Published by The Penton Publishing Co., Penton Building, Cleveland, Ohio. E. L. Shaner, President and Treasurer; G. O. Hays, Vice President; F. G. Steinebach, Secretary.

Member, Audit Bureau of Circulations; Associated Business Papers Inc., and National Publishers' Association.

Published every Monday. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $6; two years $10; all other countries, one year $12. Single copies (current issues) 25c.

Entered as second class matter at the postoffice at Cleveland, under the Act of March 3, 1879.

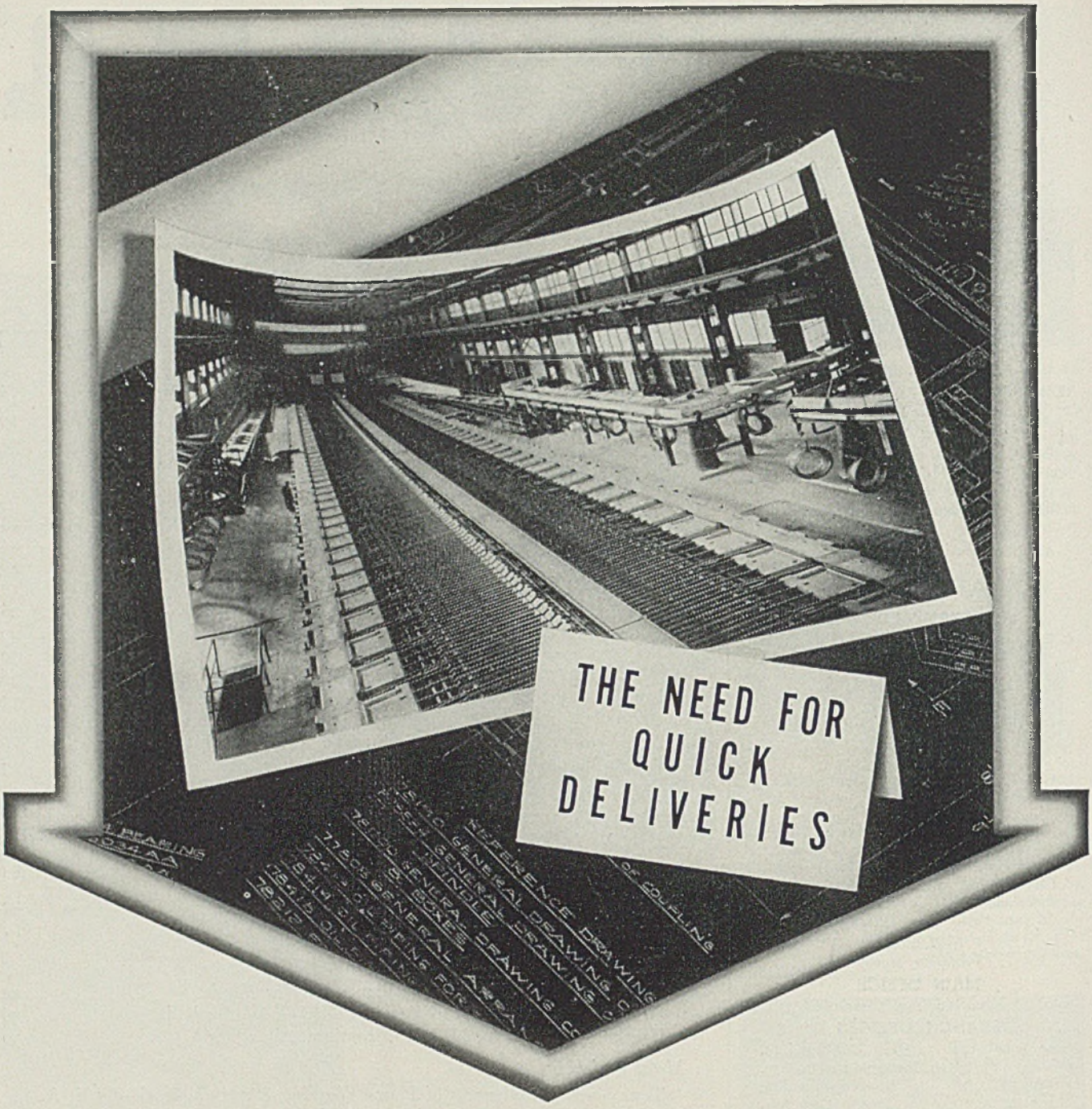
STEEL

ESTABLISHED 1882

Contents

Volume 110—No. 6 **February 9, 1942**

PRODUCTION • PROCESSING • DISTRIBUTION • USE



ROLLING steel is a *continuous* process, from soaking pits to cooling bed—from reheating furnace to storage bins. Quick deliveries all along the line mean *quicker* deliveries to freight cars—to customers—to profits.

Perfect co-ordination is written into the plans and specifications of all Morgan Mills. May we help you?

MORGAN
WORCESTER
ENGINEERS AND
MANUFACTURERS

MORGAN CONSTRUCTION COMPANY • WORCESTER, MASSACHUSETTS

R-97

HIGHLIGHTING THIS ISSUE OF STEEL

■ CESSATION of passenger car production brings the realization (p. 39) that the automobile industry is no more. Work already is in full force in converting it to 100 per cent war footing, without taking time out to worry about the long-range future. Detroit sees a big job ahead and proposes to do it. Eventually the industry expects to employ women in large numbers on war production due to scarcity of man power . . . Much progress is reported by William H. Harrison (p. 23) in making machine tools and cutting tools available in larger volume; revision of the Iron and Steel Products Price Schedule is expected to eliminate past confusion; the revisions cover principally dislocated tonnage and extras.

• • •

Use of bonderized black plate for can ends in place of tin plate bids fair (p. 103) to become general . . . Prices on oil field equipment (p. 34) are to be stabilized; price ceilings now apply on noncommercial radio and television sets, phonographs and radio tubes and parts, nonferrous castings, carbon tetrachloride; tire retread machinery will be rationed; steel barrel price schedule has been modified; priorities compliance is being checked . . . Second-hand machine tools are under priorities (p. 35); slab zinc prices are frozen; a new brass ingot price list is announced; zinc pool requirements for February are larger . . . Exporters have relief (p. 37) on iron and steel prices.

Ceiling on Radio Sets

• • •

Priority ratings may be extended (p. 46) by simple endorsement; maintenance steel has been allocated (p. 47) for the railroads . . . Pig iron users must file PD-70 (p. 31); consumers operating under the Production Requirements Plan may extend AA ratings without special permission; P-8, P-20 and P-21 are interpreted; railroad specialty prices are fixed; cobalt in all forms is under complete allocations . . . Industry is legally safeguarded (p. 32) from antitrust suit as a result of entering price agreements with the government; practically all priority forms and orders now may be reproduced; producers of conveying and auxiliary equipment may benefit under PRP, also industrial repair shops; chromium is under complete allocations . . . Demands for stiff wage increases are being pressed more widely (p. 21).

Priority by Endorsement

• • •

Instead of allowing small plants to close or run at half speed on their usual civilian production, as we are doing, Britain has learned how to put to use every bit of production capacity to get out needed war work. A. J. Liebling tells (p. 54) how he saw the system operate recently. . . . E. A. Tice describes (p. 64) a series of tests which reveal the effectiveness of flame cleaning as a method of preparing structural steel for paint. . . . The American Iron and Steel Institute's committee reports (p. 70) on possible alternates for nickel and chromium in alloy steels. . . . Improved service life accompanies lower cost of fluorescent lamps (p. 98).

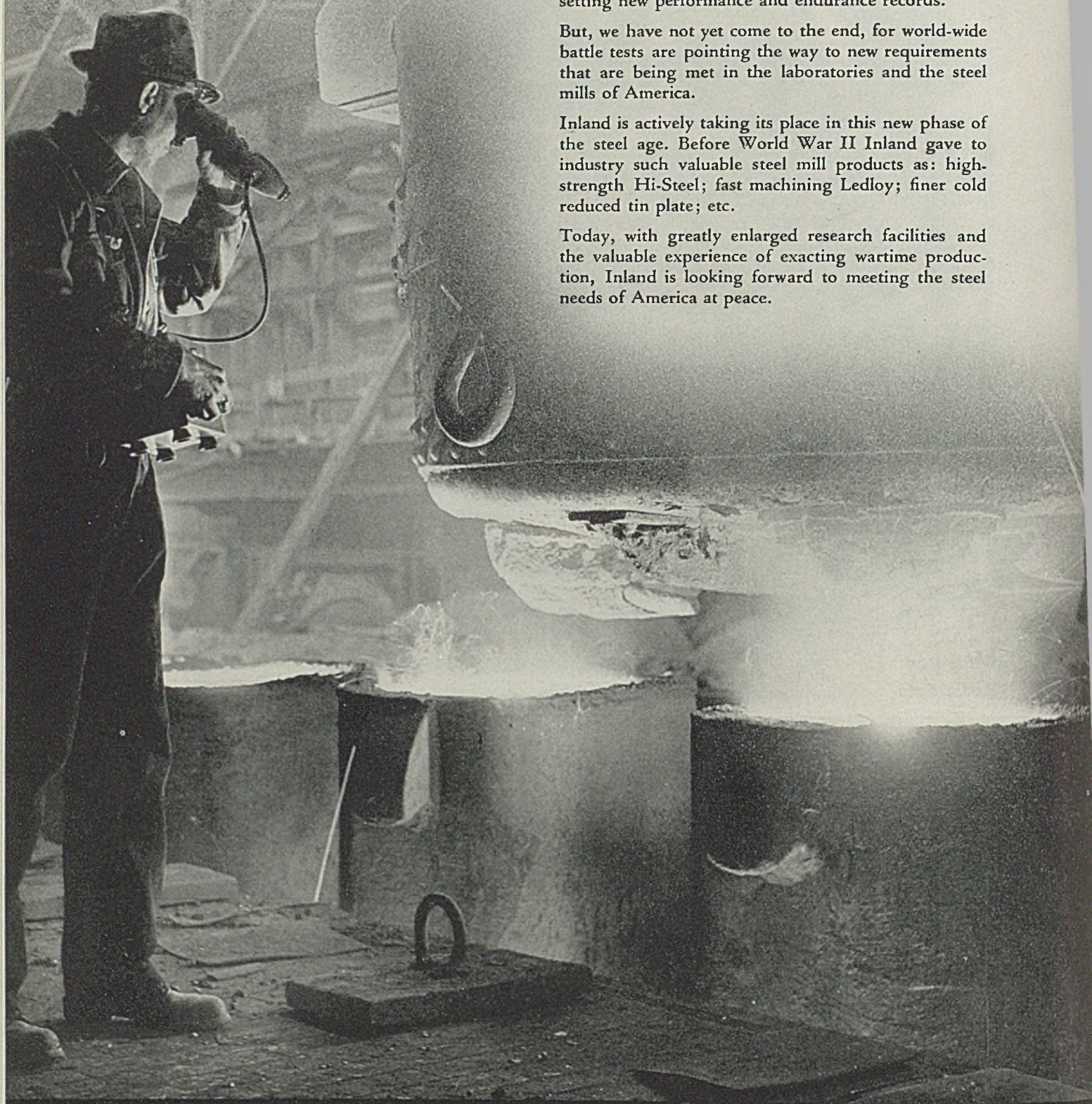
"Bits-Pieces" In Britain

• • •

Structures and properties of forgings are analyzed (p. 56) by STEEL'S engineering editor. G. W. Birdsall, in the first of a series on forgings, forging practice and forging equipment. . . . C. L. Peterson presents details of the mechanical materials handling equipment that is helping to build machine tools faster at the Warner & Swasey Co.'s plant. . . . In Section II of his series on how to get the most from arc welding, E. W. P. Smith tells when, where and how (p. 76) to weave the welding electrode. . . . F. C. Wood explains (p. 86) the advantages of drying air for blast furnace use and describes modern types of air-conditioning equipment designed for this work.

Forgings Are Analyzed

Better Steels Are Coming— from the Tests of War



Out of today's grueling war tests are coming better steels for tomorrow. In Britain, Russia, North Africa, and the Far East equipment built of American steel is setting new performance and endurance records.

But, we have not yet come to the end, for world-wide battle tests are pointing the way to new requirements that are being met in the laboratories and the steel mills of America.

Inland is actively taking its place in this new phase of the steel age. Before World War II Inland gave to industry such valuable steel mill products as: high-strength Hi-Steel; fast machining Ledloy; finer cold reduced tin plate; etc.

Today, with greatly enlarged research facilities and the valuable experience of exacting wartime production, Inland is looking forward to meeting the steel needs of America at peace.

INLAND STEEL CO.

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

Unions Extend Pressure For New Wage Increases; Other Concessions Asked

War Labor Board studies UAW demand for $1 a day advance, union shop from General Motors Corp. . . . Labor protected by new price control law prohibiting ceilings over wages

■ PRESSURE for new wage increases and other concessions are being exerted by union leaders in the metalworking industries on an increasingly wide front.

The demands generally are for a straight $1 a day increase and for no easing in the time-and-a-half and double time payments for overtime. They come on the heels of enactment of the emergency price control measure, which specifically exempts wages from its control, and at a time when industry is attempting to attain 'round-the-clock production of war materials. Such continuous operations necessarily require Saturday, Sunday and holiday work, with a resulting automatic increase in wage costs.

Studies of increases in wage and in living costs since the emergency began reveals no justice in the new wage demands. The steel industry, for example, granted a 10-cent hourly increase in April. The increase now asked, if granted, would mean a total increase in *hourly rates* of 36 per cent since last spring. Living costs, meanwhile, have advanced only about 8 per cent.

This computation does not take into consideration the longer work week now prevalent in most industries, nor the inflation in *average hourly* rates due to overtime payments.

That the steel industry could absorb the increases asked, even at peak operations, without an upward adjustment of prices of steel products is extremely doubtful. E. G. Grace, Bethlehem Steel Co. president, in presenting the financial report for his company for the last quarter of 1941, produced figures to show that had the $1 a day increase been in effect during that period the increase in wage costs would have exceeded company's total net profit.

Despite the economic aspects of the situation, however, union leaders have shown every inclination to take advantage of the emergency to gain all possible advantages. Union leaders, with management, have pledged to avoid strikes and to settle all controversies by peaceful means, which means the issue sooner or later will be dumped into the laps of members of the War Labor Board.

Board Studies GM Case

The board in fact already has under advisement the demands of the United Automobile Workers-CIO against General Motors Corp. The board's intervention was asked both by management, now struggling with the problem of converting facilities to continuous munitions production, and the union.

Union's demands include: (1) $1 a day increase; (2) union shop provision; (3) revision of seniority provisions; (4) extension of powers of impartial umpire to permit him to rule on and interpret all contract provisions; (5) $100 defense bond to all employes in lieu of vacations with pay; (6) union plant defense and antisabotage committees in all plants.

In Pittsburgh last week it was stated that wage increases will be asked of steel producing and metalworking companies by the Steel Workers Organizing Committee within the next few weeks.

Although as yet no steel producer is paying common labor more than the $5.80 per day base established in April, 1941, some smaller fabricators have already met demands of the union for higher rates all along the line. This action has been most prevalent on the West coast, where labor shortages have pointed the way for union demands.

Current negotiations between SWOC and the independent steel producers are being watched carefully. SWOC is asking a flat $1 per day increase, departing from the usual custom of asking an hourly increase. The increase brings the total up to $6.80 per day, or 85 cents per hour, an increase of 12½ cents.

On two previous occasions the union has won increases, each ten cents per hour. The first came when the initial contract was signed with the United States Steel Corp., on March 16, 1937, raising the rate from $4.20 to $5 per day, or from

52½ to 62½ cents per hour. The second increase came April 14, 1941, when the new contract became effective, and established a base of $5.80 per day, or 72½ cents per hour.

Demand for $1 a day wage increase has been asked by SWOC at the National Tube Co., United States Steel Corp. subsidiary, according to Thomas Pycrat, secretary of the SWOC local at Lorain, O.

Contract negotiations between the Bethlehem Steel Co. and SWOC were broken off last week in New York, according to James F. Dewey, federal labor conciliator. Involved in the negotiation were 90,000 workers. The SWOC asked for $1 a day wage increase.

Gary Tin Plate Reckoners Discontinue Slowdown

Slowdown of 80 reckoners, who count, weigh and bundle tin plate in the sorting and shipping department of the Gary, Ind., tin mill, Carnegie-Illinois Steel Corp., thereby forcing layoffs of 1900 employes, ended with the morning shifts, Feb. 4. Failing to obtain a settlement with company officials early in the week, SWOC officials ordered the reckoners to resume normal operations while the appeal for higher wages is carried to the top management.

Slowdown started Jan. 29 and by end of that week production of tin plate had been cut in half, forcing suspension in tinning operations. Product being made was essentially for cans, but part of it was for the government for shell packing cases.

Reckoners are paid a base rate of $7 per day and their average rate in wages and incentive payments is $11.60 on a scale at $1.88 for each box of 107 pounds handled, and because the government order entails handling boxes weighing 135 pounds they demanded an increase in the incentive rate.

Plant of American Car & Foundry Co., in Madison, Ill., which builds freight cars, has been closed by a dues collection strike started Feb. 2 by 1200 members of the AFL Brotherhood of Railway Carmen. A company spokesman stated the walkout violates a no-strike clause in the union's contract and that the agreement does not provide a closed shop.

Strike by 7000 workers of the Bendix Products division, Bendix Aviation Corp., South Bend, Ind., was averted by the acceptance by UAW-CIO of a wage agreement granting increases ranging from 5½ to 10 cent san hour.

Steel Industry's Annual Payroll $1.3 Billion

■ December steel employment rose to 646,000, compared with 645,000 in November, according to the American Iron and Steel Institute. December, 1940, employment was 585,000.

The industry's payrolls amounted to $117,221,000 in the month, bringing the 1941 total to $1,301,348,000, a gain of nearly 35 per cent over the 1940 total of $960,779,000. Payrolls in November amounted to $109,856,000, and in December, 1940, to $91,233,000.

Wage-earning employes averaged 99.9 cents an hour in December, against 99 cents in November, and 86.5 cents in December a year ago. Throughout 1941, hourly earnings averaged 95.9 cents, compared with 85 cents in 1940.

Hours worked in December averaged 38.2, against 37.6 in both November and December, 1940.

AFL and CIO Organize Joint War Labor Board

Leaders of the American Federation of Labor and the Congress of Industrial Organizations have formed a joint war labor board at the President's request to consult with the Chief Executive on all matters pertaining to labor's participation in the war. First conference of the new board and Mr. Roosevelt was held last week at the White House.

Members of the board: William Green, AFL president; George

(*Please turn to Page* 119)

"White-Out" Protects Location of Atlantic Coast Units

■ Antiaircraft gun units on the Atlantic coast are on the alert for Axis raiders. Note the background has been blocked out to prevent disclosure of location. NEA photo passed by U. S. Army censor

Machine Tool "Bottleneck" Being Widened, Harrison Advises WPB

WASHINGTON

■ REPORT indicating the machine tool "bottleneck" is being widened by greatly increased building of new tools and wide-scale use and interchange of existing tools by such groups as the automobile industry has been made to the WPB by William H. Harrison, director, Production Division.

In round figures, Mr. Harrison reported, the 1942 requirements for machine tools and related metal working machinery are about $2,000,000,000. The 1941 output, he said, was $840,000,000 and present production is at the annual rate of $1,100,000,000.

"A total of two billions for the year," he said, "seems reasonable of attainment." He emphasized, however, that the problem is not overall production for the year, but rather the matching of available tools and work in the early months so that production schedules can attain high levels essential to 1942 objectives.

In making the first report of the machine tools situation since the creation of the WPB, Mr. Harrison stated that the direction of the work of the tools branch has been re-organized and that the personnel under the new chief, George C. Brainard, appointed Jan. 1, is being strengthened.

To match machines and requirements, Mr. Harrison listed several moves that are "aggressively under way."

These included:

Personal discussion of individual production problems with substantially every machine tool builder in the country.

Finding new producers and subcontracting parts and complete machines.

Sustained emphasis on more extensive use of used tools including certain types, particularly critical, shipped from England.

Simplification of sizes and designs.

Proper planning and effective use of tools available.

"With the establishment in the field of conversion groups like the automotive group in Detroit," Mr. Harrison reported, "greater use and interchange of existing tools between companies is being effected. There will be extension of this to other fields. The underlying approach is to bring the work to the tools and these possibilities are to be exhausted before moving tools."

One particular problem being solved is that of expanding the production of perishable cutting tools such as twist drills, reamers, milling cutters, hobs, broaches, taps and turning tools.

"Production of these tools in 1941 totaled $160,000,000," Mr. Harrison said. "Expansion now under way will provide an output of $260,000,000 in 1942. To meet the needs of the new program additional expansion will be necessary, bringing the total to $360,000,000 this year.

"Expansion is selective, so that capacity to make certain types of tools is being increased in far greater proportion than others, depending on their probable usage in the war program. Similar activities are under way in relation to cranes, bearings and other equipment.

"We anticipate that machine tools to meet 1942 requirements will be obtained by co-ordination and combination of the various activities under way—maximum output of new machines, through fullest use of existing facilities; limited expansions; subcontracting; new sources of manufacture; effective use of used and existing tools; further simplification of sizes and designs; proper planning and effective use of tools available and a full order board of work for manufacturers throughout the year.

"During the past 60 days substantially every machine tool builder has had placed before him the broad outline and many of the details of what is expected of him. This has been done through group meetings followed by personal discussion and examination with the manufacturer in each instance by the head of the Tools Branch and myself—by field visits one or more times to each plant by our engineers."

General Electric Halves Gear Cutting Time

■ By subcontracting most of the foundry and machine work, General Electric Co. reports it is "halving the 18 months' time it previously needed to build a 200-inch diameter hobbing machine to cut low-speed gears for cargo ship propulsion sets."

Production of the major parts for the machine is by 12 separate subcontractors in five states, and the miscellaneous parts manufacture is parcelled out to 38 firms in seven states. Two foundries, one in Virginia and the other in West Virginia, cast the major parts. One of these foundries, plus a Navy yard, a Pennsylvania construction company, a shipbuilder, and a machine tool builder take care of the annealing. Rough machining is handled by one Navy yard, a steel mill, and a locomotive manufacturer. Two Navy yards, a third foundry company, a second shipbuilder, a manufacturer of safes, the steel mill, and the locomotive firm do the finish machining.

Gear Manufacturer Building New Plant

■ Foote Bros. Gear & Machine Corp., Chicago, will begin immediately to construct a $2,200,000 government-financed plant to increase production of precision gears, pinions and parts for aircraft engines. It will be the company's second expansion within 12 months.

The plant will be built adjacent to the company's present industrial gear unit at 5301 South Western boulevard, and will have 100,000 square feet of floor space. It will be windowless. Completion is scheduled for May, with operations to start by year-end. The plant is to be built and equipped by the Defense Plant Corp. and leased to the company for an indefinite period.

Iron, Steel Price Schedule Revised

WASHINGTON

■ Iron and Steel Products Price Schedule No. 6, covering sales of iron and steel products, has been revised. Reissuance and revision of the schedule, which was one of the earliest OPA orders, brings it in line with forms set up in later price schedules.

Present revisions will smooth out some clauses of the price schedule which have caused interpretative difficulty. Principally, the definition of dislocated tonnage has been clarified. Widespread misunderstanding of the clauses in the price schedule which permit the use of the basing point closest to the mill has made clarification necessary. OPA emphasized that only tonnage which is genuinely "dislocated" as a result of the war effort may be so priced.

Clarification of the extra provisions of the price schedule also has been made. The industry's understanding with regard to charging of extras has conflicted, in some cases, with that of OPA.

■ Orders received by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., during 1941 amounted to $582,808,634, compared with $400,477,724 in 1940, an increase of 46 per cent. Unfilled orders Dec. 31 totaled $419,550,654, compared with $223,685,737 at the end of 1940, a gain of 88 per cent.

