage.
3. High thermal efficiency.
4. Unequalled capacity in a given stove shell.

These advantages are assured because Brassert, through correct application of engineering principles, has been able to provide: maximum weight and surface of brick per unit of stove volume; heating surface close to mass of brick; air and gas passages close to heating surface; velocity of air and gas maintained uniform and at a maximum throughout height of stove.

H.A. **BRASSERT** & CO.

Engineers and Contractors

FIRST NATIONAL BANK BUILDING, PITTSBURGH, PA.
60 EAST 42nd STREET, NEW YORK CITY

Steel Output Faces Cut from Coal Strike

*Blast furnaces already being shut down.
Scrap shortage continues limiting factor.
Iron ore consumption sets new record*

■ WHILE short scrap supply continues a large factor in steel production emphasis has shifted temporarily to coke, interruption of coal mining at captive mines and sympathetic strikes at commercial mines threatening reduction in pig iron output. Already numerous blast furnaces are being banked or blown out and if the stoppage continues many days others will be forced down. Efforts have been made to increase coal and coke inventory over the past few weeks but in general supply is not sufficient to span a prolonged period of mine idleness.

With the scrap shortage growing more acute and pig iron supply curtailed by blast furnace idleness a major cut in steel output seems certain within a few days. In some instances blast furnaces have only a few days' supply of coke, while others have sufficient for two weeks or more. Mills dependent on captive mines will feel the impact of the strike most severely, while those buying coke from commercial mines will be in better position.

Production last week dropped $1\frac{1}{2}$ points to 95½ per cent from these causes and will go lower this week unless the coal strike is settled immediately. Only Cincinnati showed a gain, $3\frac{1}{2}$ points, to 91½ per cent. Youngstown dropped 6 points to 88 per cent; Chicago 1 point to 101½ per cent; Cleveland $2\frac{1}{2}$ points to 92 per cent and Wheeling 9 points to 82 per cent. Unchanged rates were maintained as follows: St. Louis, 98 per cent; Detroit, 96; Buffalo, 79; Birmingham, 90; New England, 92; Pittsburgh, 99; Eastern Pennsylvania, 91.

Tapering of automobile production is limiting output of scrap at Detroit, steelmakers there already on short supply. Approach of cold weather, always a deterrent to collections, also is making the scrap position less secure.

With production only three days last week automobile output was 76,820 units, a decrease of 16,170 from the 92,990 the preceding week. In the corresponding week last year production was 102,340 cars. Auto production is being curtailed to meet the quota established by OPM and the industry will be practically shut down shortly after the beginning of December.

MARKET IN TABLOID ★

Demand

Non-defense inquiry lighter.

Prices

Ceilings not changed.

Production

Down $1\frac{1}{2}$ points to 95½ per cent.

Cause of increasing demand for shipbuilding plates is found in the fact that private shipyards building steel ships have increased from 21 to 65 since the beginning of the emergency, shipways 300 feet in length from 83 to 383 and workers from 65,000 to 250,000, as shown by a survey of the National Council of American Shipbuilders. That mills have been supplying ship steel as needed is shown by reduction of time required for completion of vessels, several months being cut from former schedules.

October consumption of Lake Superior iron ore set a new record at 6,612,186 gross tons, topping the August figure of 6,534,424 tons. Cumulative consumption to Nov. 1 this year was 62,772,674 tons, compared with 50,280,269 tons in the same period last year. Ore at furnaces and on Lake Erie docks Nov. 1 totaled 43,945,751 tons, compared with 41,125,450 tons a year ago.

Steel exports continue to rise, shipments, aside from scrap, totaling 641,094 gross tons in September, compared with 617,477 tons in August. Total exports, except scrap, for nine months totaled 4,753,255 tons, compared with 5,487,012 tons in first nine months last year.

Current steel bookings are down from October, in some cases as much as 15 per cent during first half of November, although the total for the year to date is substantially higher than for 1940. In the case of some mills orders last week were only about 50 per cent of preceding weeks. Practically no steel is being booked for non-defense use with future delivery. Order M-21 by OPM has brought this about. This is speeding the changeover to defense work by all consumers having such contracts.

Slight increase in consumer inventory is appearing here and there, the cause not being clear. It is attributed to smaller production of civilian items as shortages occur in some other materials, while defense subcontracts are not yet fully under way. When the latter is fully developed these accumulations, not large in any case, will disappear promptly.

Composite prices are unchanged, held steady by ceilings imposed by government agencies, as follows: Finished steel, \$56.73; semifinished steel, \$36.00; steelmaking pig iron, \$23.05; steelmaking scrap, \$19.17.

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.	S.A.E. Diff.
2000	0.35 3100
2100	0.75 3200
2300	1.70 3300
2500	2.55 3400
4100	15-25 Mo. 0.55
4600	0.20-0.30 Mo.; 1.50-2.00 Ni.
5100	80-110 Cr. 0.45
5100	Spr. flats 0.15
6100	Bars 1.20
6100	Spr. flats 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, Fasteners	
(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. Discount counts for carloads additional 5%, full containers, add 10%.	
Carriage and Machine	
1/2 x 6 and smaller	.65 1/2 off
Do., 5/8 and 3/4 x 6-in. and shorter	.63 1/2 off
Do., 3/4 to 1 x 6-in. and shorter	.61 off
1 1/4 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
Flow bolts	.65 off
Nuts	
Semifinished hex. U.S.S. S.A.E.	
1/2-inch and less	62 64
3/8-1-inch	59 60
1 1/2-1-inch	57 58
1 1/2 and larger	56

Hexagon Cap Screws	
Upset 1-in., smaller	.60 off
Square Head Set Screws	
Upset, 1-in., smaller	.68 off

Headless, 1/4-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
1/2-inch and under	.65-5 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l.	\$3.50 off

Tool Steels	
Pittsburgh, Bethlehem, Syracuse, base, cents per lb.	
Carb. Reg. 14.00 Oil-hard	
Carb. Ext. 18.00 ening	24.00
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	77.00
18.00 4 3	87.00
1.50 4 1	8.50
4 2	8
5.50 4 1.50	4
5.50 4.50 4	4.50

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
1 1/2" O.D.	13 \$ 9.72
1 3/4" O.D.	13 11.06
2" O.D.	13 12.38
2 1/4" O.D.	13 13.79
2 1/2" O.D.	12 15.16
2 3/4" O.D.	12 16.58
3" O.D.	12 17.54
3 1/2" O.D.	12 18.35
4" O.D.	11 23.15
4 1/2" O.D.	10 28.66
5" O.D.	9 44.25
6" O.D.	7 68.14

Seamless	
Sizes	Gage Hot Cold
1" O.D.	13 \$ 7.82 \$ 9.01
1 1/4" O.D.	13 9.26 10.67
1 1/2" O.D.	13 10.23 11.79
1 3/4" O.D.	13 11.64 13.42
2" O.D.	13 13.04 15.03
2 1/4" O.D.	13 14.54 16.76
2 1/2" O.D.	12 16.01 18.45
2 3/4" O.D.	12 17.54 20.21
3" O.D.	12 18.59 21.42
3 1/2" O.D.	12 19.50 22.48
4" O.D.	11 24.62 28.37
4 1/2" O.D.	10 30.54 35.20
5" O.D.	10 37.35 43.04
6" O.D.	9 46.87 54.01
7" 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 2 1/2 and 1 1/2 less, respectively. Wrought pipe, Pittsburgh base.	
Butt Weld Steel	
In.	Blk. Galv.
1/2	63 1/2 51
3/4	66 1/2 55
1-3	68 1/2 57 1/2
Iron	
1/2	30 10
3/4	34 16
1 1/4	38 18 1/2
2	37 1/2 18
Lap Weld Steel	
2	61 49 1/2
2 1/2-3	64 52 1/2
3 1/2-6	66 54 1/2
7 and 8	65 52 1/2

Iron	
2	30 1/2 12
2 1/2-3 1/2	31 1/2 14 1/2
4	33 1/2 18
4 1/2-8	32 1/2 17
9-12	28 1/2 12
Line Pipe, Plain Ends Steel	
1 to 3, butt weld	68 1/2
2, lap weld	63
2 1/2 to 3, lap weld	66
3 1/2 to 6, lap weld	65
7 and 8, lap weld	64
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 Std. ftgs., 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., Youngs., Buffalo, Birm.	40.00
Duluth	42.00
Sheet Bars	
Pitts., Cleveland, Youngs., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00
Wire Rods	
Pitts., Cleveland, Chicago, Birmingham No. 5 to 3/4-inch incl. (per 100 lbs.)	\$2.00
Do., over 3/4 to 1 1/4-in. incl.	2.15
Worcester up \$0.10, Galveston up \$0.25 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.)	14.75
Do. (1000 lbs. or over)	13.00
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls. to jobbers	7.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	\$29.00

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets		Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars		
							Hot Rolled	Cold Rolled			Carbon	S.A.E. 2300	S.A.E. 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.48	5.11	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.95	4.45	3.55	3.55	5.25	3.55	4.05	5.26	3.31	4.06	8.56	7.10
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	4.05	5.05	3.31	4.05	8.56	7.10
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
Indianapolis	3.60	3.75	3.75	3.70	3.70	5.30	3.45	....	5.01	....	3.97	....	....
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	....	....
Omaha	4.10	4.20	4.20	4.15	4.15	5.75	3.85	5.32	6.00	....	4.42	....	....
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-		3100		6100	
	Series	Series	Series	Series	Series	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	6.45	....	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
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	2.95c	15 10 0
Ship plates	2.90c	16 2 6
Boiler plates	3.17c	17 12 6
Sheets, black, 24 gage	4.00c	22 5 0
Sheets, galvanized, corrugated, 24 gage	4.61c	25 12 6
Tin plate, base box, 20 x 14, 108 pounds	\$ 6.20	1 10 9
British ferromanganese	\$120.00 delivered Atlantic seaboard	duty-paid.

Domestic Prices Delivered at Works or Furnace—

	£ s d	
	£	s d
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	\$25.79	6 8 0(a)
Basic pig iron	24.25	6 0 6(a)
Furnace coke, f.o.t. evens	7.40	1 16 9
Billets, basic soft, 100-ton lots and over	49.37	12 5 0
Standard rails, 60 lbs. per yard, 300-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 0††
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	5.30c	18 7 0
(a) del. Middlesbrough		††Rebate
15% on certain conditions.		

Ores

Lake Superior Iron Ore		Spanish, No. African	
Gross ton, 51 ½ %		basic, 50 to 60% Nom.	
Lower Lake Ports		Chinese wolframite, net ton, duty pd.. \$24.00	
Old range bessemer..... \$4.75		Brazil iron ore, 68-69%, ord. 7.50c	
Mesabi nonbessemer 4.45		Low phos. (.02 max.) 8.00c	
High phosphorus 4.35		F.O.B. Rio Janeiro.	
Mesabi bessemer 4.60		Scheelite, imp. 23.50-24.00	
Old range nonbessemer.. 4.60		Chrome ore, Indian, 48% gross ton... ..	
Eastern Local Ore		Manganese Ore	
Cents. unit, del. E. Pa.		Including war risk but not duty, cents per unit cargo lots	
Foundry and basic		Caucasian, 50-52%	
56-63%, contract. 12.00		So. African, 50%... 68.00-70.00	
Foreign Ore		Indian, 50% 68.00-70.00	
Cents per unit, c.i.f. Atlantic ports		Brazilian, 46% 68.00-70.00	
Manganiferous ore, 45-55% Fe., 6-10%		Chilean, 47% 68.00-70.00	
Mang. Nom.		Cuban, 50-51%, duty free	
N. African low phos. Nom.		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.