Steel Producers Asked To Persuade Plate Users To Alter Specifications

WASHINGTON

■ STEEL industry must take the lead in getting users of steel plate to change design to take advantage of added capacity from strip mills, C. E. Adams, chief of WPB Iron and Steel Branch, told the Steel Industry Advisory Committee last week.

A report on plate production was presented to the committee by J. V. Honeycutt and J. L. Block, executive consultants, as the result of a recent survey of the entire industry.

The industry has, at present, capacity to produce 932,100 tons of plate a month, the survey revealed, coming from 77 mills.

These comprise 28 sheared plate mills with a total monthly capacity of 401,100 tons; 22 universal plate mills with a total monthly capacity of 125,000 tons, and 27 strip mills with a total monthly capacity of 406,000 tons.

Rated capacities were predicated on an average range of orders and on present shearing and other finishing facilities. Furthermore, due allowance was made in certain instances for other important steel products urgently needed in the war program and produced on the same equipment.

Included in the strip mill tonnage are ten wide continuous strip mills, operated by nine companies, all of which can produce plates up to 72 inches wide, and three of which can produce plates up to 90 inches wide. The combined monthly plate capacity of these ten mills is 303,500 tons. Maximum thicknesses produced on these mills vary from ⅜ to ¾ inches.

Sheared Plate Capacity

Among the sheared plate mills there are only 13 operated by eight companies, which can produce plates 90 inches and wider, more than ¾ of an inch thick. The combined plate capacity of these mills is 227,300 tons per month.

It is in the last mentioned category that there appears to be the greatest demand for plates for the war program. It is, therefore, essential that no plates be produced in these mills which can be rolled on other mills and that, to the greatest extent possible, requirements be redesigned to permit their production on the strip mills.

There is now under construction additional capacity which will be available at various times throughout 1942 and into the early part of 1943, totaling 46,000 tons per month. Most of this capacity is in sheared plates.

Due to various size limitations, it is not thought likely that the full capacity of 932,100 tons per month can be attained. However, the industry should be able to produce well over 800,000 tons of steel plates per month.

December plate production, the largest on record, was 635,812 tons. January figures are not yet available, but will be about 700,000 tons.

Comprehensive plans also are underway, the committee was told, for a complete iron and steel scrap allocation program. Present allocations are made only in emergencies. It is the intention of the branch to expand the allocation system to replace the present buying system of mills.

WPB Field Activities Consolidated In New Bureau, Under J. S. Knowlson

■ CONSOLIDATION of all field activities of the War Production Board in a new Bureau of Field Operations was announced last week by Donald M. Nelson, WPB Chairman.

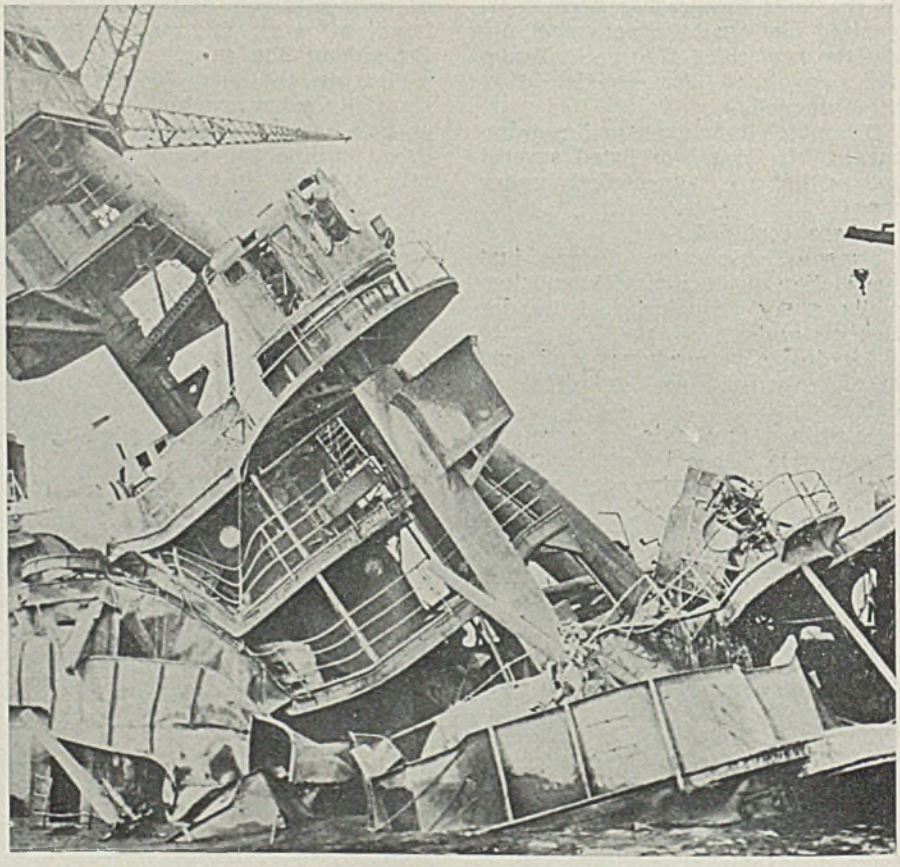
The new field bureau will be under the Division of Industry Operations which is headed by James S. Knowlson.

Merged under the new setup are the 45 field offices hitherto maintained by the Priorities Division and the 113 offices operated by the former Division of Contract Distribution. Steps will be taken to co-ordinate any other field activities of the WPB within the framework of the new bureau.

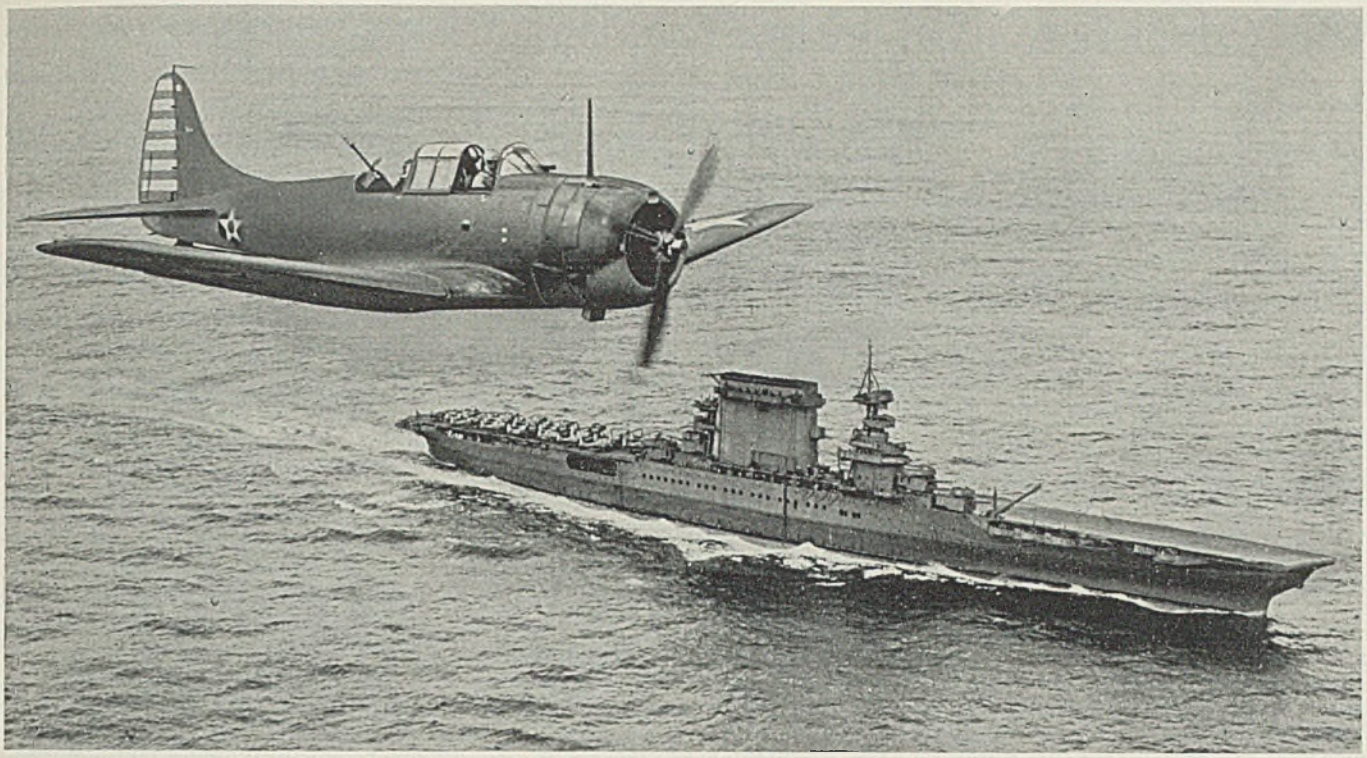
Mr. Knowlson made the following explanation of the new move:

In the interests of sound organi-

Detail of the Battleship Arizona Wreckage



■ Twisted and fire-scarred wreckage of the battleship U. S. S. ARIZONA, resting on the mud in the bottom of Pearl Harbor where it was sunk in the Japanese attack on Dec. 7. United States Navy photograph from NEA

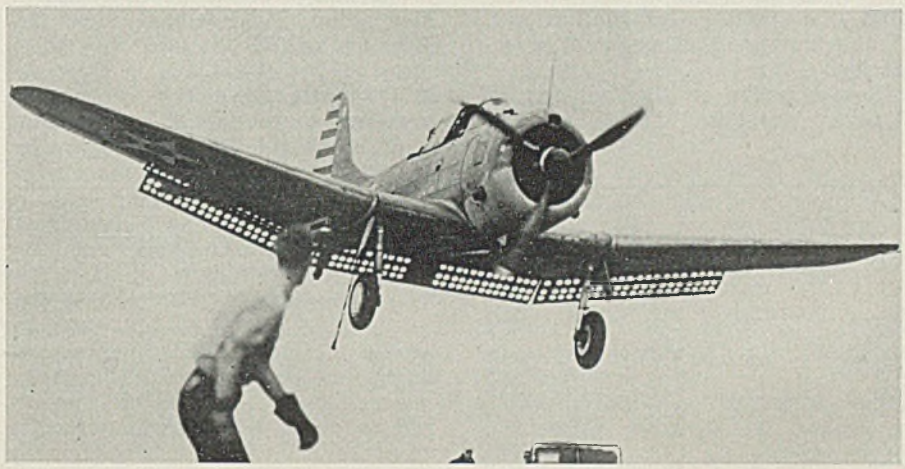


Scouting on the Pacific

■ Typical of the intensive search for Axis air, sea and undersea craft being carried out by the Pacific fleet is this scout bombing plane circling over its aircraft carrier base while on patrol duty. One of the first photographs of actual patrol activity to be released.

Right, perforated wing flaps down to reduce landing speed, the warplane comes in for landing on the aircraft carrier. A member of the plane handling crew is racing out to lend a hand; in the background is the control officer who guides the pilot in for landing.

NEA photos passed by censor



✦

zation and administrative procedure, it is necessary to have all field activities handled through the same administrative channels.

This will help give faster, more efficient service in the field to business and industry, the need for which becomes more pressing every day as the war load picks up and as industries and plants convert to war work.

The policy staff decisions in priorities will continue to be made through the Bureau of Priorities; the policy decisions in the increasingly important field of subcontracting will continue to be made within the Division of Production, to which the Division of Contract Distribution was transferred when the WPB was set up.

However, for administrative purposes, field activities in both areas will be handled through the new Bureau of Field Operations. This should facilitate prompt decisions and actions.

The existing field offices are instructed to continue their present activities without any interruption whatever. It is expected that existing staff and personnel in the field will be retained, in so far as possible. Organizational details are being worked out and will be transmitted to the field offices shortly.

As the two field staffs are merged, the field offices will report to Washington through the Bureau of Field Operations, and this bureau will handle any clearances which may have to be taken up with the Bureau of Priorities or with the subcontracting section of the Production Division.

In turn, the Bureau of Priorities and the subcontracting officers of the Production Division will channel all field matters through the Bureau of Field Operations.

This will provide centralized responsibility in Washington for field operations, whether the matters involved are going to the field or coming from the field.

L. Edward Scriven, formerly in charge of the priorities field offices, will head the Bureau of Field Operations and will report to Mr. Knowison.

ASM Experts To Aid in Solving War Problems

■ American Society for Metals, Cleveland, is organizing in each chapter a War Products Advisory Committee to which any member may submit any problem of engineering, metallurgy, welding or manufacturing which may arise in the course of war work. Members of the committees will be experts in their respective fields and the service will be free and confidential.

The society has 52 chapters in industrial centers.

Pig Iron Production Rate

Down 1.12 Per Cent in January

■ PIG IRON production in January came to 4,958,785 net tons, a decline of 56,210 tons or 1.12 per cent from the record December output of 5,014,995 tons. January total was up 6.03 per cent from a year ago and 23.21 per cent from two years ago.

The average daily rate in January was 159,961 tons, compared with the record of 161,774 tons in December, also a 31-day month. This was a decline of 1813 tons or 1.12 per cent.

The daily average for January compares with the 1941 average of 153,200 and the 1940 average of 128,128 tons.

The January operating rate cannot be calculated accurately because the American Iron and Steel Institute has not yet made its official announcement of blast furnace capacity as of Dec. 31, 1941. On the basis of the latest capacity figure, 57,830,610 net tons, as of June 30, 1941, the January production rate figures out to 102.89 per cent of capacity.

Stacks active on the last day of January numbered 219, a gain of one during the month. Stacks active on the last days of December, November, October and September, numbered, respectively, 218, 215, 216 and 219.

Of the January total 13.90 per cent was comprised of merchant iron, including ferromanganese and spiegeleisen. This compared with 14.26 per cent in December and 14.58 per cent average for 1941.

Stacks blown out during January were as follows, all making nonmerchant iron: Columbia Steel Co., Provo, Utah, Jan. 17; Bethlehem Steel Co., Lackawanna B, Jan. 22; National Tube Co., Lorain No. 4, Jan. 31.

Stacks placed in blast during January, also all making nonmerchant iron, were as follows: Carnegie-Illinois Steel Corp., Isabella No. 1, Jan. 17; Bethlehem Steel Co., Lackawanna A, Jan. 20; Sharon Steel Corp. Mary, Jan. 21; National Tube Co. Monongahela No. 4, Jan. 29.

■ Domestic production of manganese ore containing 35 per cent or more manganese (natural) in December, 1941, was 10,100 gross tons; shipments were 9700 tons, and producers' stocks at the end of the month were 1400 tons, according to the Bureau of Mines. In November production was 12,700 tons, shipments 13,000 tons and stocks at the month end were 1000 tons. Shipments in 1940 averaged 3344 tons monthly, for a total of 40,123 tons.

PIG IRON STATISTICS

RATE OF FURNACE OPERATION
(Relation of Production to Capacity)

	1942[1]	1941[2]	1940[3]	1939[4]
Jan.	102.89	95.5	85.4	51.0
Feb.	....	95.3	75.0	53.5
March	....	96.3	69.5	56.1
April	....	91.8	68.9	49.8
May	....	94.1	74.2	40.2
June	....	95.7	83.6	51.4
July	....	97.0	86.1	55.0
Aug.	....	97.4	89.9	62.4
Sept.	....	99.3	91.5	69.7
Oct.	....	98.9	94.2	85.2
Nov.	....	99.0	96.4	90.3
Dec.	....	104.1	96.4	88.5

[1] January, 1942, percentage of capacity is based on capacity of 57,830,610 net tons, as of June 30, 1941, inasmuch as revised figure for Dec. 31, 1941, has not yet been published. [2] Second half percentages based on 57,830,610 net tons as of June 30, 1941, and first half on 57,503,030 net tons as of Dec. 31, 1940. [3] Based on 55,628,060 net tons as of Dec. 31, 1939. [4] Based on 56,222,790 net tons as of Dec. 31, 1938. Capacities by American Iron and Steel Institute.

JANUARY IRON PRODUCTION
Net Tons

	No. in blast last day of Jan.	No. in blast last day of Dec.	TOTAL TONNAGE Merchant	TOTAL TONNAGE Non-merchant
Alabama	19	19	125,734*	213,246
Illinois	20	20	118,638	374,204
Indiana	19	19	21,789	527,209
New York	15	15	123,592	192,636
Ohio	46	46	145,676	957,382
Penna.	72	70	118,994*	1,422,893*
Colorado	3	3		
Michigan	5	5		
Minnesota	2	2	13,972*	215,483*
Tennessee	3	3		
Utah	0	1		
Kentucky	2	2		
Maryland	7	7		
Mass.	1	1	21,040*	366,307
Virginia	1	1		
West Va.	4	4		
Total	219	218	689,425*	4,269,360*

*Includes ferromanganese and spiegeleisen.

MONTHLY IRON PRODUCTION
Net Tons

	1942	1941	1940
Jan.	4,958,785	4,666,233	4,024,556
Feb.	.....	4,206,826	3,304,368
March	.....	4,702,905	3,270,575
April	.....	4,340,555	3,139,043
May	.....	4,596,113	3,497,157
June	.....	4,551,040	3,813,092
July	.....	4,766,216	4,060,513
Aug.	.....	4,784,639	4,234,576
Sept.	.....	4,721,337	4,172,551
Oct.	.....	4,860,033	4,437,725
Nov.	.....	4,707,194	4,397,656
Dec.	.....	5,014,995	4,542,864
Total	.....	55,918,086	46,894,676

AVERAGE DAILY PRODUCTION
Net Tons

	1942	1941	1940	1939
Jan.	159,961	150,524	129,825	78,596
Feb.	.....	150,244	113,943	82,407
March	.....	151,707	105,502	86,465
April	.....	144,685	104,635	76,732
May	.....	148,262	112,811	62,052
June	.....	151,701	127,103	79,125
July	.....	153,749	130,984	85,121
Aug.	.....	154,343	136,599	96,122
Sept.	.....	157,378	139,085	107,298
Oct.	.....	156,775	143,152	131,053
Nov.	.....	156,906	146,589	138,883
Dec.	.....	161,774	146,544	136,119
Ave.	.....	153,200	128,128	96,749

Canada Discontinues Publicizing War Contracts

TORONTO, ONT.

■ Canadian Department of Munitions and Supply has discontinued the practice of issuing lists of individual contracts awarded. This is in line with the policy of the United States Army which ceased announcing such awards soon after the outbreak of the war.

The department has completed arrangements with the Chrysler Corp. of Canada Ltd., Windsor, Ont., whereby the company will manufacture Ranger aircraft engines. To date Canada has produced no aircraft engines but has imported them, chiefly from the United States, to be installed in fuselages made here. Chrysler's production quota has been set at 300 monthly.

Under a new ruling, importers of certain types of plates from the United States must obtain permission from F. B. Kilbourn, steel controller, before placing orders. Because deliveries of plates more than 96 inches in width are uncertain, the controller has warned Canadian fabricators against ordering such plates if narrower widths can be used. Shipyards and boilermakers holding contracts for ships to be used in the war effort are exempt from the order.

Another restriction promulgated by the department requires a license for any construction, remodeling or machinery installation project costing more than $5000.

Canadian Iron Steel Output Higher in 1941

Canadian steel and iron production in 1941 exceeded that of 1940 by a wide margin. Ingots and castings output increased 19 per cent, pig iron 16 per cent and ferroalloys 40 per cent. At the end of December ten blast furnaces were in production, 94 per cent of capacity. Production in gross tons:

	Steel ingots, castings	Pig iron	Ferro-alloys
Dec., 1941	218,611	148,377	17,845
Nov., 1941	221,367	133,735	17,078
Dec., 1940	188,520	110,477	18,397
12 Mos., 1941	2,411,887	1,364,334	190,374
12 Mos., 1940	2,014,172	1,168,895	135,412

A. F. A. Committee To Draft Protection Code

■ American Foundrymen's Association, Chicago, has appointed a committee to draft a set of rules and recommendations to be used as a guide in providing safeguards for foundries during war time so that maximum operating capacity will not be endangered. Move was taken at the government's request.

Committee will function under the A.F.A. safety and hygiene section; James R. Allan, International Harvester Co., will be chairman. The committee already has prepared five codes of recommended good practices, as follows:

"Code of Recommended Practices for Testing and Measuring Air Flow in Exchange Systems."

"Code of Recommended Practices for Grinding, Polishing and Buffing Equipment Sanitation."

"Recommended Good Practice Code and Handbook on Fundamentals of Design, Construction, Operation and Maintenance of Exhaust Systems."

"Code of Recommended Good Practices for Metal Cleaning Sanitation."

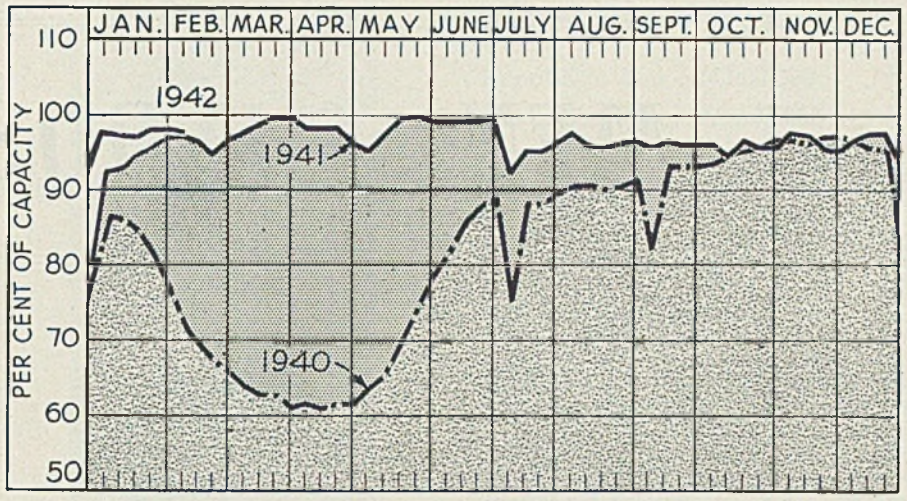
"Code of Recommended Good Safety Practices for the Protection of Workers in Foundries."

Fabricators Form Pool To Handle Large Jobs

■ Four structural steel companies in the Middle West which have been co-operating to expedite work on large projects since October, 1940, last week announced they have adopted the name Four V Structural Steel Companies, for purpose of identification. They are Clinton Bridge Works, Clinton, Iowa; Duffin Iron Co., Gage Structural Steel Co. and Midland Structural Steel Co., all of Chicago. Offices of the Four V are at 37 West Van Buren street, Chicago.

A number of large defense projects have been fabricated by pooling facilities, too large for any one of the companies. Bids are made by one company after consultation with the others, and work is distributed to obtain best delivery. The bidding firm assumes all responsibility and sublets at the terms of the original contract. This relieves the buyer of dealing with several fabricators.

■ Republic Steel Corp. last week notified employes that they may voluntarily authorize payroll deduction of $3 or more per month, for which defense stamps will be issued, exchangeable for bonds. The plan is available to more than 70,000 employes.



PRODUCTION . . . . Down

■ PRODUCTION of open-hearth, bessemer and electric furnace ingots last week dropped 1 point to 96 per cent. Three districts gained, three declined and six were unchanged. A year ago the rate was 97 per cent; two years ago it was 71 per cent, based on capacity as of respective dates.

Youngstown, O. — Addition of one open hearth by Youngstown Sheet & Tube Co. caused the rate to advance 1 point to 88 per cent. Outlook is for further gain this week. For the third consecutive month Carnegie-Illinois Steel Corp. works here have eclipsed all previous production records in ingots, semifinished and finished steel.

Central eastern seaboard — Steelmaking last week continued at 90 per cent as scrap receipts continued steady.

Cincinnati — Increased 3 points to 87 per cent as a result of better scrap supply.

Detroit—Slower operation at one plant caused a drop of 2 points to 85 per cent. Production varies from day to day, in accordance with scrap supply.