Description	Pittsburgh, Pa., and Warren, O.		Youngstown, Pa.		Wheeling, W. Va.		Cincinnati, Ohio		Cleveland, Ohio		Detroit, Mich.		Birmingham, Ala.		Alabama City, Ala.		Minneapolis, Minn.	
	Wheeling	Warren	Youngstown	Wheeling	Warren	Youngstown	Wheeling	Warren	Youngstown	Wheeling	Warren	Youngstown	Wheeling	Warren	Youngstown	Wheeling	Warren	Youngstown
No. 1 heavy melting	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00
No. 1 hyd. comp. black sheets	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
No. 2 heavy melting	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00
Dealer No. 1 bundles	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00
Dealer No. 2 bundles	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00
Mixed borings and turnings	15.25	15.25	15.25	15.25	15.25	15.25	15.25	15.25	15.25	15.25	15.25	15.25	15.25	15.25	15.25	15.25	15.25	15.25
Machine shop turnings	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50
Shovel turnings	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50
No. 1 bushelling	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50
No. 2 bushelling	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50
Cast iron borings	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50
Uncut structurals and plate	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75
No. 1 cupola	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00
Heavy breakable cast	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50
Stove plate	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00
Low phos. billet bloom cross	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00
Low phos. bar cross and smaller	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00
Low phos. punch, plate scrap**	23.00(c)	23.00(c)	23.00(c)	23.00(c)	23.00(c)	23.00(c)	23.00(c)	23.00(c)	23.00(c)	23.00(c)	23.00(c)	23.00(c)	23.00(c)	23.00(c)	23.00(c)	23.00(c)	23.00(c)	23.00(c)
Machinery cast cupola size***	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00
No. 1 machine cast, drop broken,	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50
Clean auto cast	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50
Punchings and plate scrap††	22.00(c)	22.00(c)	22.00(c)	22.00(c)	22.00(c)	22.00(c)	22.00(c)	22.00(c)	22.00(c)	22.00(c)	22.00(c)	22.00(c)	22.00(c)	22.00(c)	22.00(c)	22.00(c)	22.00(c)	22.00(c)
Punchings and plate scraps‡	21.00(c)	21.00(c)	21.00(c)	21.00(c)	21.00(c)	21.00(c)	21.00(c)	21.00(c)	21.00(c)	21.00(c)	21.00(c)	21.00(c)	21.00(c)	21.00(c)	21.00(c)	21.00(c)	21.00(c)	21.00(c)
Heavy axle and forge turnings	19.50(c)	19.50(c)	19.50(c)	19.50(c)	19.50(c)	19.50(c)	19.50(c)	19.50(c)	19.50(c)	19.50(c)	19.50(c)	19.50(c)	19.50(c)	19.50(c)	19.50(c)	19.50(c)	19.50(c)	19.50(c)
Medium heavy elec. furnace turnings	18.00(c)	18.00(c)	18.00(c)	18.00(c)	18.00(c)	18.00(c)	18.00(c)	18.00(c)	18.00(c)	18.00(c)	18.00(c)	18.00(c)	18.00(c)	18.00(c)	18.00(c)	18.00(c)	18.00(c)	18.00(c)

GRADES ORIGINATING FROM RAILROADS

No. 1 R.R. heavy melting steel

Scrap rails

††Retrolling quality rails

Scrap rails 3 feet and under

Scrap rails 2 feet and under

Scrap rails 18 inches and under

*Johnstown, Pa., and Warren, O. are not bases for railroad grades. Wheeling railroad only. Eastern Pa. includes Coatesville, Chaymont, 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; Middle town 25 cents less and Ashland, Ky. ††The term 'rails for retolling' includes any rails which are sold to be used for retolling, irrespective of whether or not such rails are usable for re-laying. **1/2-inch and heavier, cut 12 inches and under; ***may include clean agricultural cast; ††under 1/2-inch to 1 1/2-inch at Pittsburgh. (d) Bases at Atlanta only.

OTHER BASE PRICES: Machine shop turnings \$17.60, Alloy, W. Va., \$13.35 Toledo, O.; Shovel turnings \$14.25 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 subtracting the actual transportation costs to the consumer's plant within the basing point. For shipping points outside the basing point, the shipping point price is determined by taking the nearest basing point and subtracting the lowest

Sheets, Strip

Sheet & Strip Prices, Pages 102

Pressure for sheet tonnage has eased materially in the experience of some producers, although more business is offered than can be taken. Buyers with defense work apparently are getting as much as they need, or know the reasons why not. Consumers without defense work seem to have concluded they can not obtain more without priority. Expectation of broad allocations instead of the present priority system is also a factor tending to restrict efforts to place more tonnage on mill books.

Sheets for automobile manufacture have been adequate for the number of assemblies permitted under OPM regulations. Reduced shipments to household equipment manufacturers are showing effects more prominently as consumer inventories are reduced. Full force of these curtailments are expected soon after the first of the year.

A substantial tonnage of hot sheets has been allocated among 10 producers for shipment to England over the remainder of this year. This and various other demands, especially from drum makers, who recently have received an A-4 rating, are further tightening hot sheet deliveries. In general, shipments on cold sheets are not as extended as on hot, with a result that drum makers are ordering in a certain amount of cold tonnage. Galvanized sheet deliveries vary with the different producers, with zinc now less of a factor than steel in most instances. Where the latter is not too much of a factor some fairly good deliveries can be obtained. Some sellers, in fact, can offer January shipments on limited tonnages of priority business.

Cold strip producers are sold to August, 1942, on the overall basis, with about half on low priority or unrated. Incoming strip tonnage is somewhat below shipments and some backlogs are being reduced slightly. Ratio of defense orders for strip are on the increase.

Three shops in New England are distributing 1300 tons of cold strip for the last lot of rebid cartridge clips. Substitution of strip steel for copper and brass where possible is an increasing factor in inquiry and buying.

Bethlehem Steel Co. has shut down its Seneca division at Blassdell, N. Y., as its product is not suited to defense needs and semi-finished steel for civilian products is not available. Defense material is being produced on the continuous strip mill at Lackawanna works.

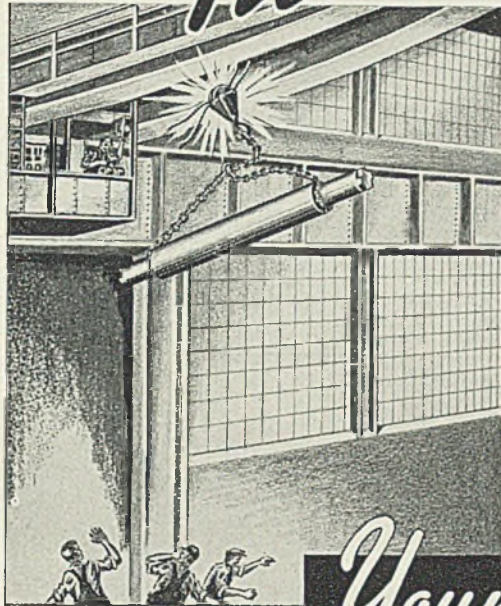
Plates

Plate Prices, Page 102

Plate deliveries on orders without priority have almost disappeared, an occasional car or mixed carload being an exception. Small tonnage is left after allocations and high priorities are filled, especially in wider plates.

More tonnage is going to ship-

This CAN'T HAPPEN HERE



WHEN CRANE
IS **EC&M**
EQUIPPED

with a

Youngstown SAFETY LIMIT STOP

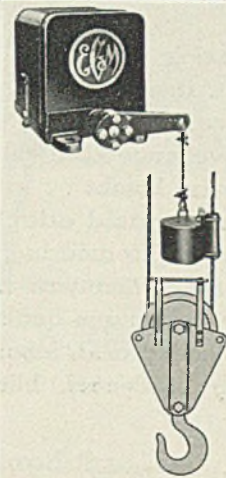
Here's the SAFETY and
CONVENIENCE men appreciate

IN THE operation of overhead cranes, the Youngstown Safety Limit Stop is as important as a safety valve to a boiler. Thousands of installations testify to its value in protecting life and property.

It not only eliminates overhoisting accidents but removes the mental hazard of an accident, resulting in notably better work by the operator. Entirely automatic, the Limit Stop resets as the hook is lowered out of the danger zone.

Contributing also to more efficient operation is full magnetic control . . . consisting of small, compact master switches which are easy to operate and can be conveniently grouped within easy reach.

Only a small part of the cost of the crane, these products by giving the safety and convenience men appreciate, are often an important factor in improving personnel relations. Ask for complete details about EC&M Crane Control Equipment.



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yards, such supplies being kept well up to the needs of these consumers. Builders of heavy equipment, while usually covered by fairly high ratings, are held up by uncertain deliveries on some sizes and widths, some direct appeals to OPM being made on this score. Considerable large tank fabrication is held up by inability to obtain preferences that would assure nearby delivery. Heads and flanged and dished work are delayed frequently by insufficient plate supply.

While plate mill schedules for November were checked by OPM down to virtually the last detail, thus reflecting a further refinement in system of allocation in this product, producers are still receiv-

ing rush instructions from Washington which alter schedules, as originally approved. Perhaps the most pronounced trend in this respect has been the diversion of an increasing proportion of plates to shipyards, with indications that railroads and railroad equipment builders will get somewhat less than last month.

Flow of plates through secondary market channels is apparently on the increase rather than declining. It is an accepted fact that some metal brokers have been able to gain acceptance of plate orders in return for diversion of scrap to the mill supplying the plates. These transactions are on a warehouse basis, the broker acting as a ware-

house and supplying warehouse priority ratings.

Tonnage in some instances has assumed major proportions. The total is small when compared to total plate production, but is substantial when compared to tonnage available through regular warehouse channels. In some cases this plate is being sold at prices above warehouse levels, no ceiling having been set for these transactions.

Another source of some plate tonnage is from stocks originally sold to French interests and since taken over by sellers here. Originally this tonnage was to have been exported, and substantial amounts have been sold in the export market, but now domestic buyers are taking over the balance, much of which is available to non-defense buyers.

PLATES CONTRACTS PLACED

800 tons, three gasoline tanks for Porto Rico, through McCloskey & Co., Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

785 tons, chromium-molybdenum steel plates, 1 x 53 x 104-inches, Rock Island, Ill., arsenal, to Carnegie-Illinois Steel Corp., 4.94c per pound, 4.75c, basing point.

539 tons, for seven 13,500-barrel tanks for defense work, various Pacific points, to Western Pipe & Steel Co., San Francisco; also 231 tons shapes for same projects.

100 tons, standpipes, air base, Presque Isle, Me., to Pittsburgh-Des Moines Steel Co., Pittsburgh, \$36,500.

100 tons or more, tanks, air corps, to Sharpville Steel Fabricators, Sharpville, Pa., \$955,200.

PLATES CONTRACTS PENDING

900 tons, pressure vessels for Standard Oil Co., Richmond, Calif.; bids being taken.

Wire

Wire Prices, Page 103

Insufficient supply of semifinished steel for wire mills has cut into production, most marked in specialties. This has been as large as 15 per cent in some cases. Orders are in smaller volume than last month and shipments are greater than bookings at the moment. Some reduction of backlogs is the result.

Automotive demand is markedly short but the lag is made up in other directions. Inquiry is substantial for high grade spring wire. Orders for various types of cable, rope and signal corps wire are being placed direct by various government departments.

Pipe

Pipe Prices, Page 103

Cast pipe deliveries are limited by supply of raw materials, scrap and pig iron, which are irregular. An eastern foundry is obtaining larger pig iron supply under allocations. Export demand has slackened but utilities are placing fair tonnages under A-10 or higher priorities, for specified work.

New York City will ask bids about Dec. 13 on 10,700 tons of pipe and 1350 tons of fittings.

An Alabama pipe manufacturer

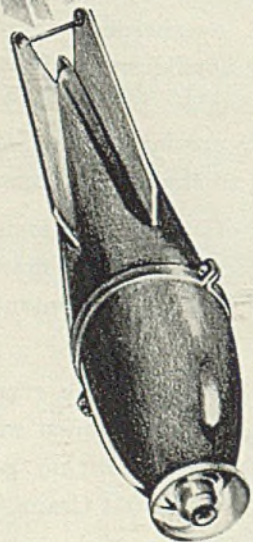


3 Million 100-Pound Bombs

could have been made of the steel **RODINE** saved!

Steel is vital to National Defense . . . steel and more steel! Rodine saved steel enough last year to have made 3,000,000 one-hundred-pound bombs . . . steel otherwise lost by acid attack in pickling baths. This amazing record of steel conservation was made possible by the unique qualities of Rodine—saving acid, labor, time, reducing brittleness, blistering, corro-

sion; eliminating formation and escape of fumes. American Chemical Paint Company specializes in chemicals to save steel . . . has adequate stocks on hand to meet your needs. ACP's 20 years' experience is helping to solve the production problems of America. Rodine—and other ACP products—may be your solution. Write for Bulletin No. 13.



AMERICAN CHEMICAL PAINT CO.

MAIN OFFICE AND WORKS
AMBLER . . . PENNA.



DETROIT, MICH. 6339 Palmer Ave., E.
CANADIAN BRANCH WALKERVILLE ONT.

has halted production of centrifugal pipe because of gas shortage occasioned by strike of by-product coke workers of Woodward Iron Co.

CAST PIPE PLACED

225 tons, 12-inch, Fort Benning, Ga., to National Cast Iron Pipe Co., Birmingham, Ala.

100 tons, air ferrying command, Long Beach, Calif., to Pacific States Cast Iron Pipe Co., Provo, Utah.

CAST PIPE PENDING

826 tons, 10-inch for Fort Lewis, Wash.; bids called Nov. 14 cancelled; no date set for new call.

575 tons, 4 to 10-inch and accessories, for Orting, Wash.; bids to Margaret Groff, clerk, Nov. 24; alternates for transite; Parker & Hill, Seattle, engineers.

WROUGHT PIPE PENDING

56,000 feet, ¾ to 2-inch galvanized wrought iron pipe; bids at Seattle Nov. 17.

Bars

Bar Prices, Page 103

Steel bar tonnage available to nondefense consumers is light, both in carbon and alloy grades. Deliveries and consumption are heavy and increasing, confined almost exclusively to rated business. Attempts to place tonnage without priority are almost fruitless. Most jobber replacements are against sales under high rating, replacements under the A-9 classification being light. Small lots are difficult to place, even when needed to round out important defense needs.

Most buyers have long since specified needs far in advance and are more concerned over deliveries against these orders than about placing new ones, especially when there is no assurance when the latter can be scheduled.

A factor in the increased demand is the fact that new tool equipment being installed for defense work is going into production and requires added material. Present forging capacity is practically at 100 per cent.

Rails, Cars

Track Material Prices, Page 103

Placing of 1000 hopper cars by the Lehigh Valley with Bethlehem Steel Co. brings total domestic freight car buying so far this month up to around 2100 cars, compared with 2499 cars during all of last month. As a substantial number of cars is on inquiry for United States Steel Corp. subsidiaries, on which early action is expected, there is every likelihood that November bookings will surpass those for October, although in all probability falling short of the September total of 4470, as general domestic inquiry continues light.

Considerable equipment is under consideration for export under the lease-lend law and buying for this purpose in the next few weeks is expected to be material.

LOCOMOTIVES PLACED

Dublin & Savannah, one 1000-horsepower diesel-electric switcher, to Bald-



Cast steel Guide Vane made by Standard for an I.P. Morris Turbine.

Standard is equipped to supply steel castings of unusual size and shape to suit your requirements.

The acid open hearth steel is produced in Standard's furnaces under the control of trained metallurgists.

Standard's long experience and expert personnel is reflected in the high quality of its products.

CASTINGS • FORGINGS • WELDLESS RINGS • WROUGHT STEEL WHEELS

STANDARD STEEL WORKS

Division of THE BALDWIN LOCOMOTIVE WORKS PHILADELPHIA



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win Locomotive Works, Eddystone, Pa. Navy, one 25-ton diesel-electric to Atlas Car & Mfg. Co., Cleveland.

Southern Pacific, three 44-ton diesel-electric, to General Electric Co., Schenectady, N. Y.

Union Railroad, seven 1000-horsepower diesel-electric, five to Electro Motive Corp., LaGrange, Ill.; two to American Locomotive Co., New York.

United States Government, 30 steam locomotives under lease-lease for export, twenty 2-8-8-2 type for Yunnan-Burma railroad in China and ten 2-8-2 for unannounced destination; to American Locomotive Co., New York.

Upper Merion & Plymouth, one 80-ton diesel-electric, to General Electric Co., Schenectady, N. Y.

Western Pacific, eight diesel-electric switchers, 660-horsepower, to American Locomotive Co., New York.

LOCOMOTIVES PENDING

Navy, Bureau of Supplies and Accounts, delivery South Boston, Mass., one diesel-electric with spare parts, sch. 9415, bids Nov. 25.

Navy, Bureau of Supplies and Accounts, one diesel-electric with spare parts, delivery submarine base, New London, Conn.; bids Dec. 2, sch. 9493, Washington.

CAR ORDERS PLACED

Aluminum Co. of America, one 90-ton transfer car, to American Car & Foundry Co., New York.

Indianapolis Railways Inc., five 44-passenger trolley coaches, to J. G. Brill Co., Philadelphia.

Lehigh Valley, 1000 fifty-ton hopper cars, to Bethlehem Steel Co., Bethlehem, Pa.

Mathieson Alkali Works, six 50-ton box cars, to American Car & Foundry Co., New York.

CAR ORDERS PENDING

Navy, Bureau of Supplies and Accounts, 15 freight cars, for delivery to Bayonne, N. J., schedule 9470; bids Nov. 28.

BUSES BOOKED

A.c.f. Motor Co., New York: Twenty-one coaches; 20 for San Diego Electric Railway Co., San Diego, Calif.; one for Mastco Co. Inc., New Britain, Conn.

Structural Shapes

Structural Shape Prices, Page 103

Structural steel awards are light, most representing projects figured some time ago and held back by difficulty in getting priorities. New projects come out slowly and most are for defense purposes. Light structurals are in active demand, particularly from warehouses, though deliveries on the warehouse priority number are not promising.

SHAPE CONTRACTS PLACED

- 2000 tons, three warehouses, naval supply depot, Oakland, Calif., to Judson Pacific Corp., San Francisco.
- 1750 tons, superstructure, South Canal street bridge, City of Chicago, to Mt. Vernon Bridge Co., Mt. Vernon, O.; bids Sept. 24.
- 1550 tons, power house addition, Appalachian Electric & Power Co., Glenlyn, Va., to Virginia Bridge Co., Roanoke, Va.; American Gas & Electric Co., project.
- 900 tons, state highway bridge, Orange county, New York, to American Bridge Co., Pittsburgh, through Lane Construction Co., Meriden, Conn.
- 660 tons, Mill Creek pumping station, United States engineer, Cincinnati, to Rock Island Bridge & Iron Works, Rock Island, Ill.; Ferd J. Robers Construction Co. and La Crosse Dredging Corp., Cincinnati, joint contractors; work also takes 73,500 feet steel cast-in bearing piles; 9600 square feet, steel sheet piling, and miscellaneous metal materials, including gates.
- 640 tons, two buildings, arsenal, Benecia, Calif., to unstated eastern supplier.
- 626 tons, sheet piling, U. S. Engineer, New Orleans, to Inland Steel Co., Chicago, at 2.95c; Invitation 149, bids Oct. 31.
- 550 tons, building, Exolon Co., Buffalo, at Blasdell, N. Y., to Buffalo Steel Corp., Buffalo.
- 400 tons, power house No. 5, Pit River, California, for Pacific Gas & Electric Co., to Bethlehem Steel Co., San Francisco.
- 375 tons, gun placement shelters, United States engineer, Boston, to Bethlehem Steel Co., Bethlehem, Pa.; Invitation 60, bids Nov. 14.
- 265 tons, transit shed building 223, Oakland, Calif., for government, to American Bridge Co., Pittsburgh.
- 265 tons, state highway bridge project RC-41-47, Chemung-Steuben counties, New York, to American Bridge Co., through H. E. Bunce, Waverly, N. Y., contractor, \$185,918.45; bids Nov. 6, Albany.
- 239 tons, overhead bridge FAP-467-B-(2).

SHAPE AWARDS COMPARED

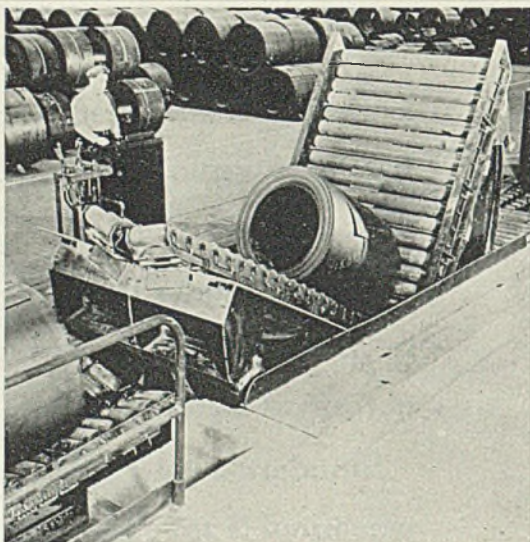
	Tons
Week ended Nov. 22	11,748
Week ended Nov. 15	15,617
Week ended Nov. 8	18,755
This week, 1940	11,377
Weekly average, 1941	27,840
Weekly average, 1940	28,414
Weekly average, Oct., 1941	22,530
Total to date, 1940	1,317,806
Total to date, 1941	1,308,487

Includes awards of 100 tons or more.

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One of 30 Mathews experienced Field Engineers is near you with ready and able service.



INCREASED CAPACITY FOR NATIONAL DEFENSE

Our plant capacity has been increased over 65% to care for the rising demands of the National Defense Program — plus the normal demands of peacetime production. All orders, whether subject to Defense priorities or not, are given the same helpful care and attention that have always marked our dealings with prospects and customers in the past.

MATHEWS CONVEYER COMPANY

142 TENTH ST. - - - - - ELLWOOD CITY, PA.

Field Engineers and Sales Offices located in 30 Industrial Centers.

- Soelch, Wis., to American Bridge Co., Pittsburgh; C. B. Taylor, contractor.
- 204 tons, two buildings, Rath Packing Co., Waterloo, Iowa, 137 tons to Des Moines Steel Co., Des Moines, Iowa, and 67 tons to Iowa Steel & Iron Works, Cedar Rapids, Iowa; W. A. Klinger Inc., contractor.
- 200 tons, addition, building 14, General Electric Co., Pittsfield, Mass., to F. L. Heughes & Co., Rochester, N. Y.
- 172 tons, Belt railway subway, West Forty-seventh street, Chicago, for Cook county, to American Bridge Co., Pittsburgh; bids Oct. 21.
- 168 tons, highway bridge, Jayhawk Ordnance Works, Pittsburg, Kans., for government, to American Bridge Co., Pittsburgh.
- 160 tons, receiving and storage building, proving ground, Savanna, Ill., for War Department, to Clinton Bridge Works, Clinton, Iowa.
- 154 tons, Tidal basin bridge, Washington, to American Bridge Co., Pittsburgh.
- 150 tons, bridge over North Shore channel, Lincolnwood, Ill., for Cook county, to Bethlehem Steel Co., Bethlehem, Pa.; bids Oct. 21.
- 110 tons, school, Ramapo, N. Y., to Dreler Structural Steel Co. Inc., New York, through Brotherton Construction Co.
- 110 tons, laundry building, Sunnyside yard, Long Island, New York, for Pennsylvania railroad, to American Bridge Co., Pittsburgh.
- 100 tons, shapes and bars, addition, Air-Cooled Motors Corp., Syracuse, N. Y., to Syracuse Engineering Co., Syracuse, and Joseph T. Ryerson & Son Inc., Chicago; Conlon-Farnsworth Co., Syracuse, contractor.