Chicago — With several open hearths idle from lack of scrap the production rate held at 103 per cent. One producer increased its rate, one declined slightly and four others were unchanged.

Cleveland—Receded 10 points to 84½ per cent as one large interest dropped its rate sharply because of repair work.

Buffalo—Unchanged at 79½ per cent, with 34 open hearths in production.

Birmingham, Ala.—Steady at 90 per cent, with 22 open hearths active.

New England—Advanced 7 points to 92 per cent, two works being at 100 per cent.

Pittsburgh—For the fifth week production held at 95 per cent. Larger scrap supply would cause a much higher rate.

Wheeling — Shortened bessemer and open hearth operations reduced the rate 11 points to 84 per cent.

St. Louis—Continued better scrap supply enabled producers to hold at 78 per cent.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Feb. 7	Change	Same week 1941	Same week 1940
Pittsburgh	95	None	96.5	69
Chicago	103	None	98	74.5
Eastern Pa.....	90	None	96	68
Youngstown ...	88	+ 1	95	44
Wheeling	84	—11	100	86
Cleveland	84.5	—10	89.5	70
Buffalo	79.5	None	90.5	60.5
Birmingham ..	90	None	100	90
New England..	92	+ 7	92	63
Cincinnati	87	+ 3	95	61
St. Louis	78	None	93	70
Detroit	85	— 2	96	93
Average	96	— 1	*97	*71

*Based on capacities as of those dates.

Davey Steel Co. Plans To Liquidate Business

■ Directors of W. H. Davey Steel Co., Cleveland, have recommended to stockholders that steps be taken to liquidate the company. Stockholders will meet Feb. 17. As a non-integrated sheet producer, the company has had difficulty obtaining semifinished steel. It is proposed to finish war work now on hand during February and March.

A group of Detroit manufacturers are reported to have agreed to purchase the plant, retool it for manufacture of products other than sheets and expend a substantial sum for remodeling.

MEN of INDUSTRY

■ **ROGER M. BLOUGH** has been appointed general solicitor in charge of all legal matters, United States Steel Corp. of Delaware, Pittsburgh. He succeeds the late William Beye. Mr. Blough has been engaged in law practice with White & Case, New York, since 1931, in which year he was graduated from Yale Law School. When the Temporary National Economic Committee investigated the steel industry in 1939 and 1940, Mr. Blough acted as an associate counsel for the United States Steel Corp. He was born Jan. 19, 1904, in Riverside, near Johnstown, Pa.

♦

John A. Bigelow has been named plant protection engineer, Wickwire Spencer Steel Co., New York, and will supervise protection of the company's plants located in Buffalo; Worcester, Clinton and Palmer, Mass.; Mt. Wolf, Pa., and Blue Island, Ill., including maintenance of employment records and employe records and employe identification.

♦

F. P. McKegney, formerly assistant chief engineer, Air Reduction Co., New York, has been promoted to chief engineer.

♦

Glenn A. Hutt, since 1935 associated with Ferro Enamel Corp., Cleveland, has been appointed assistant sales manager.

♦

Dewey H. Dolison has been appointed district manager of the Chicago territory, Airtemp Division, Chrysler Corp., Detroit.

♦

W. F. Newbery has been promoted to central region manager, Detroit Rex Products Co., Detroit, maker of metal cleaning equipment and materials.

♦

E. H. Blywise, president of The Grabler Mfg. Co., Cleveland, announces the appointment of **R. H. Sonneborn,** formerly with Republic Steel Corp., as general sales manager, effective Feb. 1.

♦

J. H. Allen has resigned as a vice president, Hokar Products Corp., New York, to assume management of Olavarria Trading Corp., New York, newly organized to do a general iron and steel export business.

Roger M. Blough

John A. Bigelow

R. H. Sonneborn

Mr. Allen, associated with the steel industry a number of years, was at one time New York district sales agent for Elyria Iron & Steel Co., Elyria, O., before its merger with Republic Steel Corp.

♦

J. P. Henry has been named New England representative, Ampco Metal Inc., Milwaukee, with headquarters at 210 Capitol National Bank building, Hartford, Conn.

♦

Clifford G. Allen has become purchasing agent, Akron, Canton & Youngstown Railway Co., Northern Ohio railway, with offices at Akron, O., succeeding **R. A. McKinnon,** resigned.

♦

Howard A. Herder, Sahara Coal Co., Chicago, and **Vernon G. Leach,** Peabody Coal Co., Chicago, have joined the technical advisory board, Bituminous Coal Research Inc., Battelle Memorial Institute, Columbus, O.

♦

H. A. Carter has been elected president and sales manager, Geneva Metal Wheel Co., Geneva, O. He succeeds **A. M. Ford,** who has resigned the presidency but continues as treasurer. Mr. Carter has been associated with the company since 1916.

♦

W. F. Schulten has been elected an assistant to **J. B. Morrow,** president, Pittsburgh Coal Co., Pittsburgh, with authority to co-ordinate company relations with the war efforts of the nation. He will retain his present post of general traffic manager.

♦

Dr. C. O. Ball, formerly assistant director of research, American Can Co., for the past two years in New York and before that in Maywood, Ill., has joined Owens-Illinois Can Co., Toledo, O., as technical director. He will be in charge of the company's metal container research and development program.

♦

Harmon S. Eberhard has been named vice president, Caterpillar Tractor Co., Peoria, Ill. He succeeds the late Thomas J. Connor. Mr. Eberhard first entered the tractor field with Holt Mfg. Co., Stockton, Calif., predecessor of Cater-

pillar. In 1925 he was transferred to the engineering department in San Leandro, Calif., later becoming assistant general chief engineer and chief engineer in charge of research. The past nine years he has been located in Peoria.

♦

Dr. C. F. Rassweiler, who joined Johns-Manville Corp., New York, last June as director of research, has been named a vice president. The company's research laboratories are located in Manville, N. J., and are managed by **E. R. Williams.**

♦

J. E. Heuser has been transferred from the Milwaukee office of Ampco Metal Inc. to the Cincinnati office to assist **J. E. Cook.**

♦

James R. Longwell, formerly chief engineer, Carboloy Co. Inc., Detroit, has been appointed to the newly

Paul H. Miller

created post of factory manager. **Paul H. Miller,** associated with Carboloy's engineering department the past eight years, succeeds Mr. Longwell as chief engineer.

♦

George M. Snodgrass, formerly vice president and sales manager, Imperial Electric Co., Akron, O., has been appointed manager, Eastern Sales Division, Sawyer Electrical Mfg. Co., Los Angeles, wholly-owned subsidiary of A. O. Smith Corp., Milwaukee. He will have offices at 2110 Terminal tower, Cleveland.

♦

Edward M. Hicok, the past three years comptroller of manufacture, Western Electric Co., New York, has become personnel relations manager, manufacturing department, a newly created post. **John M. Stahr,** since 1936 works comptroller of the company's Hawthorne plant, Chicago, succeeds Mr. Hicok as comptroller of manufacture.

♦

Harold G. Beebe, heretofore assistant manager, Industrial Division,

J. R. Longwell

International Resistance Co., Philadelphia, has been promoted to manager of that division. **Harry A. Ehle,** former manager of the Industrial Division and assistant to the president, has been made a vice president. **Robert Elmore** will assist Mr. Beebe.

♦

Robert V. Finch has been appointed representative in northeastern Ohio and northwestern Pennsylvania for Cowles Detergent Co., Cleveland, manufacturer of industrial alkalies. His headquarters are in Cleveland.

♦

F. F. Seaman, general manager, Robbins & Myers Inc., Hoist and Crane Division, Springfield, O., has been re-elected chairman, Electric Hoist Manufacturers' Association. **A. S. Watson,** vice president, Detroit Hoist & Machine Co., has been elected vice chairman of the association.

♦

W. E. Fruhan has been appointed assistant manager, Pipe Sales Division, in charge of merchant pipe, Republic Steel Corp., Cleveland. Mr. Fruhan, who succeeds **R. H. Sonneborn,** has been with Republic and predecessor company since 1919, and has been chief clerk of the Pipe Division the past eleven years.

♦

George W. Codrington, general manager, Cleveland Diesel Engine Division, General Motors Corp.; **Nicholas Dreystadt,** general manager, Cadillac; **H. L. Hamilton,** head of Electro-Motive Division; **H. J. Klingler,** general manager, Pontiac; **S. E. Skinner,** general manager, Oldsmobile, have been elected vice presidents of General Motors.

Harry W. Anderson, recently placed in charge of personnel, has been elected vice president and a member of the administrative committee. **R. M. Wagner** has been named production manager for all plants and products of Buick Motor Division.

FINANCIAL

Republic's Net $24,000,000; Taxes for Year $57,000,000

■ WITH steel ingot production at 99.5 per cent of capacity during 1941, Republic Steel Corp. shows a consolidated net income for the year of $24,038,340.

Provision for federal income and excess profits taxes for the period totals $46,250,000, nearly twice the net income. This compares with $8,000,000 for the same purpose in 1940. Total taxes for the year will amount to approximately $57,000,000. The corporation's profits are at rate of $3.87 per common share.

Net income for the fourth quarter was $6,041,244.

Sales and operating revenue for 1941 totaled $483,812,368.

"To reach 99.5 per cent of capacity, the corporation had more than 70,000 people on its pay roll, the largest number in its history," said T. M. Girdler, chairman.

"The operating rate would undoubtedly have been well in excess of 100 per cent of capacity had there been an ample supply of raw materials, principally scrap, available for our use."

National Steel Corp.

National Steel Corp. reports net earnings for 1941 were $17,102,350.05, equal to $7.75 a share, compared with $15,066,340.58 in 1940, equal to $6.83 a share.

Federal normal income and excess profits taxes amounting to $19,825,000 were provided for in 1941, against $7,447,695 in 1940.

Earnings for the fourth quarter of 1941 were $4,180,078.48, compared with $4,225,212.65 in the final quarter of 1940.

Jones & Laughlin Steel Corp.

Fourth quarter net profit of Jones & Laughlin Steel Corp. totaled $4,234,599, against $3,942,157 earned in the preceding period and $4,044,126 during the final 1940 quarter.

During the past year the company reports net income of $16,274,983, comparing with $10,277,029 for 1940.

Estimated provision for federal income and excess profits taxes for last year amounted to $15,342,670 or almost five times the 1940 provision of $3,155,992.

■ Allegheny Ludlum Steel Corp., with a backlog of about $30,000,000 in orders, has more than 12,000 employes, an increase of about 2000 in the past year. This is twice the number employed just after merger of Allegheny and Ludlum Steel companies in 1938. Wages and salaries in 1941 totaled more than $24,000,000.

REVISIONS AND ADDITIONS TO

PRIORITIES—ALLOCATIONS PRICES

as published in Section Two of STEEL of Jan. 12, 1942

"M" ORDERS

M-11-h: Zinc, effective Feb. 1, 1942. February pools fixed at 40 per cent of producer's November, 1941, production of metallic zinc and 20 per cent of November, 1941, production of zinc oxide.

M-75: Diphenylamine, effective Jan. 30, 1942. Deliveries by producers and distributors are to be made only as directed by Director of Industry Operations in schedules to be issued at the beginning of each month. Application for making deliveries filed on PD-263, application for accepting delivery on PD-262, 266.

"P" ORDERS

P-90 (Amendment): Production Requirements Plan, effective Jan. 30, 1942. Permits producers operating under the plan to extend AA ratings without special permission from Bureau of Priorities.

"E" ORDERS

E-4: Second Hand Machine Tools, effective Feb. 3, 1942. Authorizes Director of Industry Operations to prohibit sale or other disposal of any second hand machine tool and to determine to whom a particular tool should be allocated.

"MISCELLANEOUS" ORDERS

Priorities Regulation No. 4, effective Jan. 26, 1942. Validates all preference rating certificates issued by the Division of Priorities, OPM, to continue effective until expiration or until cancelled by Director of Industry Operations, WPB.

RATIONING REGULATIONS

No. 2: Automobiles, effective Feb. 2, 1942. Provides for release of new passenger cars purchased, but not delivered, before passenger car sales were banned Jan. 1, 1942.

M-18-a (Amendment): Chromium, effective Feb. 4, 1942. Prohibits melting of any chromium except upon specific authorization by Director of Industry Operations. Persons seeking delivery of chromium ores, concentrates or material commercially suitable for use in manufacture of steel or for other metallurgical purposes required to file PD-53a with WPB by 20th of month preceding month in which delivery to be made. Buyers of chromium in any form required to make application by same date to processor or dealer, filing copy with WPB. Chromium oxide content of ore permitted to be used to make chromium chemicals in any month limited to monthly average content of chemicals delivered between July 1, 1940 and June 30, 1941.

No. 29 (Amendment) By-product Coke, effective Feb. 7, 1942. Prices in general are the same as originally became effective Oct. 1, 1941, but amendment recognizes existing regional prices for foundry coke and permits all producers to compete freely at these prices. New England delivered price limited to delivery points taking freight rate of no more than $3.10 per ton from Everett, Mass. Area governed by Swedeland, Pa., ceiling price limited to section governed prior to Sept. 15, 1941.

No. 4 (Amendment) Iron and Steel Scrap, effective Feb. 2, 1942. Sets chemical boring ceiling at $3 a ton above cast iron borings; $5 increase when chemical borings used for making explosives. Maximum freight charge on shipments of any scrap from New England set at $6.27 a ton. Dock charges, where vessel movement involved in computing shipping point and delivered prices, placed at 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. Only public carriers may use established truck rates; carload rate for rail shipments applies where delivery is by seller's vehicle but no less than $1.50 a ton. Scrap shipped from a dealer's yard may not be considered as railroad scrap regardless of its origin. Shipments of mixed grades are to be considered as unprepared scrap unless consumer authorizes such mixture.

No. 40 (Amendment): Builders' Hardware, effective Feb. 3, 1942. Fixes ceilings as highest prices prevailing 15 days preceding Oct. 15, 1941. Original schedule set base period as 30 days preceding last Oct. 20. Persons subject to the schedule who make some retail sales, need.

No. 46 (Amendment): Relaying Rails, effective Feb. 7, 1942. Raises minimum shipping point price from $22 a gross ton to $24. Denver added as basing point. Maximum prices for rails sold from warehouse: $32 per gross ton in carlots; $2 per 100 lbs. for 5 tons to carload; $2.25 per 100 lbs. for less than 5 tons. Extras in cents per 100 lbs. for special preparation: 15 for cutting to lengths of 10-15 feet and necessary drilling; 20 for cutting to less than 10 feet and drilling; 5 for bonding; 10 for special drilling. Buyer may pay agent commission up to $1 a ton, to be added to maximum prices.

PRICE SCHEDULES

No. 43 (Amendment)—Used Steel Barrels, Drums, effective Feb. 2, 1942. Establishes price ceilings on containers of following capacities: 50-58 gallons, $2.25; 29-33, $1.85; 14-16, $1.45. Ceiling price for raw used drums extended to any purchaser. Premium of 25 cents allowed on any 50-58 gallon lined and reconditioned drum suitable for use as food drum. Lesser premium allowed for smaller sizes. Buyer permitted 5 to 15-cent deduction on own pickups.

No. 49 (Amendment)—Iron and Steel Products at Resale, effective Jan. 30, 1942. Limits markup on export sales to 5% over invoice prices of domestic seller, in case of export agents. Export merchants allowed 10% increase.

No. 81—Primary Zinc, effective Jan. 29, 1942. Maximum carload prices in cents per lb., f.o.b. E. St. Louis, Ill.; Prime western 8.25; selected 8.35; brass special 8.50; intermediate 8.75. High grade and special high grade are 9.25, delivered. Producers may add 0.15c for 20,000 pounds to carlots, 0.25c for 10,000-20,000 pounds, 0.40c for 2000-10,000 pounds, 0.50c for less than 2000 pounds. Other sellers may add 0.65c, 0.75c, 1.00c and 1.50c for respective quantities.

No. 82—Wire, Cable and Accessories, effective Jan. 29, 1942. Includes hot rolled black or cleaned rods for electrical uses, and copper, copperclad or copper alloy wire used for conducting electricity. Maximum prices are manufacturers' net prices on Oct. 15, 1941. Weatherproof wire prices figured against base price of 17.5 cents. For material containing lead, add number of pounds of lead times $0.00325.

No. 83—Radio Receivers and Phonographs, effective Feb. 9, 1942. Manufacturers' maximum prices are highest net prices received Oct. 15, 1941, or in the preceding three-month period. OPA must approve prices for models offered after Oct. 15.

No. 84—Parts for Radio Receivers and Phonographs, effective Feb. 9, 1942. Manufacturers' maximum prices are highest net prices received Oct. 15, 1941, or in preceding three-month period.

No. 85—New Passenger Automobiles, effective Feb. 2, 1942. Maximum wholesale prices are highest prices prevailing Oct. 1 to Oct. 15, 1941 (Feb. 2, 1942, prices for Packard and Crosley), plus lower of $15 or 1 per cent of list price for each elapsed month after Jan. 31, 1942. Add taxes and fixed delivery charges for retail prices.

No. 86—Domestic Washing Machines, Ironing Machines, effective Feb. 9, 1942. Manufacturers' maximum prices are highest prices quoted Oct. 1-Oct. 15, 1941 (Feb. 2, 1942, prices for Apex Electrical Mfg. Co.). OPA must approve prices for models offered after Oct. 15.

No. 87—Scrap Rubber, effective Feb. 5, 1942. Maximum prices fixed at seven reclaiming centers, including geographical differentials. Ceiling at Akron, O., for beadless auto and truck tires $24 per net ton. Red passenger car inner tubes east of Rockies 7½ cents per pound.

No. 41 (Amendment): Steel Castings, effective Feb. 3, 1942. Establishes maximum prices for railroad side frames, bolsters, couplers and yokes at levels prevailing Oct. 1, 1941.

No. 91—Tea, effective Feb. 3, 1942.

For additional revisions and additions please see STEEL of Jan. 19, p. 30, Jan. 26, p. 31, and Feb. 2, p. 29.

No. 92—Soy Bean and Peanut Oils, effective Feb. 4, 1942.

No. 93—Mercury, effective Feb. 4, 1942. Prime virgin mercury produced in California, Oregon, Washington, Idaho, Utah, Nevada or Arizona, $191 per 76-pound flask. When produced in Texas or Arkansas, $193. When imported from Mexico, $193, f.o.b. United States freight station nearest point of entry, including duty. Other imports $191, f.o.b. port of entry. Agent's selling commission limited to 1% of maximum price.

No. 94—Western Pine Lumber, effective Feb. 15, 1942. Maximum prices generally are those prevailing during period Oct. 1-15, 1941.

No. 95—Nylon Hose, effective Feb. 5, 1942.

Pig Iron, Foundry Scrap Users Must File Form PD-70

Users of pig iron and foundry scrap are not relieved of the necessity of filing Form PD-70 with the WPB Iron and Steel Branch by the use of any other forms relating to iron and steel scrap.

Forms PD-149, 150 and 151, which are returnable to the Bureau of Mines at Pittsburgh, are designed to cover scrap for the production of steel.

Form PD-70 relates to the inventory and consumption of pig iron and is the form on which monthly allocations of pig are based.

It was pointed out by the branch that unless PD-70s are received, and received on time, from all users, allocations for the month following cannot be made equitably. Warning was given that in the future those who are late will be left out of allocations for the following month.

Form PD-70 is due on the twelfth of each month. Present intentions are to change this date shortly to the fifth of each month to give more time to study requirements.

Producers Under PRP Allowed To Extend AA Ratings

Producers operating under the Production Requirements Plan are permitted to extend AA ratings without special permission from the Bureau of Priorities by an amendment to Preference Rating Order P-90 issued by the Division of Industry Operations.

Producers operating under the Production Requirements Plan have been forbidden to make use of any preference ratings except those assigned on PD-25-a application forms. Today's amendment makes an exception to this rule in the case of AA ratings, to avoid delay in the handling of rush military contracts.

Define Limits of Assistance Under Orders P-21, P-20, P-8

WPB has issued interpretations of three Preference Rating Orders, P-21, P-20 and P-8, to define more clearly the extent to which priorities assistance is available under them.

Order P-21 covers materials for the repair and rebuilding of steam, electric or diesel locomotives; P-20 applies to materials going into the construction of locomotives specified in that order; and P-8 governs materials for the construction of railroad, industrial and mine freight cars.

Each order assigns an A-3 preference rating to deliveries of the necessary materials. Each states that the rating may be used to obtain materials entering "directly or indirectly" into the equipment covered.

In order to avoid confusion, the interpretations state that the term "directly or indirectly" does not mean that a producer or supplier can use the rating to get materials for plant expansion, improvement or maintenance. The rating can be used only for materials which will be physically incorporated in the product, or for perishable tools used up in the process of manufacture.

STEEL Index Is Ready

■ *The index to Volume* 109, STEEL, *for the last six months of* 1941, *now is ready for distribution. Copies will be sent to all subscribers requesting them.*

Railroad Specialties Prices Frozen at Oct. 1 Levels

Price ceilings for so-called railroad specialties, side frames, bolsters, couplers, and yokes, are fixed at levels prevailing Oct. 1, 1941, by Amendment No. 1 to Steel Castings Price Schedule No. 41.

A ceiling based on July 15 prices originally was set for steel castings, including railroad specialties. This ceiling permitted the steel castings producers to keep a price increase which had been made to July 15, but eliminated a corresponding increase made by the railroad specialty producers after July 15. The new amendment permits the corresponding increase for the railroad specialties.

A change also was announced in steel castings. This is applicable in the case of a producer who receives an order for a particular item which he was not making on or prior to July 15, and therefore, one for which he had not filed a price. In such case, where on and after February 5, 1942, a producer makes a steel casting for which he has not previously filed a price with OPA, then such casting must be sold at a price not higher than that listed in the Steel Founders Society's comprehensive report for the corresponding casting. As an alternative, or in a case where the particular casting is not listed in the comprehensive report, the producer must obtain approval of the proposed selling price from OPA. If OPA does not act upon any such request for approval of a price within six days, the requested price is deemed to be approved automatically.

All Forms of Cobalt Subject to Allocation

All forms of cobalt have been placed under complete allocation by Order M-39-b, issued by WPB. Previously only metallic cobalt and chemical compounds were affected.

Order prohibits cobalt in all pigments after May 1, and meanwhile reduces use to 40 per cent of the amount used in the first half of 1941. Exceptions include cobalt alloys of all kinds, plating, hard facing compounds, laboratory and research equipment.

Price Ceiling Established On Titanium Pigments

Effective March 1, Price Schedule No. 98 has been issued, establishing maximums on titanium pigments at levels of Oct. 1, 1941. Ceiling was imposed due to increased demand for titanium pigments and indications by dealers other than producers of higher price tendencies.

Prime Defense Contractors May Obtain New Automobiles

Prime contractors on defense and other essential production will be given aid in obtaining new passenger autos under a ruling by OPA. Second beneficiaries of same ruling are public officials in specific cases.

Fire Pump Production To Be Adequate for All Needs

The fire pump industry will be able to meet the requirements of the Army, Navy, lend-lease and civilian defense for thousands of new fire-fighting pumps, it was announced last week by George Angell, chief, WPB Fire Equipment and Safety Section.

In addition, he said, the industry will be able to use substitute materials for some of the critical items now being used in such pumps.

Industry representatives, comprising an industry advisory committee, advised the WPB representatives that with some additional tooling it will be possible for them to increase production to at least 100 per day of pumps with a capacity of 500 gallons per minute and suitable for front mounting on fire engines. About 30 such pumps are now produced daily.

Windows of WASHINGTON

Price control bill NRA in reverse. Provides for ceilings over all commodities except labor and, to limited extent, farm produce. Permits voluntary agreements between producers and government . . . Restrictions on reproduction of priority forms and orders eased . . . More manufacturers enabled to use Production Requirements Plan to obtain ratings . . . Chromium under complete allocations system

By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ A SORT of NRA, in reverse, is established by the emergency price control bill recently passed by Congress. It provides for voluntary agreements between the government and producers and processors as to maximum prices, without antitrust laws being invoked.