SHAPE CONTRACTS PENDING

- 6000 tons, Basic Magnesium Corp. plant, Las Vegas, Nev.
- 3600 tons, including 2500 tons for perstocks and 1100 tons for powerhouse, Fort Peck dam, Montana; bids to United States engineer, Kansas City, Mo., postponed from Nov. 21 to Dec. 12.
- 2900 tons, extension to building 199, navy yard, Boston.
- 2850 tons, airplane repair shop, unit 2, Hill Field, Utah, for war department.
- 2000 tons, estimated, tunnel shaft, Governors Island, Battery-Brooklyn tunnel, New York; bids Dec. 19.
- 1500 tons, estimated, bridge superstructure, Ashton viaduct, Lincoln-Cumberland, R. I.; bids, Dec. 10, with A-3 rating.
- 1200 tons, power house steam generating plant, Narragansett Electric Co., Westerly, R. I.
- 1010 tons, state highway bridge FAS-H-41-3, Mechanicstown, N. Y.
- 1000 tons, approaches, Hartford, Conn., bridge, state project; bids Dec. 2, with A-2 rating.
- 965 tons, state bridge, Snyder county, Pennsylvania, bids Dec. 12.
- 800 tons, addition to storage building, navy yard, Boston; Thomas O'Connor & Co. Inc., Boston, contractor.
- 800 tons, plant addition, Lyeoming Mfg. Co., Williamsport, Pa.; early action expected.
- 710 tons, bridge, Firestone boulevard, Southgate, Calif., for army engineers.
- 570 tons, Frances Cabrini Homes, Chicago, for Chicago Housing Authority; general contract to S. N. Nielson Co., Chicago; bids Oct. 15.
- 520 tons, state highway bridge FAS-SS-41-4, Felts Mills, N. Y.
- 430 tons, addition to building X-14, for Westinghouse Electric & Mfg. Co., Mansfield, O.
- 300 tons, additions and alterations, machine shop, navy yard, Portsmouth, N. H.; bids in.
- 270 tons, hangar building, for Fairchild

- Engineering & Aircraft Corp., Hagerstown, Md.
- 265 tons, auditorium, Allquippa, Pa., for board of education.
- 240 tons, sewage treatment plant, Stamford, Conn., for city.
- 224 tons, two gates, Spec. 1009, Coram, Calif., for Bureau of Reclamation; American Bridge Co., Pittsburgh, low; bids taken in Denver Nov. 18.
- 210 tons, building 42-M, for General Electric Co., West Lynn, Mass.
- 200 tons, state bridge, Pennsylvania, bids Dec. 12.
- 170 tons, four outriggers, for Tietjen & Lang Dry Dock Co., Kearny, N. J.
- 155 tons, stores, terminal building, New York, for Pennsylvania railroad.
- 145 tons, beam bridge, Ranger, N. C., for Tennessee Valley authority.
- 128 tons, state bridge over Licking river,

- Licking county, Ohio.
- 110 tons, girder span, for Denver & Rio Grande Western railroad, Clsco, Utah.
- 100 tons, three overhead bridge cranes, navy yard, Portsmouth, N. H.; Shepard Niles Crane & Holst Corp., Montour Falls, N. Y., low at \$47,585; bids Nov. 14.
- Unstated, six overhead cranes, 4000-lb. capacity each, for Puget Sound navy yard, Wash.; bids to supply officer, Nov. 27.

Reinforcing Bars

Reinforcing Bar Prices, Page 103

Expectation is that reinforcing bars will be placed on an allocation basis soon, as demand has been heavy and producers have difficulty in making deliveries to best advan-



How much Stainless could you save BEHIND THE SURFACE ?

★ You'll grant the importance of conserving strategic alloys—right now—for Defense. That fact alone makes Pluramelt a material you ought to know about.

But there's more to it than that. Many current uses of stainless steel actually need the alloy characteristics only on the surface. Such products could employ Pluramelt at a saving in first cost and fabricating cost, yet without sacrificing appearance or utility.

And there's the other side of the picture. Many products now made of common steel could be vastly improved, from

a competitive standpoint, if made of Pluramelt. You can't discount the selling appeal of a bright, lasting stainless surface!

Pluramelt is an exclusive product. It consists of a backing of mild or low alloy steel, armored on one or both sides with the proper grade of stainless to fit your conditions. It handles and works easily, is thoroughly proved in service on a wide variety of products, and cannot come apart.

We'll be glad to send you more complete data or discuss the application of Pluramelt to your products. Just mail the coupon below.



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 STEEL CORPORATION PITTSBURGH, PA.
Branch Offices in AL Principal Cities
 STOCKS OF STAINLESS CARRIED BY ALL RYERSON WAREHOUSES

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 Company _____
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tage for defense purposes. Civilian inquiries have almost disappeared and their place is taken by numerous important projects for defense. Awards are light.

REINFORCING STEEL AWARDS

2250 tons, Mill Creek pumping station, United States engineer, Cincinnati, to Pollack Steel Co., Cincinnati; Ferd J. Roberts Construction Co. and La Crosse Dredging Corp., Cincinnati, joint contractors.

1160 tons, aviation structure at Patterson Field, Dayton, O., to Pollak Steel Co., Cincinnati.

600 tons, aircraft engine supercharger plant, General Electric Co., Ft. Wayne, Ind., to Carnegie-Illinois Steel Corp., through Stone & Webster Engineering

Corp., Boston.

352 tons, bar and mesh, United States penitentiary, Terre Haute, Ind., to Truscon Steel Co., Youngstown, O.; bids Nov. 10.

350 tons, welded fabric, Bureau of Reclamation, Invitation C-42,220-A-1, Mecca, Calif., to Colorado Fuel & Iron Co., Pueblo, Colo.

280 tons, Dixie Ordnance plant, Sterlington, La., for government, to Joseph T. Ryerson & Son Inc., Chicago; M. W. Kellogg Co., New York, contractor.

244 tons, two buildings in Washington for Naval Research Laboratory, to Poliak Steel Co., Cincinnati.

200 tons, Watertown, Mass., arsenal, to Truscon Steel Co., Youngstown, O.; invitation G-832.

200 tons, including wire mesh, 58-inch

water supply pipe, Tacoma, Wash., to unstated interest; American Concrete & Steel Pipe Co., Tacoma, contractor.

115 tons, 21 culverts, R-2202, Vigo county, Indiana, for state highway commission, to Truscon Steel Co., Youngstown, O.; Putnam & Green, Ft. Wayne, Ind., contractor; bids Oct. 7.

100 tons, warm-up apron, Kessler Field, Biloxi, Miss., to Virginia Steel Co., Birmingham, Ala., through Barber Bros. Co., Baton Rouge, La.

REINFORCING STEEL PENDING

1505 tons, foundation and masonry, Bayou Sorrell lock, East Atchafalaya Basin protection levee, Plaquemine-Morgan City route, intercoastal waterway, Louisiana; bids Dec. 8, inv. 168, United States engineer, New Orleans; also 350 tons, steel sheet piling.

900 tons, power house superstructure, penstocks and surge tanks, Fort Peck, Mont.; bids to U. S. engineer, Kansas City, Mo., postponed from Nov. 21 to Dec. 12.

875 tons, including 700 tons bars and 175 tons wire mesh, Frances Cabrini Homes, for Chicago Housing Authority; general contract to S. N. Nielson Co., Chicago; bids Oct. 15.

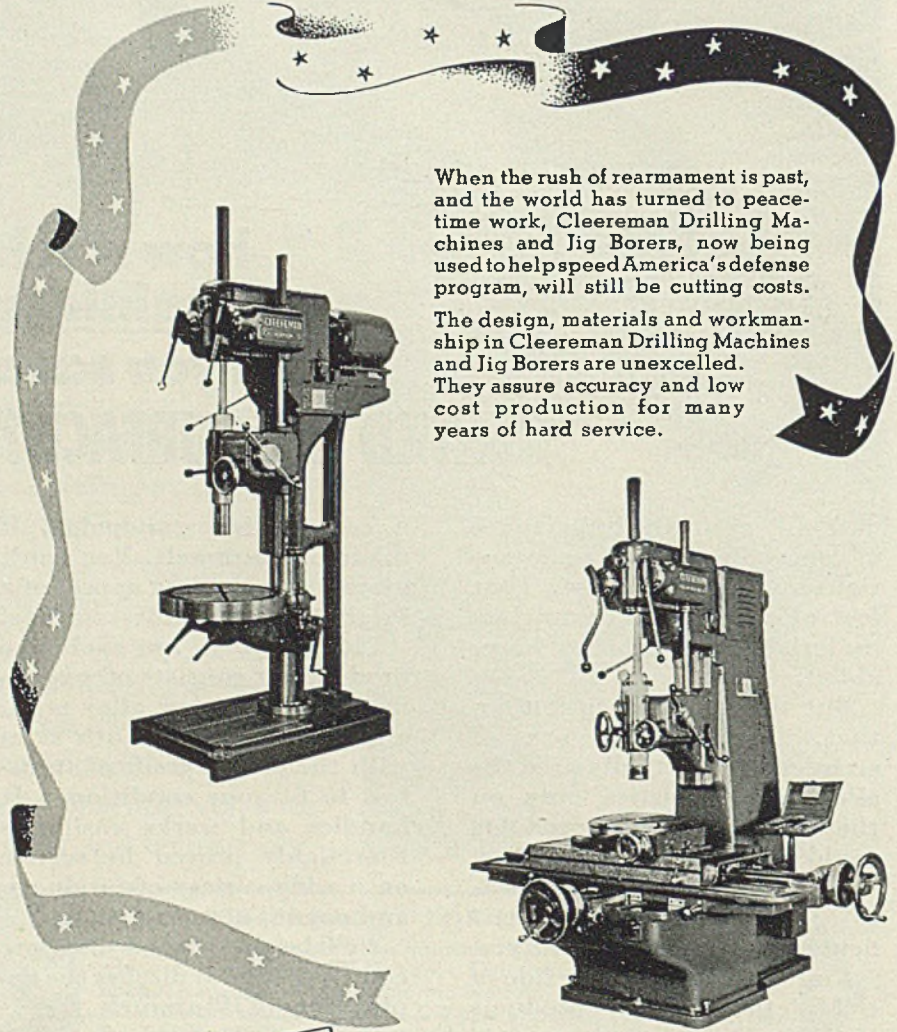
600 to 700 tons each, proposed aluminum reduction plants at Troutdale, Oreg., and Spokane, Wash.; Aluminum Co. of America, contractor.

515 tons, bar and mesh, state highway projects, including bridges, New York; bids in.

220 tons, infirmary, classroom building and boathouse, coast guard, New London, Conn.; bids Nov. 27.

130 tons, flood wall project, Mounds-Mound City, Ill., for U. S. engineer; Steers Bros., St. Louis, general contractor.

When Peace Comes ★ Cleereman Machines Will Still Be Cutting Costs



When the rush of rearmament is past, and the world has turned to peacetime work, Cleereman Drilling Machines and Jig Borers, now being used to help speed America's defense program, will still be cutting costs.

The design, materials and workmanship in Cleereman Drilling Machines and Jig Borers are unexcelled. They assure accuracy and low cost production for many years of hard service.

Pig Iron

Pig Iron Prices, Page 104

Pig iron consumers are faced by sudden interruption of shipments and consequent shutdowns if the coal strike continues sufficiently long to affect blast furnace operation. This is a result of the pig iron allocation system which has bred a feeling of security in operating without inventory, iron shipments being timed to meet needs without a protective backlog. Stoppage of shipments would bring almost immediate closing of castings production as blast furnaces reach the end of coke supply. Some relief would be provided by shipments from the pool, but this would not last long.