Vesting tremendous power in Leon Henderson, OPA administrator, the law provides maximum prices may be established for any commodity, with labor excepted and farm products subject to limitations. Prices prevailing during the first two weeks of October, 1941, generally are to be accepted as the price norm. Rents in defense housing areas are included in the controlled items.

Mr. Henderson already has been granted authority to ration all commodities sold at retail.

Only serious limitations on the OPA administrator's powers (with the exception of the prohibition of regulation of wages) are those forced into the price control act by the congressional farm bloc. These stipulated the secretary of agriculture should have the veto power over farm prices promulgated by the price administrator. A floor was placed under farm prices also which forbids their being fixed at lower than 110 per cent of parity, with alternative ways of computation which may force the floor even higher before control can set in. Farm prices now are at about 99 per cent of parity, leaving a minimum increase of 11 per cent in these commodities possible.

Teeth are put into the law by a provision that violators may be fined not more than $5000 and imprisoned for not more than two years, or both.

Most Priorities Forms, Order May Now Be Reproduced

All priority forms and orders, with a few exceptions, may now be reproduced, according to the terms of Priorities Regulation No. 5, issued by the Division of Industry Operations.

Copies of any order which contains the name and address of the producer or other person to whom the order is issued, or a serial number identification, may not be reproduced without the name and address and serial number unless they are clearly marked "Information Copy."

Reproduction for use of the new application form PD-1-a, is permitted if copies are identical with the officially published version as to wording, paragraphing, punctuation and size, and substantially the same as to color and paper.

The new Form PD-3-a may not be reproduced for use, but copies clearly marked "Specimen Copy" may be made for purposes of information.

Certain other forms and orders provide for operations which must be supervised in detail, and their reproduction is prohibited or limited. A list of these, and of the conditions governing their reproduction, is attached as Exhibit A of the regulation.

Conveyor Manufacturers May Use PRP To Obtain Ratings

Producers of conveyor machinery and auxiliary equipment are eligible for priorities assistance under the Production Requirements Plan and should file the necessary application form, PD-25-a, with the Industrial and Office Machinery Branch as quickly as possible.

Assistance to manufacturers of this heavy machinery, which is used to transport materials in and around mines and manufacturing plants, previously had been available under Preference Rating Order P-78, which expired Jan. 31. Under this order, an A-3 rating was applied to deliveries of materials going into the manufacture of the equipment.

The Industrial and Office Machinery Branch will process all PD-25-a forms received from the manufacturers. Unless these forms are filed, manufacturers cannot qualify for assistance under the Production Requirements Plan.

Industrial Repair Shops May Obtain Ratings Under PRP

Job platers, machine shops, motor rewinding shops, and other shops performing industrial repairs are eligible for priority assistance under the Production Requirements Plan, or the Modified Production Requirements Plan for small business.

By submitting applications on Form PD-25-a or PD-25-x, according to the size of their business, companies of these types may obtain a priority rating or ratings to be used over a calendar quarter for specified quantities of material. The rating assigned and the quantity of material it may be used to obtain will depend upon the volume of war or essential civilian work being handled by each company.

Chromium Placed Under Complete Allocations System

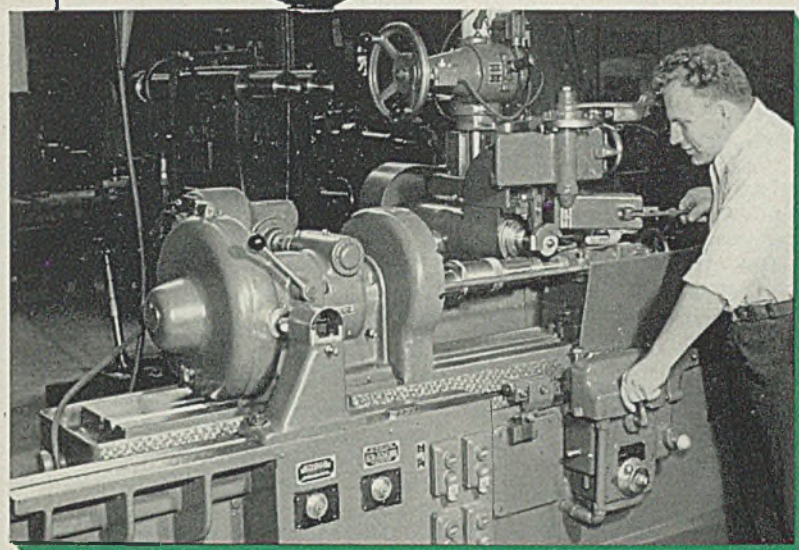
Chromium, already strictly controlled, has been placed under a complete allocations system by WPB in an amendment to Order M-18-a.

Amended order provides no chromium may be melted except with specific authorization of the director of Industry Operations. It is designed to prevent depletion of existing stocks, and to control further the flow of this important steel alloy.

The order, together with Order M-21-a which limits the uses of chrome steel, makes use of the metal completely subject to the director of Industry Operations.

M-18-a, as amended, revokes Or-

GRINDING for PERFECTION of FINISH and DIMENSIONAL ACCURACY



Grinding Splines on Wright Airplane Crankshafts

with FITCHBURG *Automatic Closed Cycle Grinding*

Continental Motors of Detroit have installed Fitchburg Spline Grinders for grinding splines on airplane crankshafts. These new Fitchburg Automatic closed cycle machines are the culmination of more than 30 years of precision grinding machine development.

No longer is there need to put up with excessive cost of spline grinding by outmoded methods. Fitchburg technique will save on assembly time — divide torque pressure more evenly and produce finishes that will give more even wear on sliding splines at high speed.

The result of using the Fitchburg method is lower costs, higher degree of accuracy, higher speed in operation, and smoother product performance.

New operators can rapidly be trained to produce accurate splines at high speed.

It will not obligate you to mail in your blue prints for study. Write today for catalog showing wide range of other successful applications.

FITCHBURG GRINDING MACHINE CORP.

FITCHBURG, MASSACHUSETTS, U. S. A.

Manufacturers of — Bowgage Wheelhead Units, Multiple Precision Grinding Units, Spline Grinders, Cylindrical Grinders, Gear Grinders, Bath Full Universal Grinders and Special Purpose Grinders.

der M-18 and takes effect upon issuance. It expires June 30, 1942.

Oil Field Equipment Makers To Meet with OPA Officials

Further measures to stabilize prices of oil field equipment will be discussed at a meeting Feb. 11, in Dallas, Tex., between representatives of approximately 250 manufacturers and OPA officials.

Requests that manufacturers of oil field equipment hold their prices stable were made by OPA some time ago.

Meeting will convene at 10 a.m. in the Peacock Terrace Room of the Baker hotel, and will be open to all manufacturers of oil field equipment, whether or not specific invitations have been received. C. L. Christenson, head of the oil field equipment unit of OPA's machinery section, will preside.

OPA Fixes Price Ceiling for Noncommercial Radios, Parts

Ceilings over the prices that manufacturers may charge for noncommercial radio and television receiving sets, electric phonographs, and radio tubes and parts have been established in two new schedules announced by OPA.

One schedule — No. 83 — covers home receiving sets, portable sets, automobile sets and television sets, as well as electric phonographs, whether sold alone or in combination with a radio receiver. The second schedule—No. 84—applies to all tubes and parts, both original and replacement, for all models, whether current or old.

Equipment and parts primarily designed for commercial, police, or military use are excluded from the ceilings. This exemption also takes in coin-operated phonographs which are classified as commercial.

The formal ceilings become effective Feb. 9, and supersede individual agreements with leading producers of sets and parts.

The maximum price that a manufacturer may charge for any current model, or for tubes, or other parts, according to the schedules, will be the highest net price received on Oct. 15, 1941, or in the three-month period prior thereto. The use of such period permits the fixing of ceiling prices on items of which there were no sales on Oct. 15. Price levels established by both schedules are in conformity with the provisions of the price control bill passed by Congress.

Tire Retreading Machinery To Be Rationed by WPB

Pending adoption of a method of distributing tire retreading and recapping machinery equitably throughout the country, the WPB has ordered all manufacturers of this equipment to cease immediately filling any orders except those supported by preference rating certificates.

The "stop" order, contained in a telegram to 11 manufacturers from J. S. Knowlson, director, Division of Industry Operations, was made necessary because available retreading and recapping molds have been distributed in such an uneven manner that many localities have been unable to take care of requirements.

Complaints have been received by the Industrial and Office Machinery Branch from small tire dealers that large companies are purchasing all available molds and sending many of them into localities already sufficiently supplied.

In addition to ordering manufacturers to cease delivering equipment until further notice, except to fill pending or future orders bearing preference rating certificates, Mr. Knowlson instructed them to submit to the Industrial and Office Machinery Branch a list of all orders on their books, including customers' names, shipping addresses and types of equipment ordered.

Manufacturers also were ordered to list orders that are complete and ready for shipment, those that are partially complete and those on which work has not yet begun.

It is expected that a formal order will be issued shortly putting into effect a distribution system designed to assure all localities of adequate equipment.

Price Schedule for Used Steel Barrels Modified

Modifications of Price Schedule No. 43, covering used steel barels and drums, have been made by OPA in an amendment to the schedule.

One feature of the amendment is limitation of the ceiling to three classifications of barrels and drums only. These are the 50 to 58-gallon capacity; the 29 to 33-gallon capacity; and the 14 to 16-gallon capacity. These three sizes include 98 per cent of all steel barrels and drums in use. No other capacities than these are covered by the ceiling as amended.

The ceiling price for raw used drums has been extended to any purchaser, instead of only the user and reconditioner as before.

Definition of a reconditioned drum has been tightened to insure that complete reconditioning is necessary to obtain the price differentials granted in the schedule for reconditioned drums.

The original schedule granted a premium of 25 cents for reconditioned 50 to 55-gallon drums that had been lacquer-relined and baked. The amendment revises this so that any 50 to 58-gallon lined and reconditioned drum that is suitable for use as a food drum can command this premium. A lesser premium for the smaller sizes is also put into effect.

Another feature allows the purchaser a deduction from the delivered ceiling price of a raw used drum when and if he makes his own pickups from dealers. The original schedule set a flat delivered price ceiling with no allowances for pickups by buyers.

Priorities Compliance Being Checked by WPB

Steel companies, primary copper fabricators and about 2000 aluminum foundries are being surveyed by the WPB compliance section to determine the extent, if any, of priorities regulations violations. The check is being made by agents of the Federal Trade Commission and other government agencies, and by the compliance section's own agents.

Asks Nonferrous Casting Prices Be Held at Oct. 1-15 Levels

Letters have been sent to operators of foundries making nonferrous castings asking them not to charge prices higher than those prevailing Oct. 1 to 15.

This action is expected to stabilize prices charged on a wide range of castings by some 3000 enterprises in the industry, doing an annual business approximating $500,000,000.

Nonferrous castings are widely used in the production of planes, tanks, ships, and guns and of many important civilian articles. Prices have risen about 20 per cent on the average during 1941.

Price Ceiling Established For Carbon Tetrachloride

In the face of a threatened shortage of materials essential to its manufacture, maximum prices for carbon tetrachloride have been established in Price Schedule No. 79, issued by OPA.

Schedule fixes the maximum prices for quantities of 5 gallons or more at levels prevailing at the end of January.

Increased demand for tetrachloride is due in large measure to the use of the chemical for the cleaning of machine tools and metal parts employed in manufacture of airplane engines, military trucks, munitions and many other products.

As a result of the increased war industry effort there has been a substantially increased demand for the product. A shortage of chlorine, essential to the manufacture of carbon tetrachloride, restricts expan-

sion in production of the latter chemical.

Maximum prices established cover four zones, with the 73 cents per gallon price (for carload lots in 50-55 gallon drums) in Zone 1, 80 cents in Zone 2, 94 cents in Zone 3 and 83 cents in Zone 4. There are differentials to cover carload lots in 5 and 10 gallon cans and for less than carload lots in both size packages. The prices apply to all deliveries in the respective zones, regardless of the zone from which shipment is made.

The zones are those used in existing practices in the industry.

Second-Hand Machine Tools Subject to Strict Control

Sales and deliveries of second-hand machine tools will be more closely controlled under General Preference Order No. E-4 issued by the WPB Division of Industry Operations.

Order makes all provisions of Priorities Regulation No. 1 apply to transactions in second-hand tools, just as those provisions apply to sales and deliveries of other merchandise. Second-hand tools have been under very little priority control, and often critical second-hand tools have been purchased by companies not engaged in the most urgent war production.

The director of industry operations, or persons authorized by him, may prohibit the sale or other disposal of any specific second-hand machine tool until further notice, under the order. In such instances the director will determine to whom a particular tool should be allocated and an allocation order will be issued.

February Nonferrous Metals Output Eligible for Benefits

Benefits of the higher prices to be paid by Metals Reserve Co., for any output of copper, lead and zinc in excess of the quotas to be fixed by the WPB and the OPA will apply to February production, according to Federal Loan Administrator Jesse Jones.

Before, however, any month's output, which is in excess of quota, may be eligible for sale to Metals Reserve Co. at the higher prices, each producer will have to furnish a sworn affidavit, following the end of each month, showing his total production, his monthly quota, and the amount of his excess output. The forms for such affidavits will be supplied to the producer in due course.

After the end of each month, and upon the receipt of such affidavit, Metals Reserve Co., operating through smelting companies or other agencies, will buy from each producer a quantity of material equivalent to that producer's excess output during the month in question, at prices based on 17 cents for copper, 11 cents for zinc and 9¼ cents for lead.

Further details of the plan will be announced soon. In the meantime all producers should continue to sell their output through regular channels in the ordinary way, but should keep all data covering production, sales and settlements so as to be in position to make out the affidavit which will be required of them. If, at any time, any producer has thus sold his excess output at ordinary market prices, he will not thereby be deprived of the benefits of this arrangement, since in such cases an equivalent quantity of material will be eligible for sale, at the higher prices, from subsequent deliveries.

Accumulations of material, produced before Feb. 1, will not be counted in calculating production.

Metals Reserve Co.'s agreement to buy excess production at the higher prices will be subject to the right to cancel, upon the ending of the emergency, upon equitable terms.

Formal Price Maximum for Slab Zinc Established

Formal price ceilings have been established for primary slab zinc on a basis of 8.25 cents per pound, f.o.b. East St. Louis, for prime western grade, under Price Schedule No. 81, issued by OPA.

An informal price ceiling has prevailed at this level since Oct. 9; for a year prior thereto the price was pegged on a basis of 7.25 cents per pound, f.o.b. East St. Louis, for prime western. OPA pointed out that continued reports of some dealer sales at prices materially in excess of the informally approved ceilings have made necessary issuance of a formal ceiling order.

In the new OPA schedule, any sales of primary slab zinc to Metals Reserve Co., resulting from output in excess of WPB and OPA quotas, shall be excepted from maximum price provisions. Such sales are to be made in accordance with the premium price plan announced by OPA, WPB, and MRC.

Quantity differentials on primary slab zinc under the new schedule are patterned exactly after those in the primary lead order.

Grades of primary slab zinc established under the schedule are in accordance with specifications of the American Society for Testing Materials.

Primary slab zinc which fails to meet such standards should be sold at normal differentials below the established maximum prices. However, in the case of "tailor-made" zinc—viz, that made by a producer to conform with individual specifications required by a particular customer—such producer must submit to OPA necessary information for determination of the maximum price that may be charged in each instance.

The new zinc schedule also provides that persons desiring to sell for export at prices over the maximum shall file with OPA, prior to execution of such sales, complete information regarding the transaction, including the export commission desired.

Substitution of Zinc, Brass In Artillery Fuzes Studied

Possibility of using zinc and brass die castings instead of aluminum in the manufacture of artillery fuzes is being discussed by the technical subcommittee of the Defense Industry Advisory Committee for the Die Casting Industry.

Aluminum castings are vital in the aircraft industry, and the use of less critical metals in making artillery fuzes will result in a substantial aluminum saving. Brass, steel and zinc castings already are being used in some fuzes, but it is likely that more extensive substitutions can be accomplished.

The change from aluminum to either brass or zinc affects ballistic properties, and in an accurate mechanism such as a fuze, failure to function properly might result in serious consequences. Therefore, it is necessary to make up samples of brass and zinc castings and subject them to extensive tests before actual use.

Zinc Pool Requirements Increased for February

Zinc pool requirements for February were increased 9 per cent over January by the Division of Industry Operations setting the February figure at 40 per cent, based on November, 1941, production.

The zinc oxide pool for the month is doubled, from 10 to 20 per cent. No zinc dust is set aside for the month.

New Bronze, Brass Ingot Price List Announced

A new list of maximum prices for brass and bronze ingot has been announced by OPA in a letter to all nonferrous foundries.

Individual ingot makers, accounting for more than 99 per cent of the 1941 industry output, have agreed in writing with OPA, to observe this new list of maximum prices.

New price list contains some revisions downward and a few upward, but the general ingot price level is left substantially unchanged.

WPB Adopts Daily Reports System To Check War Production Progress

■ SYSTEM of daily progress reports, by which top war production officials will be kept constantly informed of the exact status of all phases of the production program and will be able instantly to discover the location and the cause of delays anywhere along the line, has been adopted by WPB.

The system was devised by Stacy May, chief, Progress Reporting Division.

It will work as follows:

The division will keep detailed reports up to date on each of the 300 principal military items being produced. Each day the chairman and top officials of the board will receive a report sheet showing current progress on such items as need attention. On a given day this report sheet may include half a dozen or a dozen different items.

For each of those items, the sheet will show, first, the total quantity which must be delivered during the current month in order to meet the goals laid down by the President. In addition, it will show the quantities delivered each day during the month, presenting a cumulative total so that a glance will show whether the program is being met for each item.

To take an imaginary example: Suppose the daily sheet reveals the production of M-3 tanks is behind schedule. The chairman or other responsible official will then call on the division for a breakdown report on tanks. This report will come to him immediately and will present tank production figures broken down in terms of the principal component parts in the production of tank hulls, tank motors, tank transmissions, tank guns and so on. Inspection of this sheet may show that all of the necessary components are being produced on schedule except the transmissions. Production of tank transmissions would thus be revealed as the bottleneck in the tank program.

Will Speed Corrective Action

The division will then have available for the chairman additional reports, compiled either monthly or bi-monthly, showing the production of the various components by the individual manufacturers. To follow the imaginary example further: If the daily sheet shows tank production is behind schedule, and the first breakdown-sheet shows it is the production of transmissions which is causing the delay, the chairman can then get this second break-down sheet which will show him the production figures for each manufacturer who has contracted to make transmissions.

Thus, within a matter of half an hour or thereabouts, the chairman and his aides will know exactly where the difficulty is and will be able to take the necessary action.

Once a month copies of the overall reports showing progress on all 300 items wil be distributed. For the daily reports, however, figures will be submitted only on such items as need constant watching.

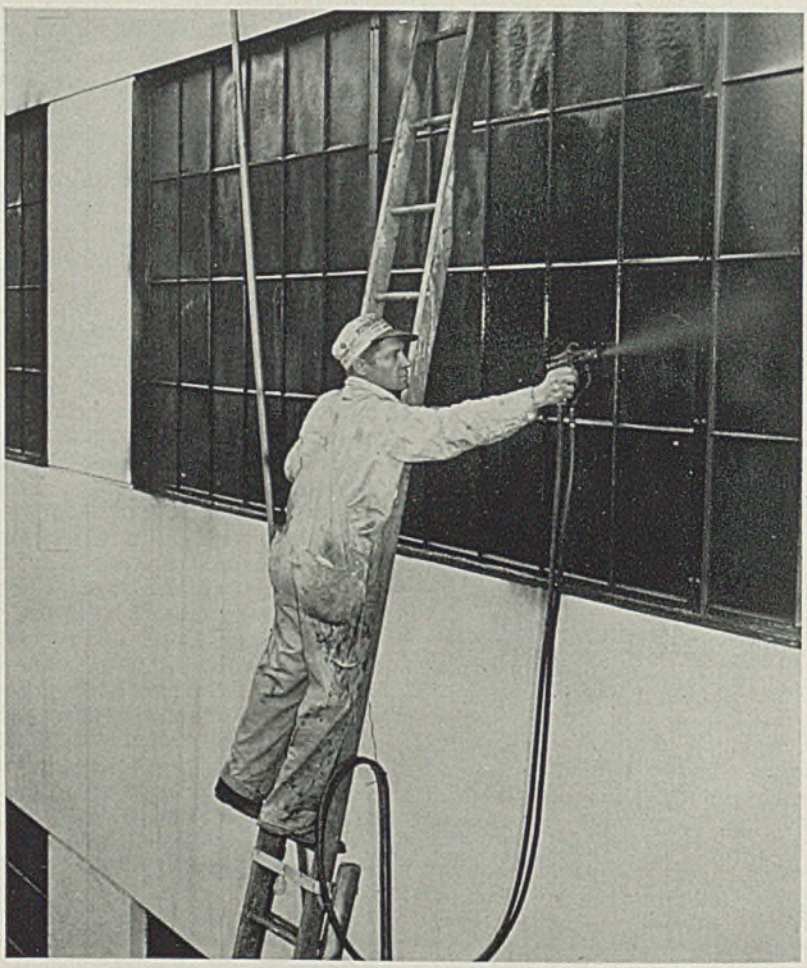
Seen as Important Step

"Compilation of these reports is one of the most important steps we have yet taken in the entire war program," WPB Chairman Nelson said. "It is now possible to make them up because we are getting accurate schedules of the production required to meet the goals which the President has set.

"These reports will be of inestimable value. They will enable us to know definitely, each day in the year, exactly where we stand on all parts of this job. They will reveal each bottleneck or delay point in the entire program when and as it develops. We will always know precisely where our major effort should be concentrated; we shall quickly be able to discover whether a delay is due to failure to place enough contracts, to shortage of tools, to a labor shortage, to insufficiency of materials or to failure by individual contractors.

"Equally important is the fact that through the use of these reports the responsibility on each official of the WPB will be clear and definite Just as they will reveal the progress of all phases of the war program, so also will these reports measure the performance of every one of us. Alibis will be impossible. Any failure to get results will be instantly revealed—and will be acted upon immediately."

Five Days' Work for 100 Men for Aircraft Blackout



■ Crew of 100 men worked five days recently to black out 1,000,000 square feet of window panes and skylights on the six plants of Lockheed-Vega, Burbank, Calif., in preparation for around-the-clock operations

Iron, Steel Price Schedule Revised To Provide Relief for Exporters

WASHINGTON

■ EXPORT provisions of Iron and Steel Products Price Schedule No. 49 have been revised to permit export agents and export merchants to charge on sales abroad certain margins over the domestic ceiling figures established by the schedule.

Although the margins and discounts allowed by mills normally are adequate to carry the cost of export business, exporters have disclosed to OPA that several mills in recent months have been withdrawing the discounts they normally granted exporters. Prior to the issuance of Price Schedule No. 49, exporters had not protested the withdrawal of their discounts by certain mills, apparently because they could add to their selling prices, as it has been possible to export steel at almost any price. South American demand for steel has been greatly in excess of the supply available here for export.

The ceiling covers exports of iron and steel products to any place outside the teritorial limits of the United States. This maximum shall be the domestic price, freight alongside ship at the port from which shipment is being made, plus an amount not more than 5 per cent in excess of the price at which the material is invoiced by the domestic seller, in the case of an export agent. The latter is defined as an exporter who acts as an agent in a sale to a foreign purchaser without taking title to goods being exported or assuming risk of loss because of demurrage, failure to obtain freight or otherwise.

Ten Per Cent Markup

Export merchants are to be allowed a 10 per cent maximum markup above the price at which the material is invoiced by the domestic seller. The term "export merchant" is defined by OPA as any exporter who resells directly to a foreign customer and who buys for his own account and assumes all risk of loss because of demurrage, failure to secure shipping space, damage to merchandise, or otherwise.

"It should be emphasized," Price Administrator Henderson said, "that the margin is allowed only to the person actually exporting, and to no other. The practice, that has developed in recent months in the export trade, of having export sales go through the hands of several intermediaries from mill to exporter, with a resultant exorbitant price by the time the material comes into the hands of the exporter, still is and will continue to be eliminated. by Price Schedule Nos. 6 and 49.

"This export market has been a pure example of inflationary price spiraling and profiteering. So far as we can see, these intermediaries performed absolutely no economic function and contributed nothing of value to the transactions in which they were involved. And certainly they have not helped our good neighbor policy to our allies in South America."

The administrator pointed out that although margins alowed were above domestic ceiling prices, exporters who are receiving discounts from mills and others may continue to receive them. "OPA investigations have disclosed that many exporters still are getting discounts from mills. Discounts run from 2½ per cent to 5 per cent, even at present." Mr. Henderson explained that the margin in the amended schedule takes into account the contentions of the exporters as to their present great risks and costs for which they required something over and above the discounts they received from the mills. This margin is to cover fully any demurrage and other expenses and risks which the export merchants may have at this time.

Only export agents and export merchants are named in the amendment. The commissions allowed by this revision of the schedule cannot be split by the exporter with any domestic seller, broker or exporter.

Sales by persons other than export agents or merchants are not affected by the change. Mill export sales still are governed by provisions of Price Schedule No. 6. Warehouse export sales are covered by domestic ceiling prices established under Price Schedule No. 49.

Imports of Vital Materials Increased Sharply in 1941

Despite withdrawal of foreign flag ships from important trade routes United States imports of ten raw materials vital to the war effort increased during 1941, according to the Maritime Commission.

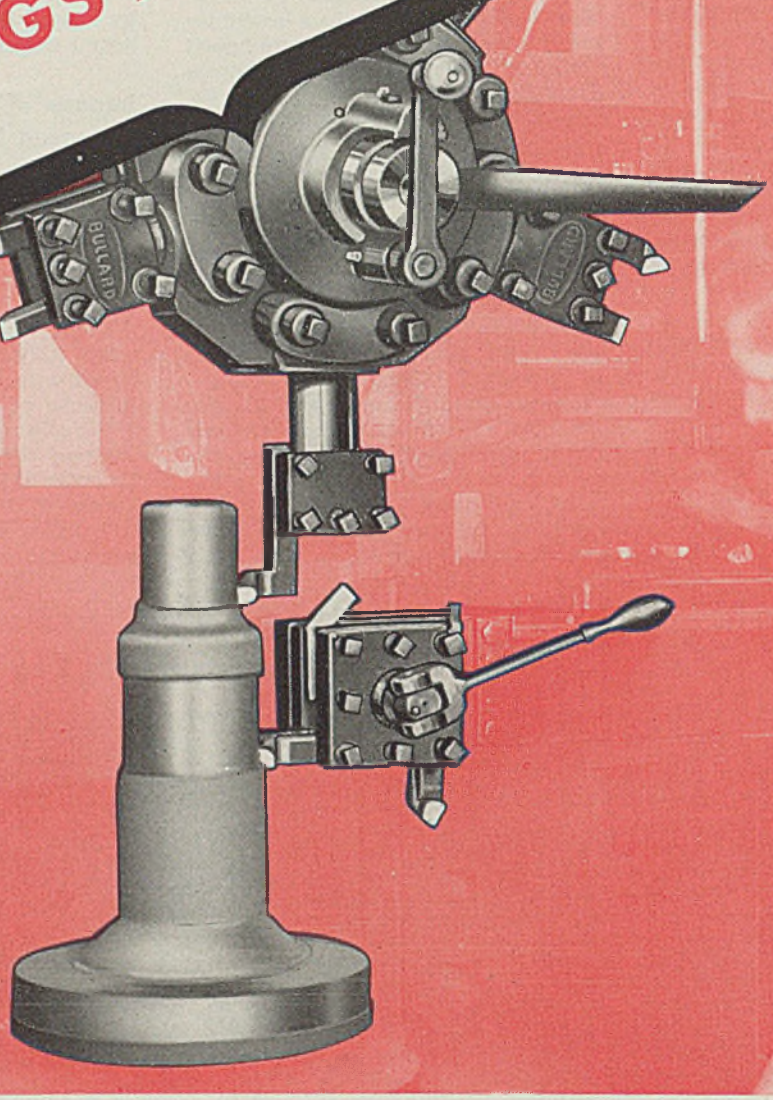
Total imports of the ten materials were 6,500,000 tons in 1941, compared with 2,250 000 tons in 1938, an increase of nearly 200 per cent.

Percentages of increase in the various cargoes over 1938 follow: Bauxite, 195 per cent; chrome, 240; copper, 205; cork, 103; graphite, 693; mica, 88; manganese, 136; rubber, 145; tin, 279; wool, 853.

President Suggests Parasites Leave Washington

■ President Roosevelt's suggestion that "parasites" get out of Washington to make room for persons needed there, and the further suggestion that Washington newspapers headline the question "Are you a parasite?" found the Daily News fully co-operative. Some news commentators facetiously searched the list of New Deal favorites to find names of those to whom the President might have referred. One writer, noted for his acrid criticisms, wired his syndicate from Detroit: "All right, I heard the President, and I went, but what about Charlie Michelson? Is he essential to the war effort?" NEA photo

WHO SAYS YOU CAN'T DO TWO THINGS AT ONCE?



THE Main Head and Side Head of this Bullard Vertical Turret Lathe are cutting simultaneously—with consequent saving in time. With five positions for tooling on the main turret head, four tools on the side head, nine different operations at one chucking are possible.

Add the sturdiness and sustained accuracy for which the V.T.L. is famous and you've got some of the reasons why it's the greatest machine tool of its type in the world.

Bullard V.T.L.s have *all* these features

Vertical Design ● Rigidity and Power for Carbide Tools ● 5-Face Turret on Main Head ● Rapid Power Traverse of Main Head ● 4-Tool Turret on Side Head ● Simultaneous and Independent Head Action ● Centralized Control

THE BULLARD COMPANY

BRIDGEPORT, CONNECTICUT

Mirrors of MOTORDOM

Detroit production philosophy setting a pattern for industry in war equipment manufacture. Huge load of orders being accepted in the "we can do it" spirit . . . Surveying availability of 25 types of "critical" machines . . . Legwork still necessary in lining up war contracts for smaller companies . . . Urgency ratings adopted for machine tools . . . Chrysler to build Wright engines in new Chicago plant

By A. H. ALLEN
Detroit Editor, STEEL

DETROIT

■ WHAT is the "Detroit philosophy" of production? There is a very definite philosophy of manufacture, whether it is automobiles or machine guns, which is peculiar to this area and is not found in any other section of the country. It is perhaps best summarized as being a complete lack of terror in the face of big figures.

There are hundreds of industrial companies throughout the country which, when faced with what appears to be a tremendous order, immediately set up a defeatist front. The general manager shakes his head and worries over how regular customers are going to be satisfied if this huge new order is taken on. The sales manager rubs his hands and timidly suggests that the new order would be swell business. The production manager says it is going to be a tough job to keep the machines going long enough and steady enough to fill the order—and maybe there are not enough machines. The labor relations man pounds the table and says it "just ain't fair" to work the men as hard as will be necessary to fill the order. So the president says, "Well, tell 'em we'll take a small piece of it."

Against this is the Detroit philosophy of looking at a big order and saying substantially, "So, they think this is a lot of production? Well, let's show them how we do it. We'll fill the order with time to spare—as a matter of fact we will take on 25 per cent more." And the strange part of it is that this positive attitude is no mere braggadocio; the job is usually done, even better than first estimates indicate.

The chief executive of one of the major automobile companies said the other evening, "If we manage to make the schedules promised on all our war orders, my conclusion is that we haven't taken on enough." This company already has beaten original schedules—by a wide margin—on nearly every war job undertaken. Instead of glowing over the fine job done, the reaction is that the orders were not large enough. That's the Detroit philosophy.

Salesmen and engineers representing companies in the East or away from the automobile center say they can feel the difference in the atmosphere as soon as they step off a train at their home office. They wish the Detroit philosophy could be spread over the entire industrial nation. They feel that if it were, this war production job would be vastly simpler.

Although they will not say so publicly, Army, Navy and government officials are uniformly amazed at what Detroit has done in war production, and are likewise amazed at what is now being projected. They are bunching up on Detroit to be on the scene where this industrial miracle is being wrought. In the heart of Detroit's New Center, the War Production Board has set up offices, along with the Priorities Division, the Contract Distribution Division and the Training Within Industry Division. In the same building is the Automotive Tool and Die Association, now co-operating on a survey of tooling facilities, the immediate bottleneck in war production. A block away are the headquarters of the Automotive Council for War Production.

Rushing Survey of Toolroom Equipment for WPB

E. C. Kanzler, chief of the automotive branch, WPB, has launched a telegraphic survey of all automobile and truck builders, plus 150 of the largest parts makers and suppliers, seeking information as to the number, status and use of 25 types of critical metalworking machines, including horizontal boring machines, jig boring machines, vertical boring machines, chambering machines, hobbing machines, deep-hole drilling machines, radial drills, turret lathes, gear grinders, internal grinders, toolroom lathes, thread millers, engine lathes 24 inches and up, milling machines, planers 36 inches and up, multiple spindle automatics, profilers, rifling machines, bar machines, rifle reaming machines and thread grinders.

Mr. Kanzler said this survey represents a necessary step preliminary to allocating orders in the government's efforts to use all available and useful machinery in production of the weapons and goods most vitally needed by the armed forces.

Irving J. Reuter, from 1925 to 1933 head of Olds, Oakland and Buick plants in that order, has been drafted from his home in Biltmore, N. C., to become an associate of Mr. Kanzler. A graduate of Purdue university, Mr. Reuter was with Remy Electric from 1909 to 1925 and retired in 1933.

Regional office of the Information Division of the OEM has been transferred from Chicago to the Detroit WPB headquarters, in charge of Paul H. Jordan. This office covers the states of Michigan, Wisconsin, Illinois and Indiana.

Unprecedented Upheaval in Production Picture at Hand

It requires no great degree of perspicacity to realize the automobile industry, as such, is no more. Anyone still clinging to the belief that some measure of car production is going to linger on had best relieve himself of this view. When you consider that only 3 per cent of the stamping and punch press capacity of the country is still at work, you appreciate the extent of the transition now in process.

Energetic parts companies, realizing their automotive accounts are now extinct, are concentrating day and night on garnering some share of war production, even if it necessitates practically remaking their

plants. Officials shuttle back and forth between Michigan and the East. Orders are placed for new machine tools in staggering quantities. Close touch is kept with the motor car companies to grab off suitable subcontracting jobs. There is plenty of legwork involved.

Some of these couriers feel that personal contact is the only way to gear up the parts and supply plants to war production. They question the effectiveness of the equipment surveys now in process, one reason being that owners of such equipment generally do not have the faintest idea of what kind of war work they can handle on this equipment unless they get out in the field and look at some parts.

In the preparatory phases of a program the size of the one now unfolding, machine tools obviously are going to be the bottleneck, so there should be no tendency to minimize or deprecate the importance of any surveys being made, whatever the eventual result. An example of how far the pressure for machine tools has gone is the use of "urgency ratings" in addition to priorities for such tools. Under A-1-a priority, there are reported to be some 2000 urgency ratings, depending on the degree of importance of the job. An antiaircraft gun job, for instance, will carry a priority of A-1-a with an urgency rating of 1. Other less pressing contracts may still carry A-1-a priority, but with urgency ratings all the way down the line to 2000.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1939	1940	1941
Jan.	356,962	449,492	*524,073
Feb.	317,520	422,225	509,326
March	389,499	440,232	*533,878
April	354,266	452,433	*489,856
May	313,248	412,492	545,355
June	324,253	362,566	546,278
July	218,600	246,171	*468,897
Aug.	103,343	89,866	*164,793
Sept.	192,679	284,583	248,751
Oct.	324,689	514,374	*401,364
Nov.	368,541	510,973	373,892
Dec.	469,118	506,931	302,518
Year	3,732,718	4,692,338	5,108,992

*Revised.

Estimated by Wards Reports

Week ended:	1942	1941†
Jan. 10	58,990	115,935
Jan. 17	75,025	124,025
Jan. 24	79,930	121,948
Jan. 31	73,305	124,400
Feb. 7	37,125	125,000

†Comparable week.

Look Ahead at Postwar Period Not Very Comforting

Vast extent of the all-out war effort raises the question as to how long the conflict will last. Estimates range from as short a period of time as two years to five years minimum. One auto executive gave it as his opinion that the country could not stand a war of over five years' duration, on the basis of morale and not resources. Another authority observes his planning is being based on at least five years of worldwide combat.

Whatever the answer, and everything is a guess at this stage, there is general agreement that the postwar period is going to be hell—extending General Sherman's observation. One manufacturer, with billions at stake, offered to pay any insurance company a premium of five million dollars for a guarantee that his company would not wind up in the red after the war effort. It is generally conceded that national wealth will be seriously depleted, the people at home reduced because of taxation and war savings investments; the soldiers and sailors and aviators returning with empty pockets and scant likelihood of good jobs.

There is consolation in the fact this country probably will have to maintain and keep equipped large forces of land, sea and air patrols, even after the war is ended. Further there is the hope that a sharply curtailed production of civilian goods now will build up a heavy postwar demand for automobiles, refrigerators, radios and the like.

Whether the automobile industry will ever emerge again as its old competitive self is open to question. Competition has been suspended now, with resources, talents, patents and productive ability being pledged to a common goal. The specter of complete socialization of the industry after the war flits in and out of current discussions.

To Build Engines at Chicago

Announcement was made last week of award of a $100,000,000 contract to Chrysler Corp. for airplane engines. Originally it was presumed this was for the new Chrysler in-line airplane engines now undergoing tests, but later advices from Chicago indicated it was for construction of Wright 12-cylinder radial engines, requiring a plant of 2,000,000 square feet employing 25,000, to be located in the Chicago area. Studebaker already is in production on Wright engines in plants in this district, and Buick has launched production of Pratt & Whitney engines at its Melrose Park, Ill., plant.

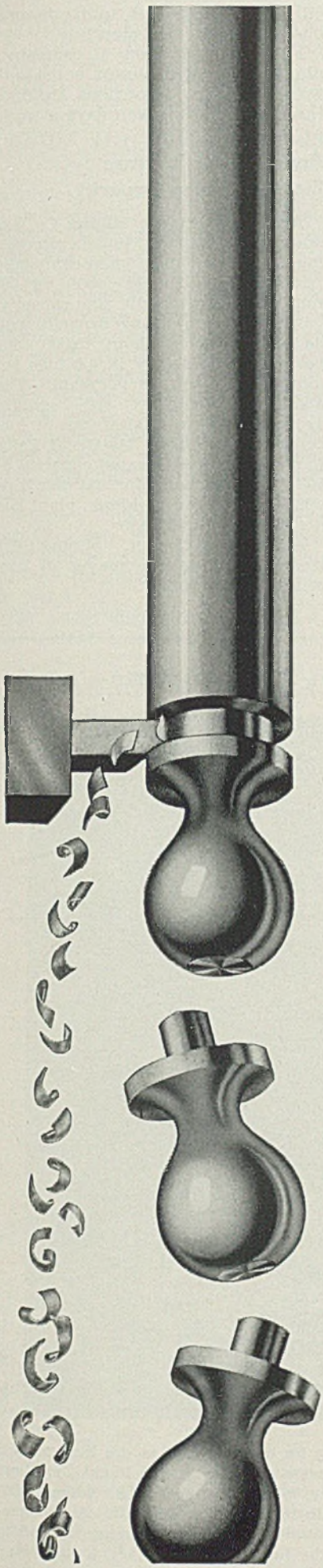
See Employment of 700,000

As employment figures are projected, it becomes apparent the automobile and parts industries will have to add about 75 per cent more working people than were on payrolls at the peak of 1941, or in all something like 700,000 persons. With the selective service likely to remove added thousands, including many with dependents, the need for more extensive employment of women is clearly indicated if peak

(*Please turn to Page* 122)

Men and Machines His Chief Worries

■ Lack of machine tools and a probable shortage of skilled workmen are the principal deterrents to conversion of the automotive industry to full war production, Ernest Kanzler, chief of the automotive branch of the WPB, tells newsmen in Detroit. NEA photo



J&L STEEL

COLD FINISHED BESSEMER SCREW STOCK

uniform Bessemer Flame Control

free cutting steel for superior parts.

JONES & LAUGHLIN STEEL CORPORATION

AMERICAN IRON AND STEEL WORKS • PITTSBURGH, PA.

EXPANSIONS

National Tube To Build New Blast Furnace in Lorain

■ National Tube Co., U. S. Steel Corp. subsidiary, will build a new blast furnace with 1200 tons daily capacity at its Lorain, O., works. It will replace No. 4 furnace of 800 tons capacity, which was blown out at the end of January. The plant will have total capacity of 4800 tons, largest in its history.

Arthur G. McKee & Co., Cleveland, is drawing plans and will supervise construction of the new stack, which is scheduled for operation by July 15.

Hauck Investigating Steel Projects on West Coast

Progress report on the steel expansion program on the West coast will be made to Charles E. Adams, chief of the WPB Iron and Steel Branch, by W. A. Hauck, head of the steel expansion unit, who now is investigating the projects. Mr. Hauck left Washington last week by plane and is expected to return by Feb. 1.

Mr. Hauck's itinerary includes Los Angeles, San Francisco, Portland, Oreg., Seattle, Provo, Utah, and Chicago.

At Los Angeles he will look into the possibilities of building a new aircraft tubing plant, in addition to visiting the steel plant programs being financed by the Defense Plant Corp. At San Francisco, the projects being undertaken by the Columbia Steel Co. and Bethlehem Steel Co. and the forging capacity expansion will be investigated.

In the Northwest, Mr. Hauck will see the work being done by the Pacific States Steel Co. at Portland, the forging plant of Bethlehem, and the projects of Isaacson Iron Works and the Northwest Steel Rolling Mill Co. at Seattle. At Provo he will visit the site of the new plant to be built there by U. S. Steel, and at Chicago the special offices established to direct the Provo plant.

Warner & Swasey Co. Building; To Increase Output 40 Per Cent

Warner & Swasey Co., Cleveland turret lathe builders, will expand facilities to increase present production by 40 per cent, Charles Stilwell, president, said last week. Expansion, which is being undertaken at government request, will consist of two new buildings.

One will be an extension of one of the company's present buildings, will contain 30,000 square feet of floor space and cost $450,000. It will be financed by the company.

The other will have 110,000 square feet of floor space and will cost $750,000. Building and machinery and equipment, costing an additional $1,500,000, will be financed by Defense Plant Corp.

Construction will be started as soon as possible and the first unit is expected to be completed and ready for operation by July.

During the past two years, Warner & Swasey has already increased output by more than 400 per cent.

Crane Co., Undertaking $6,000,000 Program

Crane Co., Chicago, is undertaking a $6,000,000 expansion program to increase capacity for war material production, John H. Collier, president, announced last week. When completed the expansion will enable company to double output of cast steel valves.

Cost of the two new buildings involved will be met by the company while the Navy will supply funds for tools and equipment. New facilities are expected to be in production within six months.

Present production at company's plants is devoted almost entirely to war materials. Operations are on a three-shift basis seven days a week.

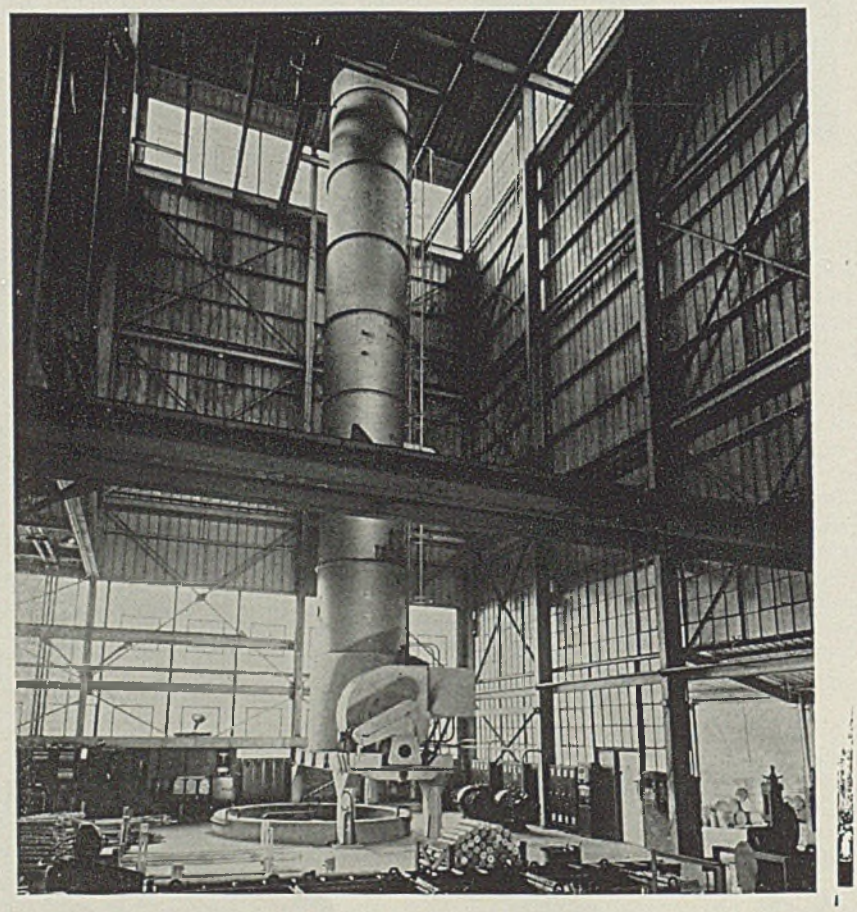
Anaconda To Increase Zinc Processing Capacity

Anaconda Copper Mining Co. has started expansion of its zinc processing facilities which, when completed next fall, will add about 45,000 tons to its electrolytic zinc capacity.

Anaconda's refining capacity will be boosted from about 15,000 tons per month to nearly 19,000 tons per month, or about 26 per cent. The additional facilities will require around 90,000 to 100,000 tons of concentrates annually. Its Great Falls, Mont., plant has a rated capacity of 108,000 short tons for cathode zinc while its Anaconda, Mont., plant has a rating of 54,000 tons.

Anaconda Copper Mining Co. treats substantial tonnages of concentrates on toll.

Hardens Aluminum Aircraft Parts



■ Extruded aluminum bars, rods and tubing for airplane bodies are heat treated in this 76.5-foot Westinghouse resistance furnace at the Reynolds Metal Co. plant, Louisville, Ky. Pieces are heated uniformly to 925 degrees Fahr., without distortion, and dropped to a water quench bath in the pit underneath. A 40-horsepower hoist motor with variable voltage control and dynamic braking is used to raise parts into the furnace

Company, 200 Years Old, Gives Away Bonds for New Babies

■ Taylor-Wharton Iron & Steel Co., High Bridge, N. J., now celebrating its 200th anniversary, has produced materials or munitions for every war in which this country has been involved, including the Colonial conflicts with the Indians before the War of Independence, according to George R. Hanks, president. At the High Bridge plant are the remains of one of the original forges built in 1742.

Company now is making, among other products, shell forgings, tank parts and high pressure gas containers.

Eighteen hundred employes have been notified that a $25 defense bond will be given by the company to each baby born to an employe in 1942.

Net profit during 1941 was $487,007, compared with $233,319 in 1940.