A new factor is appearing in the pig iron picture, possibility of shortage of iron ore. While shipments in 1941 have been the heaviest in history, consumption also has been at record rates and many observers believe stocks at the close of navigation will not be sufficient to support the present rate of consumption until navigation opens in 1942.

CONCRETE BARS COMPARED

	Tons
Week ended Nov. 22	5,851
Week ended Nov. 15	10,814
Week ended Nov. 8	18,781
This week, 1940	13,792
Weekly average, 1941	14,270
Weekly average, 1940	9,661
Weekly average, Oct., 1941	9,894
Total to date, 1940	455,462
Total to date, 1941	670,691

Includes awards of 100 tons or more.

Address
Bryant Machinery & Engineering Company
400 W. Madison St., Chicago, Ill., U. S. A.
Sales Division of
Cleereman Machine Tool Company

CLEEREMAN

DRILLING MACHINES and JIG BORERS

Some attention is being paid to the possibility of all-rail shipment but lack of sufficient cars may limit this tonnage.

Jobbing foundries in some areas, while booking substantial defense contracts, find definite lessening in small orders, normally the backbone of their regular business. They attribute this principally to growing shortage of other materials, which handicaps many customers. Some castings buyers, they say, have cut down their regular lines and are acquiring special defense machining jobs to continue operations. As a result some jobbing foundries are not operating as fully as a few weeks ago. Increasing defense tonnage may offset this decline and in some cases it has more than made up for the loss.

Consumers of charcoal iron are receiving the last shipments free of mandatory control, which becomes effective Dec. 1, under M-17 ruling. Silvery iron is not under M-17, although prices have been frozen by OPA with other grades.

Scrap

Scrap Prices, Page 106

Scrap shortage grows more acute and supplies at steel plants continue to shrink as receipts are less than consumption. Further curtailment of steel production is in sight and open hearths taken off in the past few weeks remain idle. Hope for relief by allocation offers little comfort as all districts share in the shortage and relief for one district would be at the expense of another.

Two New England consumers operating at 100 per cent have less than two weeks supply, one needing low phos scrap, which it has been able to obtain in small lots by trading other grades.

Buffalo has received another boatload from Duluth, about 5000 tons, the seventh cargo in about three weeks.

Scrap from Detroit motor plants will dwindle the remainder of this year, most large producers curtailing or closing early in December when OPM fourth quarter quotas will have been filled. Some rejections are being made, indicating an effort to observe ceiling prices and stop overgrading. Blast furnace borings and turnings are being shipped from Detroit to Buffalo by

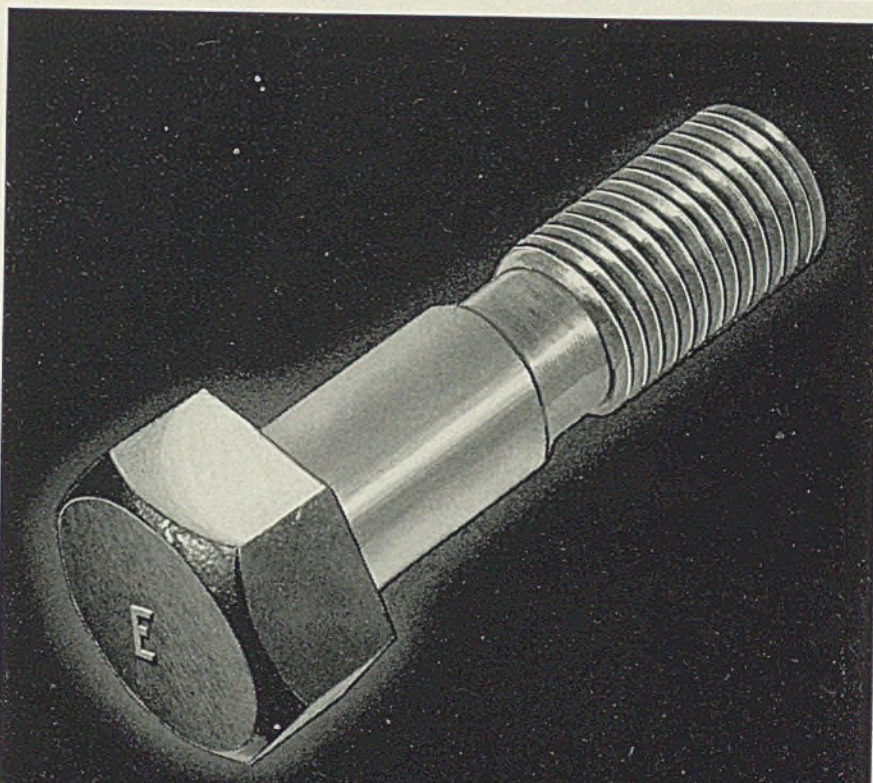
boat, these grades not being used at Detroit. The rebuilt furnace soon to be blown in there will not require additional scrap, using only ore and sinter.

Steelmakers at Chicago foresee lessened steel production before the end of the year, as scrap shortage continues. At the moment no further diversion of tonnage to other consuming centers is known but it is probable outside dealers with contracts calling for shipment there are making deliveries to points where need is greater. Ceiling prices appear to be strictly observed by Chicago district consumers.

Melters in the St. Louis area have been cramped by limited shipments

from the Southwest, where floods have prevented collections. This condition has now largely passed and with completion of harvests the flow of country scrap is expected to increase. An important consumer in that district has obtained sufficient tonnage for the remainder of this month after being near to closing.

Some foundries are able to continue operations on material delivered in truck lots by collectors working in the vicinity. This has a tendency to limit supply to larger melters buying in carloads, the scrap being delivered without moving through yards. This method of buying is accompanied by upgrad-



ERIE Bolting

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FOR EACH JOB...**



ERIE BOLT & NUT CO.
ERIE, PA.

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

ing in many instances, especially in mixed cast.

A New England cast pipe foundry is operating on a 54-hour week and would increase this schedule if more scrap were available.

Pacific Coast

Seattle — Important industrial plans are developing rapidly in this area and indicate immediate construction of aluminum reduction plants at Troutdale, Oreg., and Spokane, and a heavy forging plant at Seattle. Alcoa has the contracts to erect the plants at Troutdale and Spokane and is reported to have placed several thou-

sand tons of shapes required for the buildings with steel interests at Pittsburgh. For each of these projects between 600 and 700 tons of reinforcing bars will be required. Ross B. Hammond Co., Portland, has the contract for preliminary work at Troutdale, a \$12,000,000 project, capacity 45,000 tons annually. There will be three units, the first to be completed by May, the last by August. Plans include a carbon plant. At Spokane condemnation has been begun to acquire 640 acres for the proposed \$3,000,000 plant. A \$1,000,000 electric power station is planned as one unit.

Bids are opened here Nov. 21 by Com. T. L. Hannah, navy inspector

for the No. 2, \$2,500,000 heavy forging plant for Isaacson Iron Works on a four-acre site adjoining Boeing Aircraft Co. Plans include L-shaped, steel and frame structure, 442 x 332 feet, with exterior crane runway, offices, powerhouse, four fuel oil storage tanks, machine, forging and heat treating shops. Tools and cranes have been ordered by the navy, the latter to be supplied by Ederer Engineering Co., Seattle, and Harnischfeger Corp., Milwaukee. Bids are also in for boilers, air compressors, power rectifier, blowers and other equipment.

Puget Sound navy yard has called bids Nov. 27 for furnishing six overhead cranes.

Heavy backlogs, some as much as six months, are reported by rolling mills and fabricating shops. The present program involves adopting rolling schedules that will serve the various defense agencies to the best advantage.

Inquiry for cast iron pipe would be exceptionally strong were it not for priorities which are causing many cities to postpone projects until materials are more quickly available.

There seem to be a better understanding of regulations covering steel and cast iron scrap. The latter continues scarce and some foundries are facing difficulty in obtaining necessary supplies. Rolling mills have ample stocks of steel scrap, this grade showing heavier receipts since the recent visit to the Pacific of OPM officials.

Warehouse

Warehouse Prices, Page 105

Increased inquiry for small tonnages is coming to mills, lots normally too small for their consideration. This is an indication of the tightness of warehouse supply, which usually cares for these small orders. These inquiries carry high priorities, indicating pressing need.

Warehouses find demand for many items far in excess of stocks and consumers are forced to use substitutes in size and analysis. A large part of present warehouse service is involved in advising on this point.

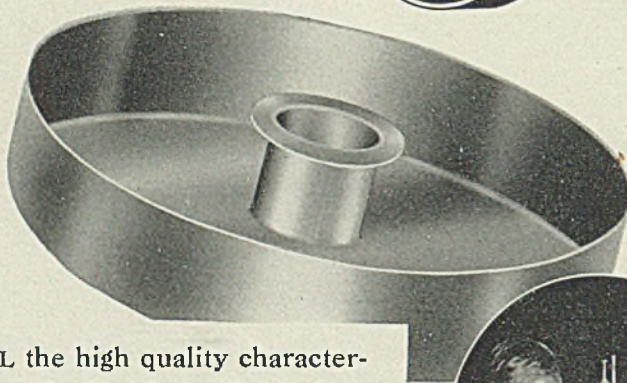
Shipments to warehouse fall far short of the quotas allowed by OPM, priority of A-9 being too low to provide tonnage in view of the heavy requirements of higher preferences.

Canada

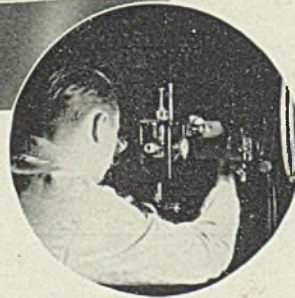
Toronto, Ont. — If Canada is to carry through its war program on the substantially broadened scale proposed by government leaders, more drastic and far-reaching compulsory measures to cut down consumption of iron and steel by non-essential industry will be unavoidable. Steel production in Canada for the current year will be more than 100 per cent greater than that of 1939 and almost 25 per cent higher than in 1940, according to an es-

RESEARCH Has Added Important Qualities to

Thomas Strip



ALL the high quality characteristics of cold rolled strip steel are amplified in Thomastrip. Structure, gauge, width, straightness, and flatness are MEASURABLE in one form or another. Therefore, through specialization, plus research based upon wide variety of experience, Thomas provides steel which is accurate to customers' specifications.



Developing Steel to Meet Individual Demands . . .

BRIGHT FINISH NOT COATED
HOT TIN COATED, ELECTRO
COATED WITH NICKEL OR
ZINC, COPPER, BRASS . .

COLD ROLLED
STRIP STEEL

THE THOMAS STEEL CO. WARREN, OHIO

Specialized Producers of Cold Rolled Strip Steel

timate by F. B. Kilbourn, steel controller. Requirements for war purposes have increased much more rapidly, and the United States, which also is faced with a steel shortage, is the main reliance of Canada for imported steel. Approximately 40 per cent of Canada's current steel requirements are being filled from the United States and arrangements are under way for further tonnage from that source.

Already government action has been taken to curtail use of steel among non-war industries. The automobile industry, makers of radios, washing machines, electric stoves, and refrigerators, have been notified that they must substantially reduce production, and action is to be taken immediately to substantially reduce output of such lines as oil tanks, hot water tanks, heating apparatus, range boilers, pots and pans, pails, cans, galvanized roofing, garden furniture, baby carriages, beds and numerous other articles.

Orders for plates are flooding the market, from a wide variety of sources, but with plate under direction of the steel controller, only the more important war industries are being provided. Rolling stock builders report some deliveries, but not sufficient to maintain anything like capacity operations. The principal call for plate is for shipbuilding.

Conditions are generally unchanged in sheets and strip. Inquiries are numerous, but actual booking are restricted to orders approved by the government. While mills are accepting some business in merchant bars, most orders are in small lots with delivery dates indefinite. Mills continue to accept orders for wire, nails, bolts, nuts and screws and report continual flow of small lot buying. Also some large orders are being received from government contractors and wire mills are being pushed to keep pace with demand.