Editor, Under War Strain, Gives Way To Fiction

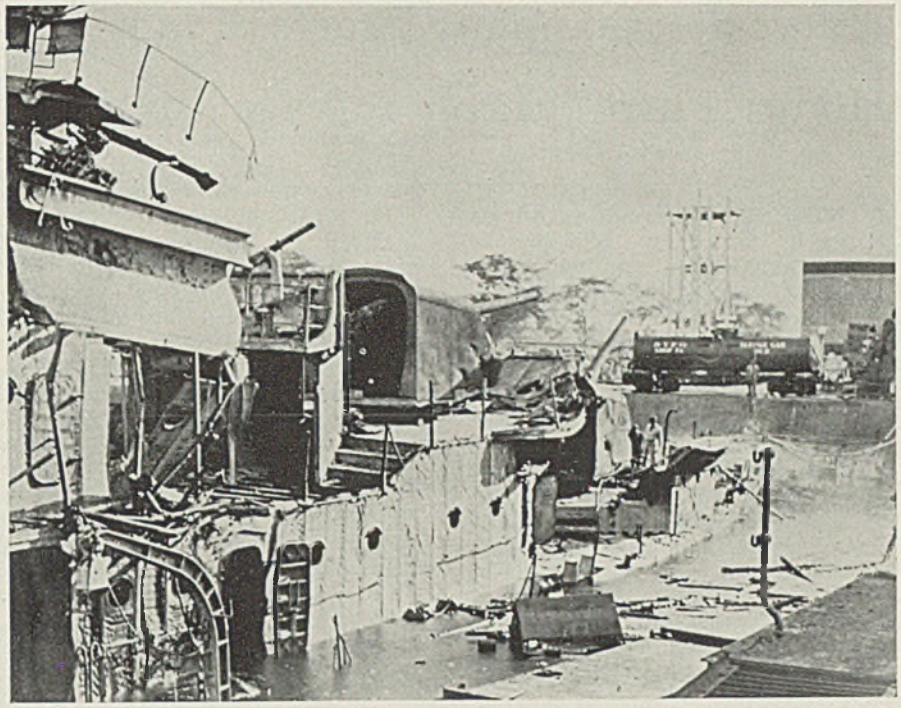
■ This item is of no importance in the metalworking industries; it is of so little concern to them it might be considered an imposition to bring it in here. Yet there is iron in this story, iron in the form of a water pipe. At a critical time the pipe gave way, and that, too, is a question as to the strength of metals.

When the hoarding fever set in a certain family loaded up with sugar. Twenty 25-pound sacks, containing 500 pounds of sugar, were piled closely on a shelf in the fruit cellar. Then the happy family motored South for the mid-winter vacation, leaving a poor relative in charge.

Now here is where the iron comes in: The pipe came through the wall just above that sugar, and in a cold spell the water in it froze and split it. It was just a short, thin slit, but potent.

The weather moderated, the ice thawed. Trickle, trickle, day after day, the water fell upon the cloth sacks, brought all the sugar into solution, washed it away, down on the floor in a syrupy stream and into the drain.

The family came home, saw at a glance what had happened, called in a plumber to repair the pipe—and then stocked canned goods.



Two Ships for One

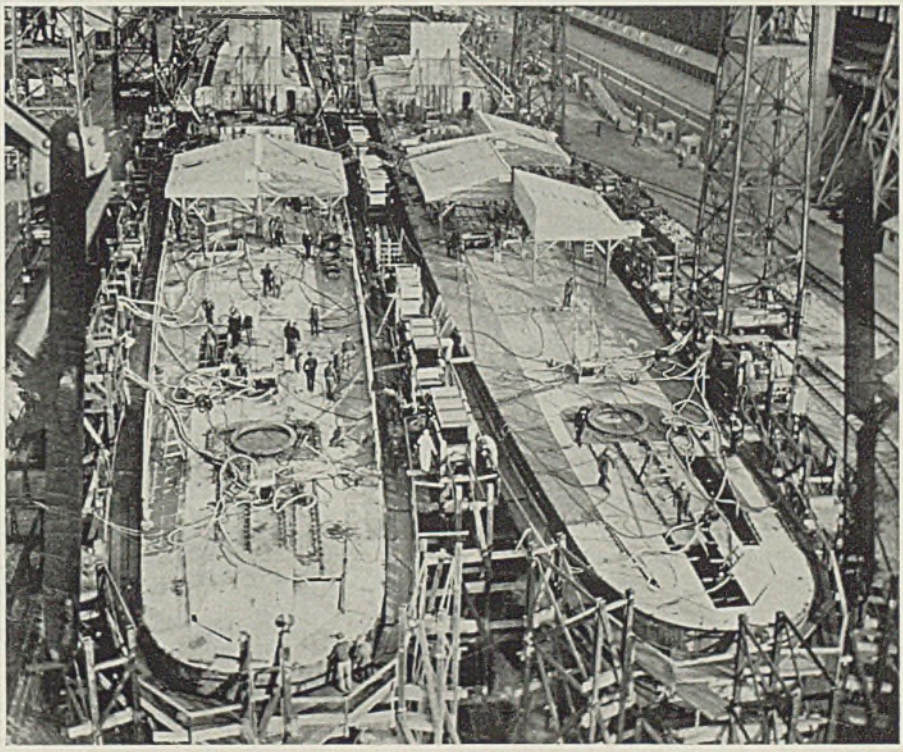
■ When, after Pearl Harbor, President Roosevelt called for vastly expanded production of ships, airplanes, guns and tanks, industry's immediate and emphatic reply was a promise to deliver the goods—"To build two battleships for every one that sinks . . ."

Last week the Navy released the photograph above, showing the destroyer U. S. S. DOWNES wrecked by Japanese bombs in the attack on Hawaii, Dec. 7. At the same time, two destroyers shown in photograph below were prepared for launching at an Atlantic coast yard.

United States Maritime Commission has announced award of 63 new cargo vessels to bring its program nearer the 18,000,000-deadweight-ton goal for the next two years.

Fifty-three "Liberty" ships of the EC-2 type were awarded to the North Carolina Shipbuilding Co., Wilmington, N. C. All will be completed by the end of 1943.

Commission also has awarded ten C-1 type vessels to Pennsylvania Shipbuilding Inc., Beaumont, Tex.



Harvester Company Starts "Plant, Home, Farm" Scrap Salvage Plan

CHICAGO

■ INTERESTING and seemingly workable plan for collection of scrap, inaugurated and being put into operation by the International Harvester Co., was offered to all industry by Fowler McCormick, company president, at a luncheon meeting of the Illinois Manufacturers' Association in the Congress hotel here Feb. 3. Meeting was called for the purpose of organizing and speeding the government's drive for collection of scrap in Illinois. Principal speaker was Lessing J. Rosenwald, chief, WPB Bureau of Industrial Conservation.

Salvage plan, described by Mr. McCormick, contemplates three separate campaigns within the company:

1. A thorough salvage search throughout all the International Harvester properties, in plants, railroads, raw material works and sales branches.

2. Mobilization of the company's 60,000 employes to uncover and collect scrap in their homes.

3. Enlisting the aid of the company's 10,000 farm equipment and motor truck dealers to salvage needed materials on their properties and to collect scrap from farmers in their districts. The scrap would be accumulated at central points and sold to scrap dealers, and farmer-customers would be credited for their share of the proceeds.

A. C. Seyfarth, International Harvester's advertising manager, is directing the plan.

Recommends Plan

Commenting upon the program, Mr. Rosenwald said: "The Harvester plan is an ingenious one which is capable of getting farm scrap flowing to industrial users. There is from 1½ to 3½ million tons of iron and steel scrap on farms, but we have thus far been unable to get it moving in sufficient quantities because there is no inducement for the regular junk dealers to go out and get it.

"The plan overcomes the inherent difficulty in assembling farm scrap at focal points and transporting it in carloads to the mills. I will recommend the plan to other large industrial companies."

W. Homer Hartz, president, Molden Frog & Crossing Works, Chicago, was appointed chairman of the Illinois Manufacturers' Association industrial salvage committee of 35 members. Mr. Hartz will work as head of an executive committee composed of the following:

M. F. Dunne, Pyott Foundry & Machine Co., Chicago, vice chairman; Noah Van Cleef, Van Cleef Bros., Chicago; Charles D. Wiman, president, Deere & Co., Moline, Ill.; John D. Swigart, Swigart Paper Co., Chicago; H. W. Lillengren, secretary-treasurer, Bliss & Laughlin Inc., Harvey, Ill.; William E. Fay, president, Champion Machinery Co., Joliet, Ill.; E. C. Xander, president, Illinois Industrial Council, Moline, Ill.; Paul W. Dillon, chairman, Northwestern Steel & Wire Co., Sterling, Ill.

Scrap Industry Replies CIO Curtailed Supply

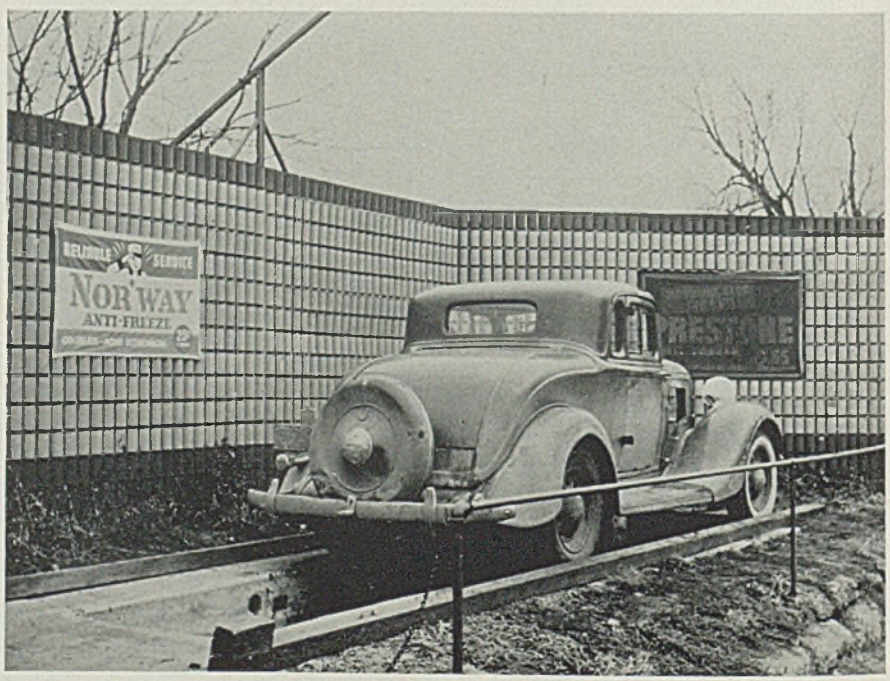
■ Replying to charges by Philip Murray, CIO president, that speculation by scrap brokers was costing the nation 2,000,000 tons of steel annually, Edwin C. Barringer, executive secretary of the Institute of Scrap Iron and Steel Inc., declared the scarcity of scrap is due in large measure to CIO "interference."

He stated that during the 1941 coal strike steel mills were forced to increase scrap content of their charges because of lack of pig iron until scrap reserves were depleted more than 500,000 tons; that fully 500,000 tons of scrap is available in coal mines which can be brought out only on Sundays, but that CIO insistence on double-time wages for this work makes the cost greater than the scrap value; that much steel production was lost by strikes at plants of Great Lakes Steel Corp. and other mills, some of them unauthorized; that CIO pickets now are tying up operations in several automobile wrecking yards in St. Louis.

"Sworn testimony taken by the congressional committee on small business," continued Mr. Barringer, "definitely refutes Mr. Murray's charge that scrap interests are endangering the war program to gain further profits . . . the committee was satisfied that there is no hoarding of consequence on the part of scrap dealers themselves. Auto graveyards, it should be understood, are not scrap yards. The scrap industry can be relied on to get out every available pound. Let others help remove the barriers that impede our efforts in many places."

■ Recent report from London to the Department of Commerce on an intensified campaign to collect iron and steel scrap states that about 250,000 tons of metal has been recovered from bombed buildings in the past six months. The report adds "little more can be expected from this source as the situation now stands."

Practical Use for Old Cans



■ To hide unsightly buildings in the rear of his filling station, a Lake Crystal, Minn., operator built this wall of 1800 old oil cans, representing about two years' sales, painted it red and yellow to match the station. NEA photo

Government Inquiries

The following prime contracts are pending, with closing dates for bids as indicated. QR refers to quantity required. Bidding forms on these items can be obtained only by wiring, mentioning schedule number, to the Procurement Branch of the service heading the list of requirements. Field offices of Contract Distribution Branch, WPB, generally have available for inspection and examination, schedules, invitations, specifications and drawings (where required) concerning these contracts.

BUREAU OF SUPPLIES, ACCOUNTS NAVY DEPARTMENT, WASHINGTON

207—**Pumps,** portable, submersible, complete with motors, controllers, and spare parts, for 440 volt alternating current, QR-338. Bids Feb. 13.

221—**Aluminum,** ingot, in commercial weight ingots, QR-5600 lbs.; aluminum alloy, ingot, in commercial ingots, QR-88,000 lbs. Bids Feb. 12.

222—**Cartridges,** dummy, (wood and steel) 5", 38 caliber, mark 5, complete, QR-12,780. Bids Feb. 13.

225 — **Nickel-copper-aluminum alloy,** round, rod, quenched but not aged, QR-approx. 50,500 lbs. Bids Feb. 12.

229—**Cartridges,** CO_2, gas filled for inflatable life belts, QR-1,600,000. Bids Feb. 13.

246—**Hand truck,** steel box, tilting type, 45" x 69" x 30" deep inside dimensions, 4 wheel, approx. capacity, 1500 lbs., QR-45. Bids Feb. 13.

248—**Iron,** wrought, bar, round, large quantities of sizes ranging from ⅜" to 4¼". Bids Feb. 12.

252—**Bread boxes,** dredge and pepper canisters, sugar, etc., QR-large. Bids Feb. 12.

253—**Assemblies,** protecting cap, waterproof, 45 second time fuzes, pieces 1 and 2, QR-471,894. Bids Feb. 13.

256—**Pumps,** centrifugal, motor driven; spare parts, tools and wrenches, QR-20. Bids Feb. 12.

260—Fire pumps, turbine driven, spare parts, tools and wrenches, QR-15. Bids Feb. 10.

263—**Chain,** proof coil, close link, Type A, Class 1, Grade II, wrought iron or steel, ¾", feet per length 200, QR-282 lengths; 100, QR-140 lengths. Bids Feb. 17.

265—**Welding rods:** aluminum, steel, cast iron, copper-zinc alloy, copper-nickel alloy, copper-silver alloy, and chromium-cobalt composition, QR-Varying quantities of numerous sizes. Bids Feb. 12.

282—**Solder,** tin-lead, bar, QR-approx. 200,000 lbs.; solder, brazing, coarse, long grain, QR-800 lbs.; solder, tin-lead, wire, flux, cored, 3/32" dia. on 5 lb. spools, QR-55,400 lbs.; ⅛" dia., QR-115,000 lbs. Bids Feb. 19.

283—**Steel,** bar, Class A (open hearth carbon), finished, hexagon, 1⅝" thick, bolt material, bar, round, rough or semi-finished; bolt material, hexagon; heat treated bar; medium, black, bar; lengths, structural, steel, galvanized; channels, steel, structural, common, galvanized; sheet; chrome nickel, hot rolled bar; nickel, bar, chrome vanadium, large quantities of various sizes. Bids Feb. 13.

285—**Waste paper** receptacles, waste paper, metal, steel, round, plain side, olive green finish, dia. at top 12", height overall 14"; fiber, type A, size 1, QR-168,000 of ea. type. Bids Feb. 12.

287—**Facing,** foundry, sea coal or bituminous, grade E, in barrels of approx. 308 lbs. ea., QR-30,000 lbs.; in paper lined jute or burlap bags of approx. 125 lbs. ea., QR-45,000 lbs. Bids Feb. 19.

298—**Extinguishers,** fire, portable, carbon-dioxide, (with brackets) cap. at least 2 lbs. of gas, fully charged, QR-1751; 4 lbs. cap. QR-1171; 15 lb. cap. QR-13,951. Bids Feb. 19.

284—**Blades,** saw, butcher, type H, length 24", width ⅞", QR-15,000; 24", QR-5700. Bids Feb. 12.

291—**Skids,** barrel, all steel, QR-404; trucks, hand, stevedore, QR-500. Bids Feb. 17.

301—**Steel,** rivet, bar, large quantities of numerous sizes. Bids Feb. 19.

304—**Steel,** plate, floor, QR-large. Bids Feb. 19.

305—**Nickel-chromium-alloy,** bar, round, ⅜" dia., QR-500,000 lbs. Bids Feb. 13.

306—**Shapes,** steel, plain, common, Grade C, galvanized, misc. shapes, QR-Large. Bids Feb. 19.

308—**Steel,** plate, marine, boiler, QR-large. Bids Feb. 19.

316—**Pipe** and Tubing, Steel, QR-Large. Bids Feb. 20.

317—**Tubing,** copper-nickel-alloy, QR-large. Bids Feb. 20.

319—**Extinguishers,** fire, foam type, 2½ gallon cap. complete with brackets, QR-1450; pump type, 5 gal. cap. QR-4110. Bids Feb. 19.

324—**Knives,** paring, (Cook's) corrosion resisting steel, 3½", QR-154,000. Bids Feb. 12.

WAR DEPARTMENT, AIR CORPS WRIGHT FIELD, DAYTON, O.

42-1915—**Plumbing** fittings: pipes, reducing outlet crosses, standard elbows, standard tees, short nipples, W. I., pipe plugs, pipe caps, unions, couplings, shut off air valves, pipe support straps, hose, hose couplings, Cleco never-slip hose clamps, cleco grooved nipples, cleco blow blow gun, tees, crosses, water faucets, shut off water valves, pipe covering, 85% magnesium, bands, and pipe brackets, quantities ranging from 2000 to 25,000 on ea. of 77 items. Bids Feb. 11.

Sub-Contract Opportunities

Data on subcontract work are issued by local offices of the Contract Distribution Branch, WPB. Contact either the office issuing the data or your nearest district office. Data on prime contracts also are issued by Contract Distribution offices, which usually have drawings and specifications, but bids should be submitted directly to contracting officers as indicated.

Newark, N. J., office, Contract Distribution Branch, Production Division, WPB, 20 Washington Place, reports the following subcontract opportunities:

No. 101: A large prime contractor is interested in obtaining subcontractors who can machine large aluminum castings, one of which is approximately 5-foot diameter and will require a 54-inch high-speed boring mill and drilling equipment, 1250 required. 11 hours estimated for each one. Foundry requirements: heat treating equipment to meet a schedule 15 to 30 hours, temperature of 760 to 960 degrees after salt bath. Complete delivery by May 1.

No. 102: A large New Jersey prime contractor is seeking subcontract facilities that can do sheet rolling and forming, cylinders of thin wall tubing, approximately 8-inch diameter. Welding and drilling equipment also needed. Facilities for applying rust preventative plate or bath necessary. Delivery required by May 1.

No. 103: A New Jersey manufacturer is seeking the services of shops capable of manufacturing small or medium sized gears. No information as to quantity but understand it is large.

No. 104: A large prime contractor wants a subcontractor having 6 drill automatic chucking and turning machines, automatic friction and boring spindle machines required for six months.

No. 106: A prime contractor is interested in locating subcontractors for the manufacture of small electric motors ⅛ horsepower and less.

No. 107: A prime contractor is seeking subcontractors who can wind DC armatures. Quantities—large.

No. 108: A prime contractor is seeking subcontractors for the manufacture of small precision gears.

No. 109: A prime contractor is seeking subcontract facilities. Can use the services of a 6-foot or larger boring mill. Will keep it busy for six months.

Connecticut offices, Contract Distribution Branch, Production Division, WPB, (152 Temple St., New Haven; 805 Main St., Hartford; 144 Golden Hill St., Bridgeport) report the following equipment is needed for subcontract work:

No. 1: Drill presses, capacity 1 to 3 inches. Planers, 60-inches wide by 15-foot table. Milling machines, Nos. 2 and 3 horizontals, No. 3 with 12-inch table verticals. Boring mills, vertical 2-inch bar. Lathes, 12 to 24-inch swing, 6 feet center to center. Bench lathes, 6 to 9 inches. Shapers, 14 to 24-inch stroke. Grinders, external, internal and surface. Boring mill, horizontal 2-inch bar.

No. 2: Turret lathes, 3-inch. Large drills. Heavy tapping machines for 105 mm. chemical shell adapter work. X1514 steel, 40,000 or more per month.

No. 3: Automatic screw machine to ⅝-inch bar stock.

No. 4: Bar turret and chucking turret lathes. Large screw and hand milling machines. Medium size planers. These items required separately, not necessarily as a group.

No. 5: Nonferrous casting work involving 200,000 pounds per month.

No. 6: No. 2 Brown & Sharpe automatic screw machines, 1⅛-inch bar. Subject company will supply steel; will also drill and plate.

No. 7: Forging work involving 200 pieces per month by June.

No. 8: Automatic screw machines, 6 or 4 spindles, 1¾-inch stock, 20,000 pieces.

No. 9: Gages, including concentricity, plug, snap, ring, flush pin and profile types. Hydraulic presses for dies, approximately 50-ton. Heat treating facilities. Threading machines-milling and grinding. No. 2 hand screw machines. Turret lathes, small up to more than 2½-inch, also bench lathes for polishing and small engine lathes. Milling machines. Grinding machines for 100-inch internal grinding; ½-inch up external grinding; 6 x 10 inch, 10 x 12, 12 x 16 surface grinding; thread grinding; centerless grinding ⅜-inch up to 2-inch diameter, 6 to 24-inches long.

New York office, Contract Distribution Branch of WPB, 122 East Forty-second street, New York, reports the following subcontract opportunities:

S-38: New York City manufacturer making derricks and hoists for the Navy wants subcontractors who can manu-

facture hexagonal threaded nuts; some slotted. Material: aluminum alloys, brass and carbon steel. Dimensions: Misc., ranging from ⅜ inch to 1-19/64 inch diam. Quantity: 50,000. Machines needed: turret lathes. Materials partly furnished by prime contractor.

S-39: A New Jersey manufacturer making hoists for the Navy is seeking subcontractors who can machine drums 60" in diameter. Material: steel. Quantity: 40 to 50. Machines needed: 5 and 6-foot lathes. Drums to be furnished by prime contractor.

S-40: A Philadelphia firm making 75 mm. pack Howitzer carriages for the Army wants subcontractors who can make breech locks. Material: steel. Tolerance: .0005. Quantity: 700. Delivery rate: 60 per month. Machines needed: Internal thread grinders.

S-41: A Philadelphia firm manufacturing tanks for the Army wants subcontractors who can make rotors and body turrets. Material: cast armor steel. Quantity: lots of 50. Machines needed: milling machines; drilling machines; chamfering machines; boring machines. Plans and specifications available at this office.

New Priority Forms Permit Ratings To Be Extended by Endorsement

■ APPLICATIONS for individual preference ratings now may be filed on the new PD-1-a application blanks in accordance with Priorities Regulation No. 3, issued Jan. 12. Preference ratings assigned on Army and Navy contracts may now be issued on Form PD-3-a.

The most important feature of Priorities Regulation No. 3 is that ratings assigned on PD-1-a and PD-3-a forms may be extended to suppliers and subsuppliers by a simple endorsement on purchase orders. Heretofore, ratings assigned in response to applications on the old PD-1 forms have not been extendable under any circumstances, and ratings assigned to Army and Navy orders on PD-3 forms could be extended only if the extension were countersigned by an authorized government officer when the amount involved was more than $500.

Because of the tremendous printing job involved, PD-1-a forms will not be available in quantity until about the middle of the month. However, the forms may be reproduced by anyone if the reproduction is exactly like the official form as issued Feb. 2. Reproductions made from earlier versions of the form which were prepared by OPM will not be valid.

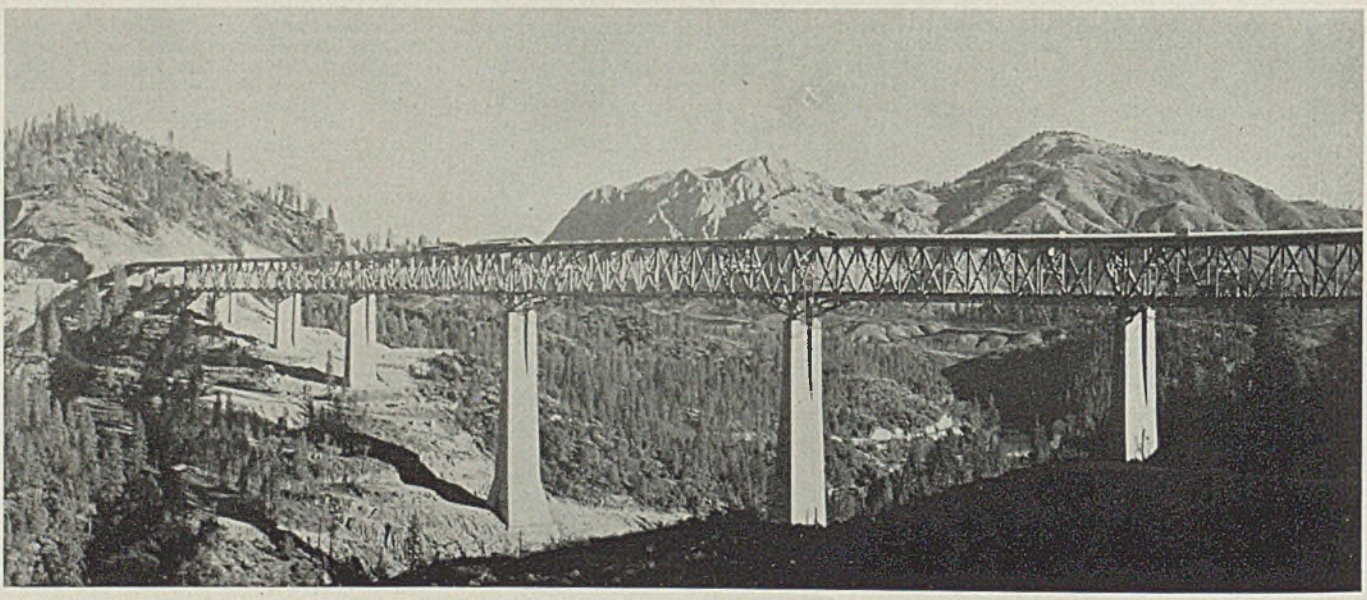
When PD-1-a forms are not available, applications may still be filed on PD-1 forms until March 2. However, ratings which have been assigned or which are hereafter assigned on PD-1 forms cannot be extended.

When an individually rated order is served upon a supplier by the original applicant under the new procedure, the rating may be extended by the supplier, by his suppliers and subsuppliers to obtain any material which will be delivered to the original applicant in accordance with the rating, but neither the applicant, his suppliers or subsuppliers may use the rating to obtain machinery or capital equipment which they use in fabricating parts to fill the order. If producers who have been assigned a rating on a PD-1-a form need machinery or capital equipment for this purpose which they cannot obtain without priority assistance, they must apply for a separate preference rating on another PD-1-a form. Prime contractors who need machinery or equipment to be used exclusively in filling Army or Navy orders may be given a rating for use in obtaining such machinery or equipment on PD-3-a forms.

Another important change made by Priorities Regulation No. 3 allows the recipient of an individual rating, his suppliers and subsuppliers to employ the rating for replacement in inventory of materials used in filling the rated order, provided such replacement does not increase inventories above a practicable working minimum.

If the materials to be replaced are in whole or in part manufac-

Newest of the Nation's Great Bridges



■ Heavy steel spans of the Pit river bridge now extend all the way across the deep canyon that will become an arm of Shasta reservoir in northern California. Only final work remains to be completed before the high double-deck bridge is opened to railroad traffic this spring. Lower deck carries two tracks of the Southern Pacific's main line between San Francisco and Portland, and the upper deck, 500 feet above the river level, has a four-lane highway and two walkways. Left of center may be seen a heavy tarpaulin shelter under which pouring of concrete goes ahead despite winter rains. The bridge, two-thirds of a mile long, is being constructed by American Bridge Co. Official photo by the United States Bureau of Reclamation, from NEA

tured, processed, assembled or otherwise physically changed by the supplier, the rating must be extended while the materials are in process of fabrication. For materials which are not processed or otherwise changed by the supplier, extension of the rating may be deferred up to three months, until an order can be placed for the minimum quantity procurable on customary terms. This provision is primarily for the benefit of wholesalers and distributors, enabling them to group their own orders while making deliveries in comparatively small quantities.

The new regulation also allows a supplier or subsupplier who has received two or more purchase orders bearing ratings of the same grade to include in a single purchase order or "basket," within the limitations indicated, any or all material required to make deliveries in accordance with the rated purchase orders which have been served upon him. In such case, he must specify in the certification on his own purchase order all of the preference rating certificate form numbers and serial numbers referring to the orders in connection with which he is extending the ratings.

All persons who receive or extend preference ratings assigned on PD-1-a and PD-3-a forms must keep records as prescribed in Priorities Regulation No. 1 and make such reports as may be required by the priorities bureau. Use of PD-3-a forms may also be subject to such further requirements as may be set forth by the Army and Navy Munitions Board with concurrence of priorities officials.

Railroads Allocated 900,530 Tons of Steel for Maintenance

■ WAR Production Board has approved a program calling for allotment of 900,530 tons of steel and 2250 tons of copper to the country's railroads during the first quarter of 1942 for maintenance of way and structures, provided the requirements can be met without interfering with shell production.

Most of the steel—538,000 tons—is for new rail to take care of added burdens being placed on railroads as the result of the war program. The remainder is of the type used for track fastenings, frogs, switches and guard rails, and bridges and buildings.

The program, drafted by the Transportation and Farm Equipment Branch of the Division of Industry Operations, will be executed by specific allocations of steel to individual railroads.

In addition to stipulating that the program must not interfere with output of shell steel, which can be rolled in mills primarily engaged in rolling rails, the WPB held that if called upon to do so, the railroads must release relay (second-hand) rail for defense needs in amounts up to one-third the tonnage of their first quarter receipts of new rail.

Estimated Requirements

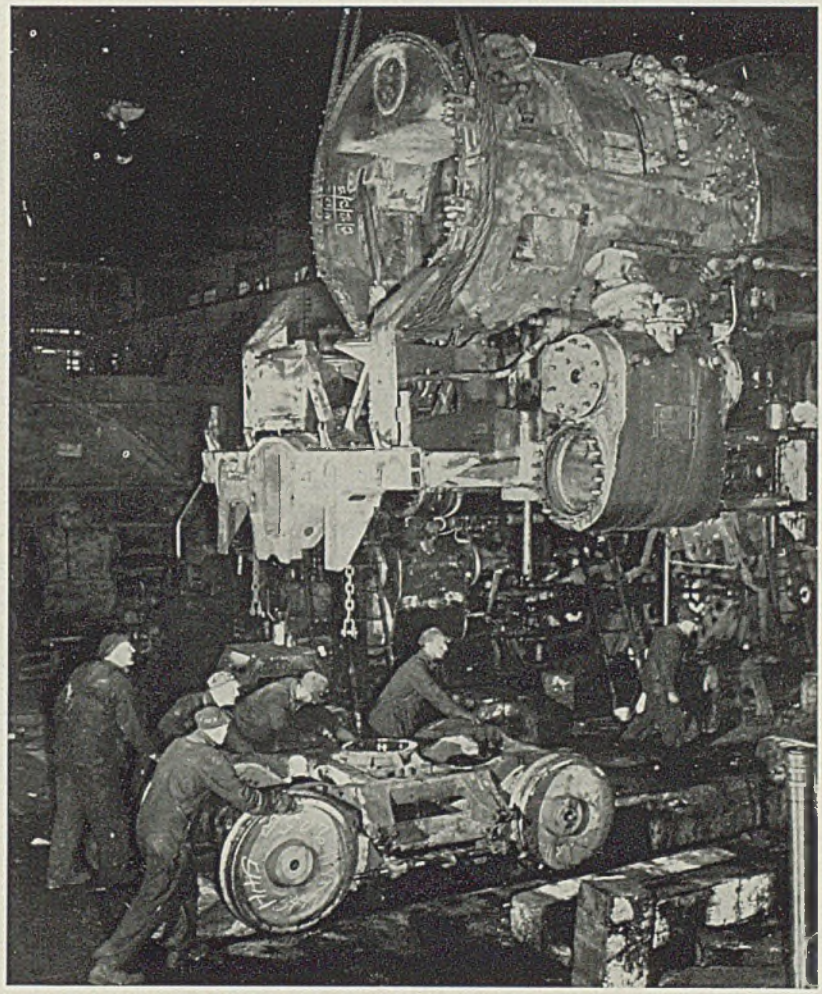
The Transportation and Farm Equipment Branch, after conferences with the Railroad Industry Advisory Committee, submitted to the board the following steel requirements (in net tons) for maintenance of way and structures during the first quarter:

Rails	538,000
Fastenings	294,000
Frogs, switches, guard rails	
Rails	21,900
Plates	12,300
Bridges, buildings	
Plates	13,700
Shapes	20,630
TOTAL	900,530

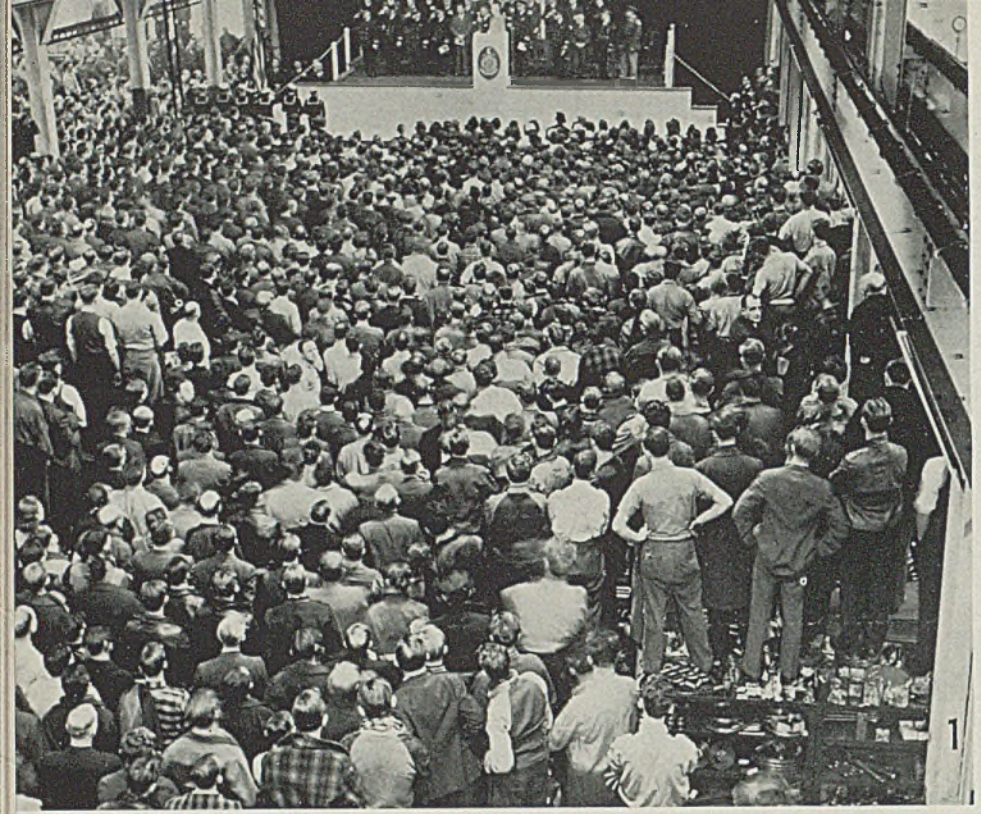
Out of the first quarter tonnage of rail, each railroad will get approximately one-third of the amount of rail requested by it for maintenance of way during the entire year. Adjustments will be necessary in ensuing quarters to meet each road's requirements as determined by the requirements survey being undertaken by the Office of Defense Transportation and in line with the steel production program.

Steel allotted for the first quarter is for essential safety and service needs, and is not intended for general expansion of or additions to the carriers' existing equipment.

The former Supply Priorities and Allocations Board approved on Jan. 1 a program calling for allotment of 1,413,893 tons of steel for repair of passenger and freight cars and locomotives, production of 36,000 freight cars during the period Feb. 1-May 1, and continued production of 926 locomotives of various types now on order.



■ Pilot truck is pushed under boiler and frame of a large locomotive as part of an overhaul job in a New York state shop. Increased freight traffic occasioned by the war production program has accelerated the repair programs in railroad shops throughout the country. Wide World photo



"You're in the Navy Now!" Awards Spur Workers' Patriotic Pep

■ IMPRESSIVE demonstrations of the extent to which industry is arising to meet the war emergency are noted in the number of instances in which important companies recently were awarded the navy's Bureau of Ordnance flag and "E" pennant.

These flags, which are flown over the plants, one above the other in the order just mentioned, are tangible recognition of "excellence of performance in fulfilling naval ordnance contracts."

In each case notice of such an award comes to a company in a letter from Col. Frank Knox, Secretary of the Navy. Shortly after this letter is received a delegation, including distinguished navy officers and civic and business leaders, attend a ceremony during which the flags are presented to company executives, and Navy "E" lapel buttons are presented to all employes. These ceremonies are broadcast and receive national recognition.

Typical of recent ceremonies are those illustrated. The guest of honor who presented the Navy flags on three of these occasions—South Bend Lathe Works, South Bend, Ind., Feb. 3; Steel Improvement & Forge Co., and Warner & Swasey Co., both of Cleveland, Jan. 30—was Rear Admiral Henry V. Butler, U. S. N. (Retired). At Wyckoff Drawn Steel Co., Ambridge, Pa., Jan. 31, the flags were presented by Lt. Com. N. S. Prime, U. S. N.

The effect of these awards on the "fighting spirit" of company personnel is well exemplified in the example of Heppenstall Co., which received the flags several weeks ago. All Heppenstall employes contributed to Pittsburgh's city-wide "buy-a-bomber" campaign, making this the largest single contribution. Heppenstall workers with their "E" pennant, are shown herewith giving the victory sign as they turned in their contribution to the bomber fund.

So that little time be lost from production, the ceremonies are held either at noon, or at change of shifts. The Wyckoff meeting was held in the auditorium at which J. T. Somers, president, accepted the flags and W. C. Undercoffler, oldest employe, received the lapel buttons for all employes. Then they went to the main gate for the flag raising.

At South Bend Lathe Works, Rear Admiral Butler presented the flags to John J. O'Brien, president, in a meeting of all employes during the noon lunch hour. The same was true at Steel Improvement & Forge Co., where Charles H. Smith, president, received the flags from Admiral Butler in the presence of Frank J. Lausche, mayor of Cleveland, who was one of the speakers. On that occasion the buttons were presented by Lt. Com. Wm. P. Bacon to Fred Borally, representing the 750 employes of the company, most of whom attended. Judge Lee E. Skeel, Court of Appeals, Cleveland, was chairman.

The Warner & Swasey program was held at 3:45 in the afternoon in the main bay of the assembly plant, in the presence of 3500 employes. Rear Admiral Butler presented the flags to Charles J. Stilwell, president, and Mayor Lausche again was a speaker. On this occasion Lt. Com. Bacon presented the lapel buttons to Jim Sprague, oldest employe. Col. Frank A. Scott, former president of Warner & Swasey Co., who served as chairman of the War Industries Board during the first World war, was chairman. Only three companies in Ohio had previ-

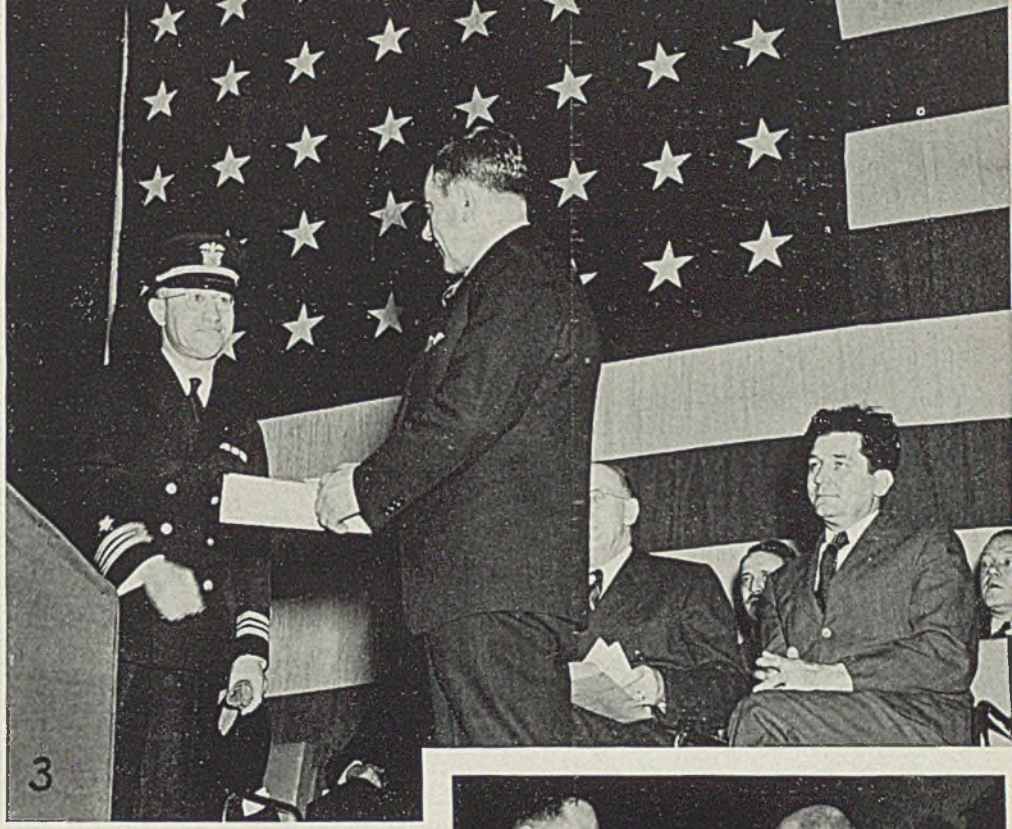


Fig. 1—Left—Posting of American flag during Navy "E" ceremony at Warner & Swasey Co., Cleveland, in presence of 3500 employes

Fig. 2—Above—As a fitting aftermath to recent award of Navy "E" pennant, Heppenstall Co. employes make largest single contribution to Pittsburgh's "buy-a-bomber" campaign

Fig. 3—Above, right—Following presentation of Navy flags by Rear Admiral Henry V. Butler to Charles H. Smith, president, Steel Improvement & Forge Co., Cleveland, Lieutenant Commander Bacon presents lapel buttons to Fred Borally in behalf of the employes. Seated next to Mr. Smith is Frank J. Lausche, mayor of Cleveland

Fig. 4—Right—J. T. Sommers, president, Wyckoff Drawn Steel Co., accepts Navy "E" pennant from Lieutenant Commander N. S. Prime at the company's Ambridge, Pa., plant

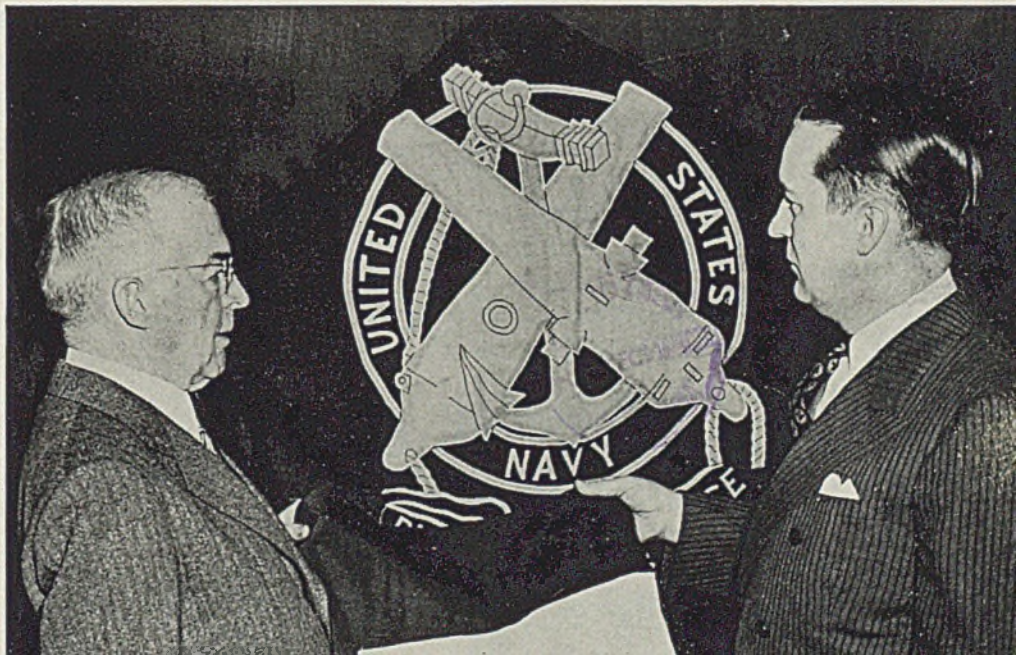
Fig. 5—Below—J. J. O'Brien, chairman of the board, and R. E. Frushour, president, South Bend Lathe Works, with Bureau of Ordnance flag and Navy "E" pennant

ously won Navy "E's".

One of these Ohio recipients was Permold Co., Medina, to whom the flags were presented by Capt. E. A. Loftquist, U. S. N., chief of staff, Ninth Naval District, Great Lakes, Ill.

Another recent recipient was McKay Co., McKees Rocks, and York, Pa. Normally manufacturing commercial chain, this company has swung over almost entirely to naval work. McKay's ceremony, held at McKees Rocks Feb. 3, was attended by a delegation of Navy officers, including Rear Admiral W. H. T. Blandy, and by leading industrial executives in the Pittsburgh district. Presentation was made by Capt. F. L. Oliver, U. S. N. (Retired) to Thomas J. McKay, president.

Speakers have emphasized that workers in these vital industries are in the war "just as much as sailors, soldiers and marines on the firing lines." The latter will stand or fall on what the former accomplish. Admiral Butler sums it up when in handing over the flags he says: "You're in the Navy now!"



STEEL

"Give" or "Take" May Tip Scale

■ ONE of the most important tasks confronting this nation today is that of glorifying sacrifice.

Too long the people have witnessed complacently government policy which encourages everyone to take as much as the traffic will bear and to give as little as possible in return. Should this attitude be permitted to continue much longer, the United States will be in danger of falling down on its war effort.

The example for taking less and giving more should be set by people in high places whose patriotic action would be applauded and duplicated all along the line.

• • •

For instance, Congress, whose members are in the national limelight by virtue of their positions as representatives of the people, recently voted themselves a retirement fund.

Regardless of whether this plan is good or bad in itself, the act of voting for this scheme at this particular time was inexcusably dumb and in poor taste. It advertised to the nation at large the lamentable fact that our lawmakers were thinking of themselves when they should have been thinking of the nation—that they were more concerned with "take" than with "give."

Congress should undo this clumsy error at once. Its members should do it with a flourish. They should reconsider the bill and vote it down unanimously on the ground that this is a time to set an example of sacrifice and not to parade an attitude of greed and selfishness.

While Congress is performing this cleansing operation, the farm bloc should get squarely behind Leon Henderson and Claude Wickard and openly declare, in effect, that its previous attitude on farm prices was wrong, that it will not hold out for all the traffic will bear, and that it will share with all other interests whatever sacrifices are necessary in prices to win the war.

At the same time, those few selfish union leaders among the many who already have seen the light should ease up on their insistence for unwarranted further gains for their members. Some union leaders and an overwhelming majority of employes already are moving toward an unselfish, co-operative attitude in this emergency. It is time for the hold-outs to fall in line.