Merchant pig iron sales show little change. Melters are pressing for delivery and there are numerous inquiries from melters that are not classed as essential producers and these are having difficulty in obtaining supplies of foundry and malleable grades.

For the purpose of more direct control of distribution of iron and steel scrap in Canada, the steel controller has ordered a license fee of \$100 for all scrap dealers. Demand is gaining and is well in excess of supply. Consumers' stocks are being reduced rapidly and supplies are not available for all current needs. Offerings are declining and dealers predict a severe shortage in both steel and iron grades for the coming year.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 103

Bolt and nut makers continue to operate at near capacity, being restricted only by quantity of steel available. Pittsburgh Screw & Bolt Co., Pittsburgh, is low on chrome nickel anchor bolts for the navy, with a bid of \$95,995.

Metallurgical Coke

Coke Prices, Page 103

Seeking to protect as far as possible against effects of captive coal mine interruption major steel producers have been buying all available coke during the past month and inventory has been increased somewhat. Shortage of hopper cars has caused shipment of considerable tonnage in gondolas, necessitating hand unloading at added expense. In spite of this effort to increase stocks, there is not sufficient coke to span any prolonged interruption in coal mining.

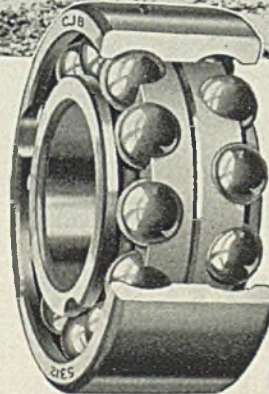
Building of by-product ovens to meet increased coke demand for new blast furnaces is proceeding on

schedule and ovens will be completed before furnaces are ready to blow in. Beehive cokemakers are receiving increased inquiries for 1942 deliveries, indicating belief that by-product supply will not meet blast furnace needs.

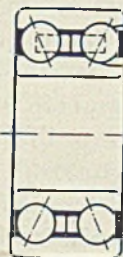
Ferroalloys

Ferroalloy Prices, Page 104

While ferromanganese sellers find demand strong, they have been able to keep up with actual needs. This may be the cause of this material not being placed under priority. No suggestion of this has been heard. The government has been keeping careful check, particularly with re-



FOR YEARS it has made no difference how "tough" the assignment, (CJB) Double Row Ball Bearings have proved that they are "Built to take it." Now—that's mighty important to designers and manufacturers of heavy equipment who are interested in ball bearings that can carry heavy radial, as well as severe thrust loads or any combination of both!



(CJB) deep-grooved races — maximum number of balls—and solid-type Ball separators—are design factors contributing to the ability of these Bearings to "take it."

Write for the new Ahlberg Catalog No. 440: it describes in detail the Double Row and other standard types of Ahlberg Bearings which are doing so much for industry.

AHLBERG BEARING COMPANY

Manufacturers of (CJB) Master Ball Bearings

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spect to inventory. Consumers with substantial stocks have been advised to limit their purchases.

These stocks have gone far toward keeping the ferromanganese situation stable to date, although it is pointed out that if they had not existed, more furnaces would have been into production, even though needed for producing pig iron. Some declare that this is already happening, as consumer stocks continue to shrink and add that as long as there is sufficient manganese ore, and there is no particular concern over this question at present, there will be sufficient supply of ferromanganese to meet all requirements.

The principal ferroalloys placed under priorities to date include

chromium, vanadium and tungsten. Ferrosilicon is being watched closely, although no priorities have been necessary.

Iron Ore

Iron Ore Prices, Page 105

October consumption of Lake Superior iron ore totaled 6,612,186 gross tons, exceeding the previous high record, 6,534,424 tons, reached in August, and well above 6,447,537 tons consumed in September. Cumulative consumption to Nov. 1 this year was 62,772,674 tons, compared with 50,280,269 tons to Nov. 1, 1940.

Ore at furnaces and on Lake

Erie docks Nov. 1 was 43,945,751 tons, compared with 40,770,029 tons a month ago and 41,125,450 a year ago. Of the total 38,852,223 tons was at furnaces and 5,093,528 tons on dock.

Steel in Europe

Foreign Steel Prices, Page 105

London — (By Cable) — War contract deliveries in Great Britain continue satisfactory and no heavy backlogs are expected at the year end. The hematite pig iron situation is slightly improved. Expansion continues in production of special alloy steels. Demand for tank plates is heavy. It is reported tin plate requirements of Empire markets are not being adequately met by American exports and the possibility is seen of supplementing them by British exports.

Equipment

Seattle—Stocks are at the lowest ebb in years, dealers being out of many items, reporting replacements extremely slow if not impossible. The market has been cleared of desirable used equipment. Public agencies are the principal buyers. Denver announces awards for important items for the Coulee power plant. Westinghouse will furnish disconnecting switches on low bid of \$158,004. General Electric circuit breakers at \$206,920, and Bowie Switch Co., San Francisco, lighting arresters, at \$148,000. Montana has completed a \$250,000 purchasing program for state highway department by awarding contracts for 63 light dump trucks, International Harvester Co., Great Falls, to furnish 21 units, others placed with motor firms in Butte, Conrad, Helena, Bozeman, Billings and Deer Lodge. King county, Washington, opened bids Nov. 21 for portable crushing and screening plant, Clallam county, Washington, has called bids Dec. 1 for power shovel and platform trailer, Pasco, Wash., Dec. 2 for pumping and meter equipment.

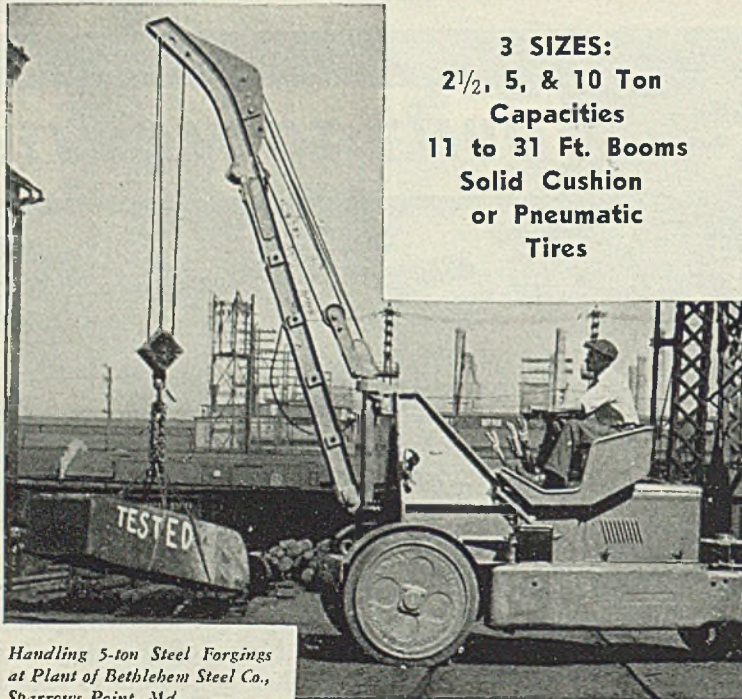
Brass Die Contract Let

Supplemental bids under schedule 6609, Bureau of Supplies and Accounts, Navy Department, close Nov. 28 at Washington on 375 tons of manganese bronze for delivery at several yards.

Among large contracts closed recently is one totaling \$1,028,595.20 to Stamford Rolling Mills Co., Springdale, Conn., for 800,000 brass dies for Frankford, Pa., arsenal at 19.72c per pound. The Springdale mill has also been awarded 259,100 feet of commercial brass strip for Frankford arsenal at 20.50c to 22.73c per pound, depending on specifications.

United Wire & Supply Corp., Cranston, R. I., for the Air Corps, has booked a \$42,233.59-order for aluminum foil, rod, sheet and

KRANE KAR SWING BOOM TRACTOR CRANE



Handling 5-ton Steel Forgings at Plant of Bethlehem Steel Co., Sparrows Point, Md.

3 SIZES:
2½, 5, & 10 Ton
Capacities
11 to 31 Ft. Booms
Solid Cushion
or Pneumatic
Tires

VITAL POINTERS TO SPEED-UP

- ➔ VISION is unobstructed
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Among the Users: Bethlehem Steel, Carnegie-Illinois Steel, American Steel & Wire, Keystone Steel & Wire, Otis Elevator, Wm. Sellers & Co., General Motors, Frost Gear and Forge, etc.

Write for Bulletin No. 55, with illustrations and specifications

SILENT HOIST WINCH & CRANE CO.
849 63rd ST., BROOKLYN, N.Y.

Nonferrous Metal Prices

Copper			Straits Tin, New York		Lead	Lead	Zinc	Alumi- num	Anti- mony	Nickel	
Electro, del.	Lake, del.	Casting, refinery	Spot	Futures	N. Y.	St. L.	St. L.	99%	Amer. Spot, N.Y.	Cath- odes	
Nov. 1-21	12.00	12.12½	11.75	52.00	52.00	5.85	5.70	8.25	15.00	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	12.50-13.50

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
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Wire

Yellow brass (high)	19.73
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OLD METALS

Dealers' Buying Prices

No. 1 Composition Red Brass

New York	10.12½-10.25
Cleveland	10.25-10.50

miscellaneous material, and Star Brass Mfg. Co., Boston, will supply pressure gage testers at \$79,230.

Nonferrous Metals

New York—Debate which is developing regarding available copper supplies may lead to a congressional investigation. In the meantime, Defense Plant Corp. is expanding metal production rapidly through lease agreements for new facilities, including copper refineries, aluminum ingot and fabricating plants, zinc smelter and magnesium plants.

Copper—Production available to consumers here is calculated at 1,800,000 tons. Neither monthly OPM questionnaires nor the recent inventory census revealed any hoarding, so far as is known publicly, despite charges appearing in two syndicated columns that the shortage is artificial. Defense Plant Corp. has closed a contract with Castle Dome Copper Co. for an electrolytic refinery in Arizona and is negotiating with Phelps Dodge Corp. for an increase of 75,000 tons of refined metal a year in the latter's facilities.

Lead—Government officials still hold to their belief that production can be increased substantially at the present price level. The trade is uncertain as to what distribution arrangements will be made for December.

Zinc—Defense Plant Corp. will provide \$4,000,000 for facilities for manufacture of slab zinc by American Zinc Co. This will raise capacity of U. S. zinc smelters to about 80,000 tons a month, a new all-time high.

Tin—London houses are making light offerings of Straits metal at the OPA maximum 52-cent level.

Light Brass	
Cleveland	6.00-6.25
Chicago	6.00-6.25
St. Louis	6.25

Lead

New York	5.25-5.50
Cleveland	5.00-5.25
Chicago	4.75-5.00
St. Louis	4.75-5.00

Old Zinc

New York	5.00-5.25
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	14.50



Electrically-controlled rolling doors made of ARMCO Galvanized ZINCGRIP-PAINTGRIP are doing their bit in Uncle Sam's fast-moving defense job. On ships, airplane hangars and in manufacturing plants rolling doors like these take a constant beating.

As it did for peace-time products (and will again), ARMCO Galvanized ZINCGRIP-PAINTGRIP assures long life and low upkeep cost for many defense applications. Here is why: The base metal is protected by three surface coatings.

First is the unique ARMCO ZINC-

GRIP coating. The zinc won't peel, even in severe forming and moderate cold drawing operations. Next is the PAINTGRIP coating which takes and preserves paint. It needs no pre-treatment. Peeling and flaking of paint is greatly retarded because the bonderized film insulates the paint from the zinc.

Now is a good time to learn how galvanized ARMCO ZINCGRIP-PAINTGRIP can help you in the design, manufacture and service of your future peace-time products. Write The American Rolling Mill Co., 3201 Curtis St., Middletown, Ohio.

ARMCO



ZINCGRIP-PAINTGRIP

Other importers have been unable to transact business since the Singapore market has remained at a relatively high price level.

Coke Oven By-Products

Coke By-Product Prices, Page 103

With the entire output of several coke oven by-products going into defense under priority ratings, continued curtailment of coking coal in captive mines will have a serious and prompt effect on the supply of by-product materials, already short for munitions, plastics and numerous other emergency requirements. This is especially true of phenol and toluol, practically all of which is allocated under priorities with little available for civilian needs. Demand for benzol and xylol are already less active.

OPA Warns Steel Men On Scrap Commissions

WASHINGTON

Steel executives in a recent conference with OPA officials in Washington, it has been learned authoritatively, have been advised against payment of certain scrap dealers' and brokers' commissions. According to an interpretation of policy in the OPA these commissions were held to be improper collections on

the part of such brokers and dealers.

It was learned that steel companies were not criticized for making the payments, it being the feeling among government officials that a misinterpretation of regulations had taken place. However, a number of practices were considered at the meeting, it has been learned, including payment of the disputed commissions and it was stated in unofficial sources that the purpose of the meeting was to clarify any further misunderstanding regarding these practices.

Seek To Stabilize Prices on Heating, Refrigerating Coils

A meeting has been called for Nov. 24 by OPA of 22 representative manufacturers and wholesalers of heating and refrigerating coils and allied products to consider restrictions on further increases in prices.

If such restriction becomes effective, it was stated, that it will cover finned coils, water heaters, radiators and convectors, unit heaters, coolers and air conditioners and heat exchangers, all used in the plumbing, heating, air conditioning and refrigeration industries. While the OPM copper curtailment order

is said to be directly responsible for this action, the proposed limitations will cover a number of products not made of copper but in the nature of substitutes. The meeting will be held in Washington.

Dealers Cautioned To Comply With Scrap Allocation Orders

Division of Priorities last week warned dealers in iron and steel scrap to comply fully and immediately with scrap allocation orders issued by OPM. The director of priorities pointed out that there are penalties in general preference order M-24 and that undue delay in making allocation deliveries could be classed as a violation under such order.

Ask Railroad Equipment Makers To Hold Prices

Manufacturers of railroad freight and passenger cars, locomotives, and maintenance of way and signal equipment were asked last week to maintain prices at the level in effect on Oct. 1 by OPA.

The OPA stated that it is studying the entire railroad equipment situation, with formation of panels of industry members under consideration as a means of further dealing with this subject. Locomotive builders and specialty manufacturers have been asked to meet with OPM officials on Nov. 25. The OPA letter extended the request to extra charges, discounts, allowances or concessions, as well as general prices. Manufacturers were requested to report any price increases that may have been ordered since Oct. 1.

President and Lewis Spar Over Coal Strike

(Continued from Page 32)

Mr. Lewis did not attend the Congress of Industrial Organization convention in Detroit, but remained in Washington.

Monday night, the steel companies announced they would attempt to operate their mines. Mr. Fairless, spokesman for the companies, said: "We are going to attempt to operate our mines. We hope our employes will see fit to do their part and produce coal for national defense.

"I sincerely hope that developments do not make it necessary for the government to operate the captive mines."

At his Tuesday, Nov. 18, press conference, Mr. Roosevelt pointedly refuted Mr. Lewis' allegation that an open shop in the captive mines would cancel the union shop agreements in the commercial mines. Authorizing the rarely permitted

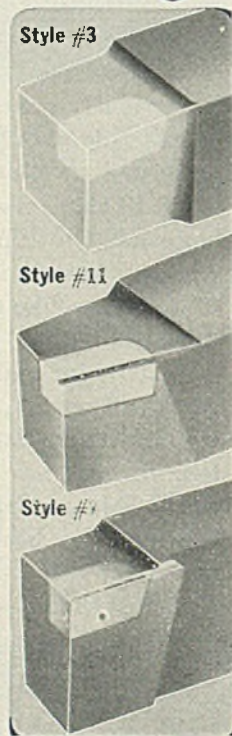
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direct quotations, the President said:

"I want to make this point perfectly clear: That the Appalachian agreement in all the commercial mines stands just as it has ever since it went into operation, and that no question involved in the captive mine strike would affect the pay, or the hours, or the collective bargaining recognition of the United Mine Workers in any of the Appalachian agreement mines.

"Therefore, I do not think that point 'A' in Mr. Lewis' letter was a valid point."

Mr. Lewis answered the President's criticism by stating: "Any suggestion that the miners would dishonor their own agreements by giving the great steel companies more favorable conditions than other companies cannot be seriously considered."

On Wednesday, the President addressed a new appeal to Mr. Lewis—the fifth—and the operators that the mines be opened. He proposed either that the closed shop issue be left at the status quo for the duration of the emergency or that the point be submitted to arbitration, with both parties agreeing in advance to abide by the arbiters' decision.

This proposal was promptly accepted by Mr. Fairless, spokesman for the steel executives.

It was coldly rejected by Mr. Lewis. Terming the President's first proposal as "an open shop proposition," the UMW chieftain said "no officer or representative of the UMW possesses any grant of authority to execute an open shop agreement for any period whatsoever."

In refusing to submit the issue to arbitration, Mr. Lewis told the President that the latter's utterances "have been so prejudicial to the claim of the mine workers as to make uncertain that an umpire could be found whose decision would not reflect your interpretation of government policy, congressional attitude and public opinion."

Mr. Lewis' appraisal of congressional attitude and public opinion, at least, appeared correct, for as the defense-hampering strike continued congressmen and the public waxed more indignant and demands for drastic action mounted.

It was well understood that the President had on his hands one of the most difficult situations he has faced in his public career—the task of subduing defiant labor factions, from whence he had obtained a large measure of his political strength. How Roosevelt would react became the biggest question of the day. In Washington it was said he would not move until after the CIO convention in Detroit had adjourned.



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Construction and Enterprise

Connecticut

FAIRFIELD, CONN.—Linley Bros. Co., 67 Montauk street, Bridgeport, Conn., has given contract for one-story, 55 x 120-foot steel plant, to C. I. Stalhammer, 329 Mapledale place, Bridgeport. Estimated cost \$40,000.

HARTFORD, CONN.—Metropolitan District Water bureau, 550 Main street, has \$2,000,000 appropriation for water supply system. C. Saville, 1026 Main street, engineer.

STRATFORD, CONN.—Vought-Sikorsky division of United Aircraft Co., has

given contract to E. Moss & Son, 555 Grant street, Bridgeport, Conn., for one-story, 75 x 177-foot plant addition, to cost about \$60,000.

New Jersey

HOBOKEN, N. J.—F. Ferguson & Co. Inc., 1122 Clinton avenue, plans foundry alterations and additions. Estimated cost \$100,000.

NEWARK, N. J.—Weber & Scher Co. Inc., 263 Sussex avenue, will erect one-story machine shop at cost of \$44,000.

PASSAIC, N. J.—Robins Conveying

Belt Co., 270 Passaic avenue, has given contract for one-story 62 x 254-foot shop addition to Mahoney-Troast Construction Co., 657 Main avenue.

New York

BROOKLYN, N. Y.—J. L. Sussman, 175 Riverside drive, New York, has plans by Frank Grad & Sons, 48 Commerce street, Newark, N. J., for one and two-story factory, estimated to cost \$65,000.

SHORTSVILLE, N. Y.—Grand Bag & Paper Co., H. Arthur Gilman, manager, will build power plant addition at cost of \$40,000.

Ohio

AKRON, O.—Work will soon start on 1100 square foot addition to Colonial Insulator Co. factory at 973 Grant street.

CLEVELAND—Barth Stamping & Machine Co., 3815 West Thirty-fourth street, will erect 40 x 80-foot machine shop and office. McGeorge & Hargett, 9400 Quincey avenue, engineers. (Noted Nov. 3).

COLUMBUS, O.—Ranco Inc., 561 West Fifth avenue, has let contract to F. Matthes, 427 East Dunedin road, for one-story steel factory unit. Cost \$40,000.

DAYTON, O.—Dayton Insulating Molding Co. has purchased a factory building at 211 East Sixth street, containing

Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 111 and Reinforcing Bars Pending on page 112 in this issue.

40,000 square feet of floor space. The company manufactures plastic parts for airplanes and automobiles.

DEFIANCE, O.—Modern Equipment Corp., M. H. Pendergast, general manager, will build an addition to its factory to provide 20,000 square feet of floor space.

EUCLID, O.—Thompson Aircraft Products Inc., subsidiary of Thompson Products Inc., Cleveland, plans further expansion of its plant to cost about \$22,000,000.

ST. MARYS, O.—Hannifin Mfg. Co., V. W. Peterson, president, 621 South Kolnar avenue, Chicago, will build one-story, 70 x 220-foot addition to plant here, costing approximately \$40,000.

WASHINGTON, O.—City, Edwin Ducey, city manager, plans sewage disposal plant, costing \$100,000. Paul A. Uhlmann, 299 South Front street, Columbus, O., engineer.

Pennsylvania

CHARLEROI, PA.—Corning Glass Works, MacBeth Evans division, Corning, N. Y., has let contract for one-story, 20 x 50-foot steel foundry addition to plant here. K. K. Knaell is Charleroi plant manager.

LATROBE, PA.—American Locomotive Co. has plans for addition to No. 2 forge shop and boring mill shop on Gertrude street. Praeck & Praeck, Martin building, Pittsburgh, architects.

MARTINSBURG, PA.—Valley Rural Electric Co-operative Inc., John Denton, manager, has REA allotment of \$218,000 to build 194 miles of rural electric lines to serve 574 customers.

WAYNESBORO, PA.—Landis Tool Co. is planning to build a foundry addition, 171 x 306 feet, costing \$450,000.

Michigan

BAY CITY, MICH.—Dow Chemical Co., Midland, Mich., has awarded contract to

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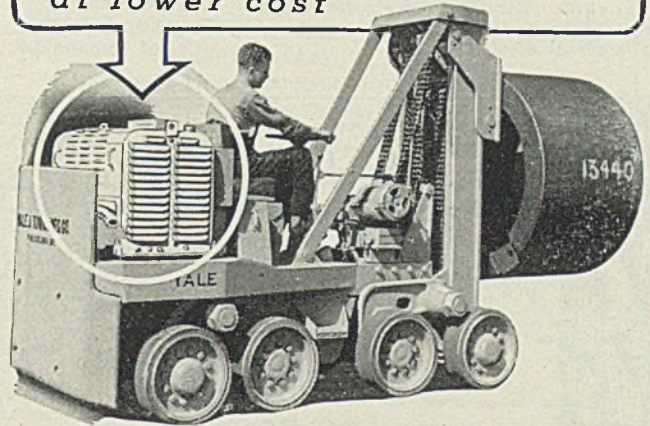
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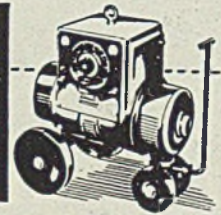
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Austin Co., Detroit, for a factory building in Bay City.

DETROIT—Vickers Inc., 1400 Oakman boulevard, is completing plans for a factory building, estimated to cost \$8,600,000.

DETROIT—Russell Engineering Corp., 607 Shelby street, has completed drawings for expansion of the plant of Continental Aviation & Engineering Corp.

DETROIT—LaSalle Tool & Gauge Co., 2830 East Seven Mile road, has awarded contract to Haberkorn-Barry Co., 2658 Porter street, for a \$31,000 factory building. H. E. Beyster Corp., architect.

FLINT, MICH.—Fisher Body Division of General Motors Corp. plans erection of a tank manufacturing plant near here. Estimated cost of land and building is about \$5,000,000.

GRAND RAPIDS, MICH.—Michigan Bumper Co. has given contract to Owen-Ames-Kimball Co., Grand Rapids, for addition to its plant.

GRAND RAPIDS, MICH.—Haskelite Corp. will build an addition to its plant costing approximately \$36,000. Owen-Ames-Kimball Co., Grand Rapids, is contractor.

Indiana

HAGERSTOWN, IND.—Perfect Circle Co. is erecting a building, 60 x 175 feet, to house the aircraft division. This is the fourth new building to be constructed by the company to provide additional space for defense contract requirements.

TERRE HAUTE, IND.—Public Service Co. of Indiana Inc., 725 Wabash avenue,

will build 50,000-watt generating unit at Dresser plant near Terre Haute; 35,000-watt unit at Edwardsport plant, and make various electric substation facility improvements.

VINCENNES, IND.—Link Engineering Corp. of Illinois, care of Vincennes Chamber of Commerce, is remodeling buildings here, to cost over \$40,000, with equipment.

WHITING, IND.—Standard Oil Co. of Indiana, 910 South Michigan avenue, Chicago, plans three-story, 60 x 150-foot refinery. Cost estimated at \$100,000.

Illinois

BLOOMINGTON, ILL.—City will make waterworks improvements and extensions costing \$1,254,000. Warren & Van Praag Inc., Standard Office building, and I. Wollmann, Unity building, Decatur, Ill., associate engineers.

CHICAGO.—Wire Sales Inc., 4712 Roosevelt road, will build one-story, 105 x 160-foot factory, costing \$50,000. Contract awarded to A. E. Nelson, 1244 East Seventy-ninth street.

CHICAGO.—R. Krasberg & Sons Co., 925 Wrightwood avenue, has given contract for one-story, 82 x 187-foot factory to A. E. Nelson, 1244 East Seventy-ninth street. Cost \$50,000. Engineering Systems Inc., 221 North LaSalle street, architect.

EAST ST. LOUIS, ILL.—Wescott Valve Co., 2133 Bond avenue, will begin work soon on erection of \$3,000,000 government plant for manufacture of steel castings and valves for the Navy. The new factory, to be built on a 15-acre tract at 4200 Bond avenue, will include a steel foundry, machine shop and testing laboratory.

Maryland

BALTIMORE—Scully Steel Products Co., 1600 Bush street, has let contract to H. J. Dudley, 102 West Chase street, for a one-story 50 x 120-foot warehouse to cost \$40,000.

BALTIMORE—Defense Plant Corp. has authorized lease agreement with Bendix Aviation Corp. for construction and equipment of plant to be used in manufacture of aircraft equipment. Total cost estimated at \$380,715.

Kentucky

LEXINGTON, KY.—Kentucky Electric Generating Co. will construct a 25,000-kilowatt electric power plant.

WINCHESTER, KY.—Clark County Rural Electric Co-operative Corp., T. E. Steele, superintendent, plans \$2,000,000 generating plant and transmission system.

West Virginia

CHARLESTON, W. VA.—Defense Plant Corp. has allotted \$3,500,000 for construction of plant here to be operated by Carbide & Carbon Chemicals Corp., 30 East Forty-second street, New York.

WHEELING, W. VA.—Continental Roll & Steel Foundry Co. is taking bids for erection of manufacturing plant here. James Thomson, Railroad avenue, East Chicago, Ind., is company engineer.


Missouri

KANSAS CITY, MO.—Corn Products Refining Co., 1001 Bedford street, maker of starch, dextrine, etc., will install motors and controls, switchgear, conveyors and other power equipment in additions to local mill. Will also expand power plant and install 4000-kilowatt turbine generator unit and accessories, and boilers. Entire project will cost over \$2,000,000. Main office of company is at 17 Battery place, New York.

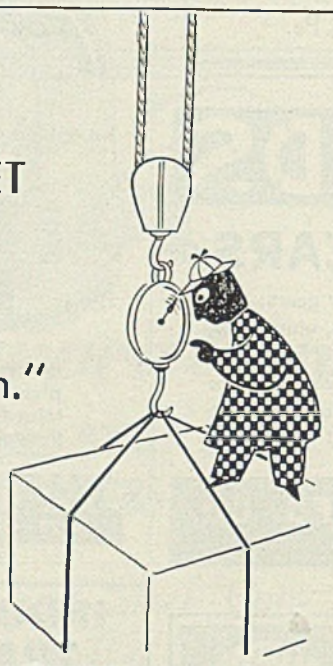
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Inc., 504 South Broadway, is taking bids for one-story factory building, 63 x 125 feet. Emil H. Niemann, 3816 Shaw avenue, architect.

Arkansas

PINE BLUFF, ARK.—War Department, Washington, has selected Sanderson & Porter, 52 William street, New York, as architects, engineers and general contractors for construction of incendiary bomb plant here. (Noted Nov. 10).

Minnesota

MINNEAPOLIS—Dayton Rogers Co., 2830 Thirteenth avenue, plans erection of factory, costing about \$75,000.

Texas

DAINGERFIELD, TEX.—Texas Iron, Steel & Coke Co., care of W. O. Irving,

president, Daingerfeld, plans iron ore smelting reduction plant between here and Hughes Springs. Estimated cost \$28,000,000.

GALVESTON, TEX.—Monsanto Chemical Co., 1700 South Second street, St. Louis, will build plant near here for manufacture of chemical products in connection with production of synthetic rubber. Cost estimated at \$2,200,000.

HOUSTON, TEX.—General Metals Corp., Liberty and Homestead road, has let contract to Peden Iron & Steel Co., 700 North San Jacinto, for construction of an 80 x 90-foot saw-tooth-type building to house die shop and inspection department.

SUGAR LAND, TEX.—Sugar Land Industries will take bids soon on one-story 65 x 100-foot and 30 x 70-foot machine shop and garage.

Utah

MT. EMMONS, UTAH.—Moon Lake Electric Association Inc. plans additional generating facilities and power plant, for which REA has allotted \$50,000. E. D. Conklin, superintendent, Mt. Emmons.

California

BERKELEY, CALIF.—Pacific Steel Castings Co., 1316 Second street, will build plant, to cost over \$40,000.

LOS ANGELES—American Screw Products Co. will build an addition to its plant at 7000 Avalon boulevard, to cost approximately \$15,000.

LOS ANGELES—Phelps-Dodge Copper Products Corp., 40 Wall street, New York, has plans for erection of condenser tube plant on a 41-acre site on Gaillard avenue, here. The plant will cover an area 250 x 750 feet.

LYNWOOD, CALIF.—Western Gear Works of California, 11183 Long Beach boulevard, is preparing plans for construction of factory and office building to cost \$130,000. B. B. Bannon is manager.

OAKLAND, CALIF.—Vulcan Foundry Co., 4401 San Leandro street, has awarded contract for foundry additions, costing about \$40,000.

SAN JOSE, CALIF.—Continental Can Co., Eighth and Taylor streets, has awarded contract for can manufacturing plant to Austin Co., Ray building, Oakland, Calif. Cost \$280,000.

STOCKTON, CALIF.—Star Engineering Co., newly organized, will build a \$6,500,000 shipyard, with seven ways. B. J. Klarman is president.

TORRANCE, CALIF.—National Supply Co. has awarded contract to Pacific Iron & Steel Co. for structural work on a \$265,000 forge and machine shop building adjoining its plant at Carson and Border avenue, part of a \$2,300,000 expansion program.

Oregon

BANDON, OREG.—Moore Mill & Lumber Co. is erecting a building and plans installation of planing mill machinery.

TROUTDALE, OREG.—RFC has purchased a 590-acre site here, and Aluminum Co. of America, it is reported, will design, build and operate an aluminum plant. T. B. Parsons, construction engineer for the company, will be in charge. (Noted Sept. 22).

Washington

SEATTLE—Cunningham Steel Foundry Co., 4200 West Marginal way, plans plant alterations and expansion.

TACOMA, WASH.—Thomas W. Simmons and associates, Los Angeles, have purchased the Pacific Iron & Steel Works here, and plan to increase facilities.

Canada

HAMILTON, ONT.—Canadian Westinghouse Co. Ltd., 288 Sanford avenue North, is taking bids through Utton & Souter, Pigott building, for further addition to its plant, to cost about \$50,000.

LONDON, ONT.—James Carson & Sons, 342 Ridout street, plans erection of machine shop at 54 York street, to cost about \$50,000, with equipment. Bids will be called early in December.

MERRITTON, ONT.—Alliance Paper Mills Ltd. will build further additions to plant here, for which Redfern Construction Co. Ltd., 36 Toronto street, Toronto, Ont., has general contract. Building to cost \$100,000 and equipment \$150,000.

MIDLAND, ONT.—Canada Steamship Lines Ltd., 715 Victoria square, Montreal, Que., plans to rebuild power plant here at cost of about \$50,000, including equipment.

ST. CATHARINES, ONT.—St. Catharines Steel Products, Vine street, is having plans prepared by A. E. Nicholson, 46 Queen street, for second addition to plant to cost \$50,000 with equipment. J. R. Stork, R. R. No. 4, has general contract.

TORONTO, ONT.—Mine Safety Appliance Co. of Canada Ltd., 637 Craig street West, Montreal, Que., has acquired building at 130 Kendal avenue, here which will be equipped for manufacturing purposes.

WALKERVILLE, ONT.—Studebaker Corp. of Canada Ltd., 508 Walker road, will make alterations to plant here and add equipment to cost about \$25,000.

WESTON, ONT.—Massey-Harris Co. Ltd., 915 King street West, Toronto, Ont., will build one-story aircraft assembly plant on Main street North, to cost about \$125,000. A. W. Robertson Ltd., 57 Bloor street West, Toronto, awarded general contract.

WINDSOR, ONT.—Long Mfg. Co. Ltd., 2744 Edna avenue, plans erection of plant addition to cost, with equipment, about \$70,000.

WINDSOR, ONT.—Canadian Motor Lamp Co. Ltd., 2429 Seminole street, will build plant for manufacture of shell cases, etc., to cost about \$1,000,000. Plant will be financed and constructed by Department of Munitions and Supply, Ottawa, and H. H. Turnbull, secretary, is receiving bids.

TRENTON, N. S.—Nova Scotia Steel & Coal Co. Ltd. will rebuild section of steel plant destroyed by fire at cost of about \$100,000, with equipment.

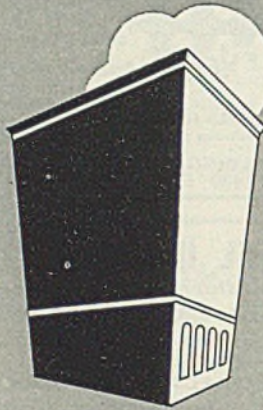
MONTREAL, QUE.—Victory Tool & Machine Co., 250 Rose de Lima street, will build plant addition, 48 x 80 feet, to cost about \$15,000, equipment extra. Paul M. Lemieux, architect, is preparing plans.

MONTREAL, QUE.—Canadian Car & Foundry Co. Ltd., 621 Craig street West, will call bids soon for another addition to its plant on St. Patrick street, to cost about \$75,000. Plans being prepared by Spence, Mathias & Budge, Union avenue.

QUEBEC, QUE.—Morton Engineering & Drydock Co. Ltd., Louise Embankment, has started work in connection with extension to drydock and engineering plant to cost \$200,000 and has given general contract to Mathieu & Sylvain, 44 Ste. Ursule street.

SHAWINIGAN FALLS, QUE.—Shawinigan Chemical Co. Ltd. will build addition to foundry to cost with equipment, about \$60,000.

WAKEFIELD, QUE.—Aluminum Co. of Canada Ltd., 1155 Metcalfe street, Montreal, Que., will build brucite renning plant here to cost approximately \$125,000, and has given general contract to Anglin Norcross Corp. Ltd., 892 Sherbrooke street West, Montreal.



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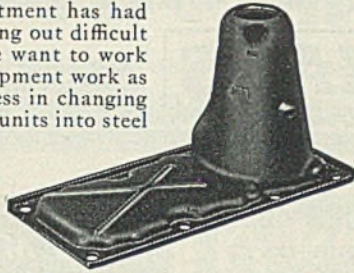
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