Industry, too, has the responsibility of setting an example of more "give" and less "take." Anyone who can appreciate what it means to dismantle the assembly lines of motordom, knows the extent to which America's largest single industry has gone to "give" for the war effort. Throughout many other important branches of industry companies are throwing overboard temporarily business advantages representing years of effort.

These examples should spur other industrial corporations to go the limit for war production. The refusal of only a few companies to co-operate can easily put a black eye on all industry in the public mind.

• • •

Last, but not least, is the government itself. When sacrifices are being demanded of private business and of private citizens, the presence of tens of thousands of government employes in unessential activities is inexcusable. To keep faith with the people, the government should slash two billions of expense from the budget for these unessentials.

Set the right example in these various sectors, and the nation soon will take pride in unselfishness!

E. C. Shaner

EDITOR-IN-CHIEF

Feb. 9, 1942

The BUSINESS TREND

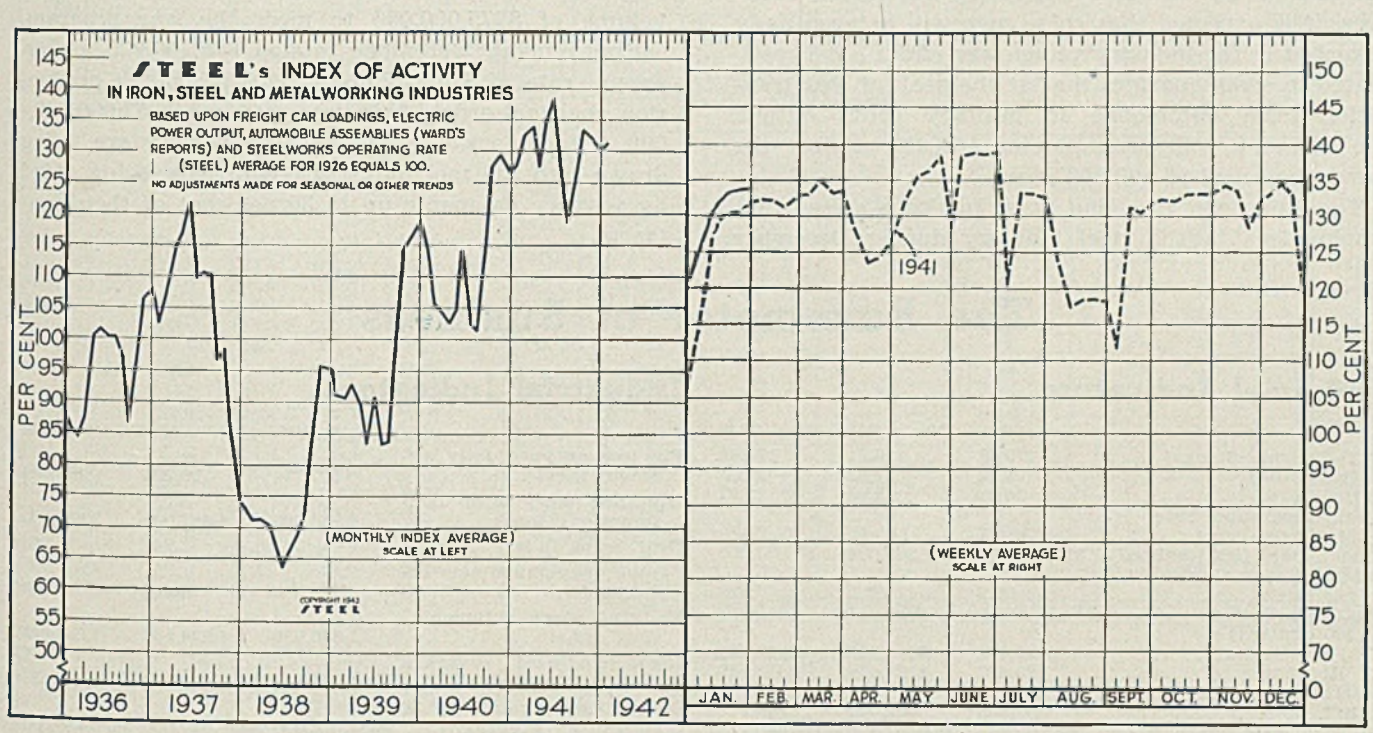
Activity Index Steady At 130-135 Level

■ THE trend of industrial activity in the iron, steel and metalworking industry as recorded by STEEL's index has registered little change in the past four months. During January the weekly index averaged 131.3 compared with 130.2 in December, while in November and October it stood at 132.2 and 133.1 respectively. The peak recorded by the index was 138.7 in June of last year.

During the latest week the index edged slightly upward to 133.9, a gain of 0.2 point over the preceding week's figure and compares favorably with the 132.0 level recorded in the corresponding period a year ago.

During the latest week an increase in electric power consumption offset a slight decline in freight carloadings and automobile production. Steelmaking operations held unchanged.

Electric power output advanced to 3,468,193,000 kilowatts during the week ended Jan. 31. This represents an increase of 15.8 per cent above a year ago. The Federal Power Commission recently warned that a power shortage was in prospect by the end of this year and the situation is expected to become more acute in the next two years providing the war lasts that long. Indicative of the tight situation in power



STEEL'S index of activity gained 0.2 *point to* 133.9 *in the week ended Jan.* 31:

Week Ended	1941	1940
Nov. 29	132.2	132.6
Dec. 6	133.4	132.5
Dec. 13	134.8	132.6
Dec. 20	132.9	132.4
Dec. 27	120.5	107.5
Week Ended	**1942**	**1941**
Jan. 3	124.7	114.5
Jan. 10	131.2	128.2
Jan. 17	133.1	130.8
Jan. 24	133.7	130.7
Jan. 31	133.9	132.0

Mo. Data	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931
Jan.	131.3	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1
Feb.	.....	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5
March	.....	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2	80.4
April	.....	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0
May	.....	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6
June	.....	138.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1
July	.....	128.7	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3
Aug.	.....	118.1	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4
Sept.	.....	126.4	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3
Oct.	.....	133.1	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2
Nov.	.....	132.2	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4
Dec.	.....	130.2	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3

production facilities, the War Production Board states that plans have been completed to build four or more floating power plants on barges for easy transit to industrial centers where power demands are greater than the existing facilities can satisfy.

Output of automobiles and trucks declined to 73,305 units during the week ended Jan. 31, compared with 79,930 the previous week and 124,000 in the like period a year ago. Most automotive builders have completed their January quotas. This resulted in a sharp decline in output for the week of Feb. 7 to 37,125 units. The Feb. 1 deadline for cessation of automobile production has been extended to Feb. 10 to allow some motor car builders time to complete January quotas.

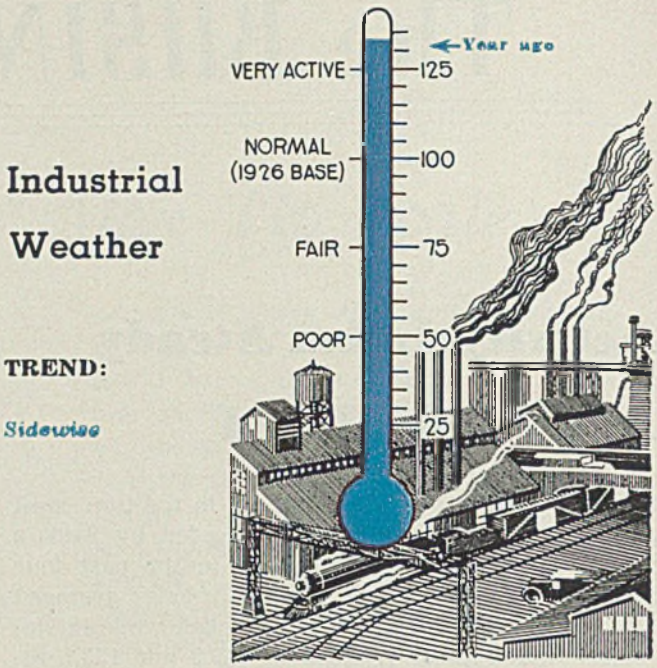
For the immediate future a sharp decline in employment in the automotive industry will occur. However, it is expected that these men will be eventually absorbed in the industry's huge war effort. It is estimated in some quarters that at the peak of this transition from automobile to military goods output, the industry will be employing 875,000 against the previous record of 500,000 men.

The American Iron and Steel Institute states that employment in the steel industry during December totaled 646,000, against 645,000 in November and 585,000 in December 1940. The Institute also reports a gain in average hourly earnings and in the number of hours worked per week.

Where Business Stands

Monthly Averages 1940 = 100

	Dec., 1941	Nov., 1941	Dec., 1940
Steel Ingot Output	126.5	126.8	114.7
Pig Iron Output	126.3	122.5	114.4
Building Construction	129.3	137.4	136.7
Auto Output	77.4	95.7	129.6
Freight Movement	108.9	123.5	97.3
Wholesale Prices	119.2	117.8	101.9



The War Production Board estimates that machine tool output this year must double the 1941 record volume of $775,000,000 to meet the war program. Output during December totaled $85,100,000, or an annual rate of $1,021,200,000. To reach the production goal tool orders this year may reach $2,000,000,000. Machinery builders of wide variety are being drawn into the tool industry. Many are being aided by advance payments up to 30 per cent of their contracts.

The Barometer of Business

Financial Indicators

	Dec., 1941	Nov., 1941	Dec., 1940
30 Industrial Stocks§	110.67	116.91	130.45
20 Rail Stocks§	25.33	27.92	27.61
15 Utilities§	14.38	15.93	19.91
Commercial paper rate (N. Y., per cent)	½–⅝	½–⅝	½–⅝
*Com'l. loans (000 omitted)	$11,370,000	$11,266,000	$9,354,000
Federal Reserve ratio (per cent)	90.8	91.0	90.8
Capital flotations (000 omitted)			
New Capital	$121,001	$110,379	$189,761
Refunding	$95,427	$127,436	$423,849
Federal Gross debt. (mil. of dol.)	$57,938	$55,040	$44,277
Railroad earnings†	$68,764,844	$93,657,126	$71,560,226
Stock sales, New York stock exchange	36,390,492	15,047,142	18,397,158

§Dow-Jones Series.
*Leading member banks Federal Reserve System.
†November, October and November respectively.

Commodity Prices

	Dec., 1941	Nov., 1941	Dec., 1940
STEEL's composite finished steel price average	$56.73	$56.73	$56.73
U. S. Bureau of Labor's index	93.6	92.5	80.0
Wheat, cash (bushel)	$1.285	$1.133	$0.93
Corn, cash (bushel)	$0.83	$0.75	$0.69

Industrial Indicators

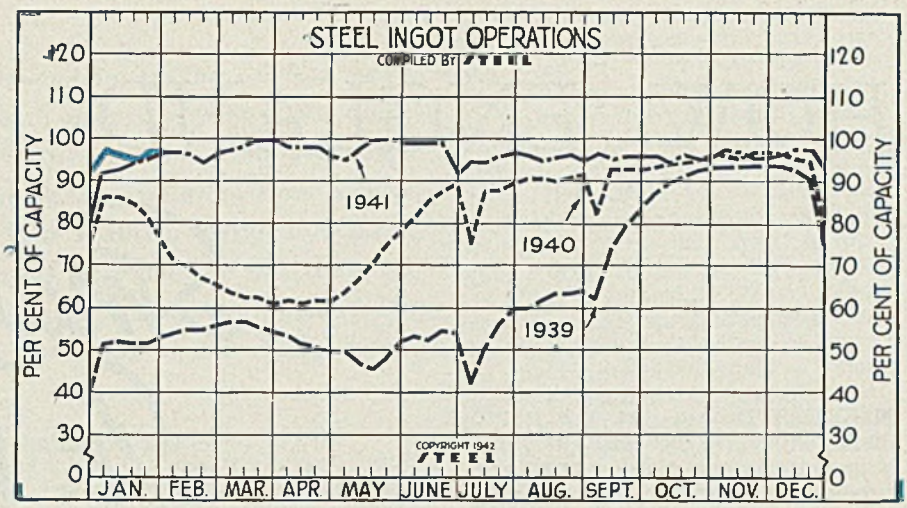
	Dec., 1941	Nov., 1941	Dec., 1940
Pig iron output (daily average, tons)	161,774	156,906	146,544
Iron and steel scrap consumption (tons)	4,634,000	4,482,000	3,950,000
Gear Sales Index	243	241	208
Foundry equipment new order index	481.2	408.5	257.8
Finished steel shipments (Net tons)	1,846,036	1,624,186	1,544,623
Ingot output (average weekly; net tons)	1,620,814	1,624,706	1,469,538
Dodge bldg. awards in 37 states ($ Valuation)	$431,626,000	$458,620,000	$456,189,000
Automobile output	302,518	373,892	506,931
Coal output, tons	46,667,000	43,770,000	41,400,000
Business failures; number‡	898	842	1,086
Business failures; liabilities‡	$13,469,000	$9,197,000	$13,469,000
Nat'l. Ind. Conf. board (25 industries, factory):			
Av. wkly. hrs. per worker†	41.5	41.7	39.6
Av. weekly earnings†	$35.74	$35.65	$29.73
Cement production, bbls.	13,810,000	14,931,000	11,195,000
Cotton consumption bales.	887,326	849,733	777,482
Car loadings (weekly av.)	761,500	864,000	680,099

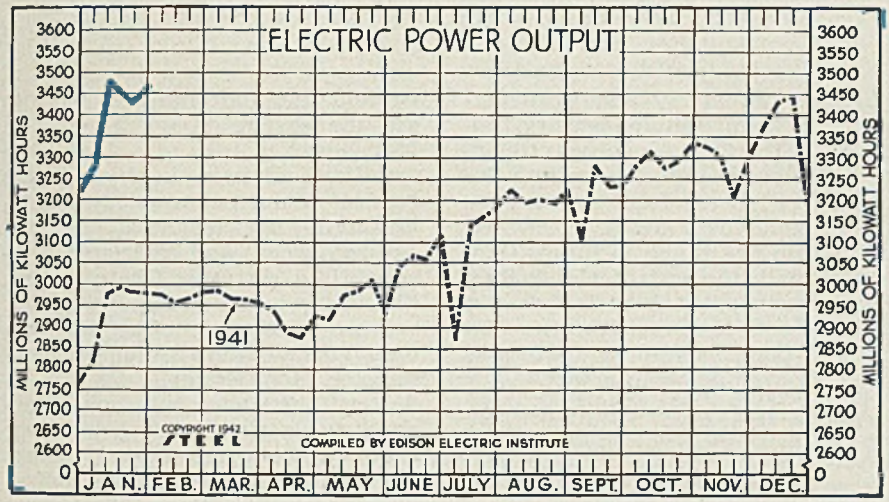
†November, September and November respectively.
‡New series.

Steel Ingot Operations

(Per Cent)

Week ended	1942	1941	1940	1939
Jan. 31....	97.0	97.0	76.5	53.0
Jan. 24....	97.0	95.5	81.5	51.5
Jan. 17....	96.0	94.5	84.5	51.5
Jan. 10....	96.5	93.0	86.0	52.0
Jan. 3....	97.5	92.5	86.5	51.5
Week ended	**1941**	**1940**	**1939**	**1938**
Dec. 27....	93.5	80.0	75.5	40.0
Dec. 20....	97.5	95.0	90.5	52.0
Dec. 13....	97.1	95.5	92.5	58.0
Dec. 6....	96.5	96.5	94.0	61.0
Nov. 29....	95.0	97.0	94.0	61.0
Nov. 22....	95.5	97.0	93.5	62.0
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





Electric Power Output

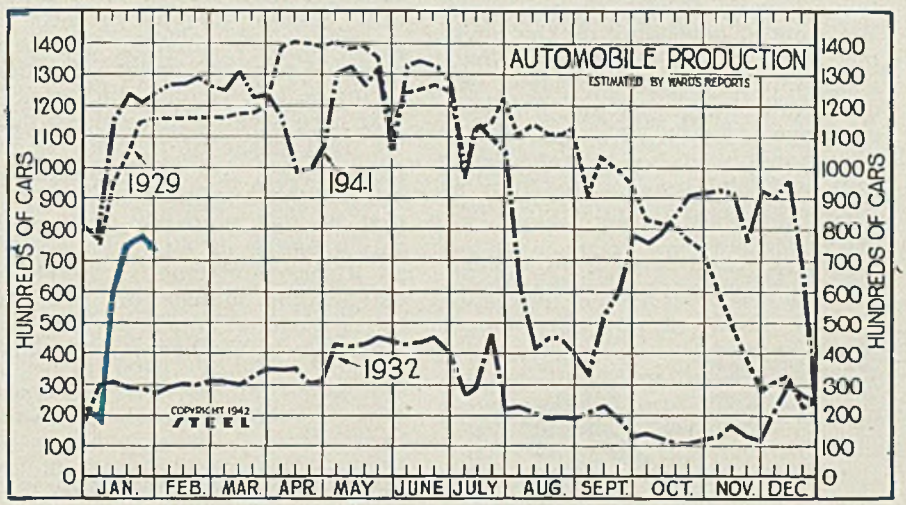
(Million KWH)

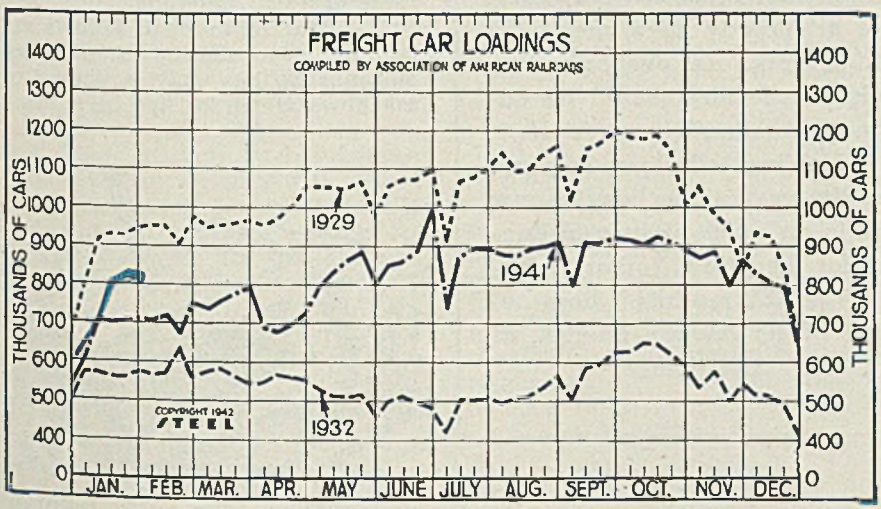
Week ended	1942	1941	1940	1939
Jan. 31.....	2,468	2,978	2,633	2,327
Jan. 24.....	3,440	2,980	2,661	2,340
Jan. 17.....	3,450	2,996	2,674	2,342
Jan. 10.....	3,473	2,985	2,688	2,329
Jan. 3.....	3,287	2,831	2,558	2,239
Week ended	**1941**	**1940**	**1939**	**1938**
Dec. 27.....	3,234	2,757	2,465	2,175
Dec. 20.....	3,449	3,052	2,712	2,425
Dec. 13.....	3,431	3,004	2,674	2,390
Dec. 6.....	3,369	2,976	2,654	2,377
Nov. 29.....	3,295	2,932	2,605	2,335
Nov. 22.....	3,205	2,839	2,561	2,248
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

Auto Production

(1000 Units)

Week ended	1942	1941	1940	1939
Jan. 31....	73.3	124.4	101.2	79.4
Jan. 24....	79.9	121.9	106.4	89.2
Jan. 17....	75.0	124.0	108.5	90.2
Jan. 10....	59.0	115.9	111.3	86.9
Jan. 3....	18.5	76.7	87.5	76.7
Week ended	**1941**	**1940**	**1939**	**1938**
Dec. 27....	24.6	81.3	89.4	75.2
Dec. 20....	65.9	125.4	117.7	92.9
Dec. 13....	96.0	125.6	118.4	102.9
Dec. 6....	90.2	124.8	115.5	100.7
Nov. 29....	93.5	128.8	93.6	97.8
Nov. 22....	76.8	102.3	72.5	84.9
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





Freight Car Loadings

(1000 Cars)

Week ended	1942	1941	1940	1939
Jan. 31.....	816	714	657	577
Jan. 24.....	818	711	649	594
Jan. 17.....	811	703	646	590
Jan. 10.....	737	712	668	587
Jan. 3.....	674	614	592	531
Week ended	**1941**	**1940**	**1939**	**1938**
Dec. 27.....	607	545	550	500
Dec. 20.....	799	700	655	574
Dec. 13.....	807	736	681	606
Dec. 6.....	833	738	687	619
Nov. 29.....	866	729	689	649
Nov. 22.....	799	733	677	562
Nov. 15.....	884	745	771	657
Nov. 8.....	874	778	786	637
Nov. 1.....	895	795	806	673

HOW ENGLAND UTILIZES

Small Plants In War Work

■ GREAT Britain just now is producing about 75 per cent as much war material as she is capable of producing, according to Lord Beaverbrook, who considers this a reproach to his countrymen. The United States is turning out around 20 per cent of its capacity, according to other Britons, who try not to sound reproachful when they mention it to an American.

"That's about as well as we were doing in 1938 and 1939," a man I know in the Ministry of Supply told me resignedly the other day. It has become such a matter of course for each nation to repeat the mistakes of others that no one any longer becomes excited about it. In an effort to cheer him up, I said that when I left New York a few months ago our armament plants were working two or three shifts and we were building new plants as fast as we could, and he answered, "Yes, that's how we tried to do it at first. We stopped depending on the obvious soon after Dunkerque. Now, when we need more cartridges, we don't wait until we have built a new cartridge factory. We get some from a man who used to make fountain pens and some more from a chap who once manufactured lipsticks.

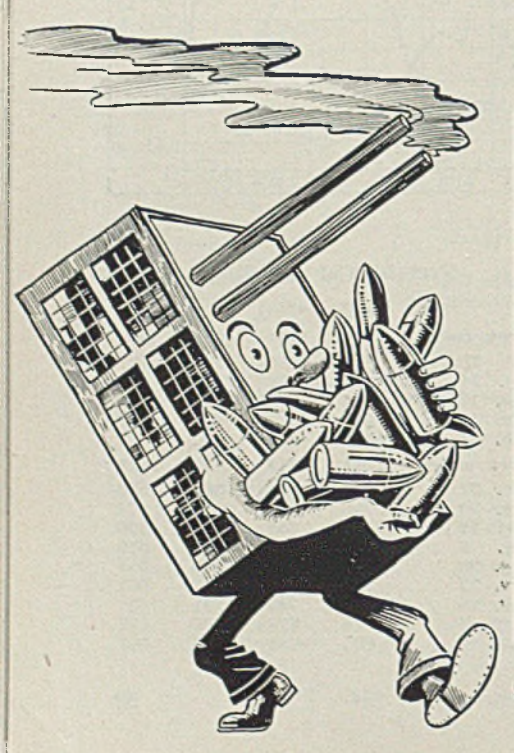
"We get shell fuzes from a shop that once turned out prams—baby buggies, you know—and fuze components from costume-jewelry fellows. In the first year of war, those little fellows used to swarm into the ministries looking for work and we would send them away. Now we hunt them and think up things they can do with the sort of plants they have. It's poppycock to say that a country with a great peacetime industrial plant has to scrap it and start all over again in a war."

Before he got through he had me so interested in the possibilities of what Britain calls its "bitts-and-pieces" system that I made a date to go to his office in the Ministry and discuss his pet subject at greater length. "And I'd like to see a couple of those embattled notions factories, too," I told him, thinking that here seemed to be the pith of the 1941 phase of the war in the British Isles. When I presented myself on the appointed day I found that he had prepared for me not only a dossier on bits-and-pieces but an itinerary. "Actually, there's an astonishing number of little factories turning out important war jobs even in the heart of London," he told me, "but the best place to see the system in operation is in Manchester.

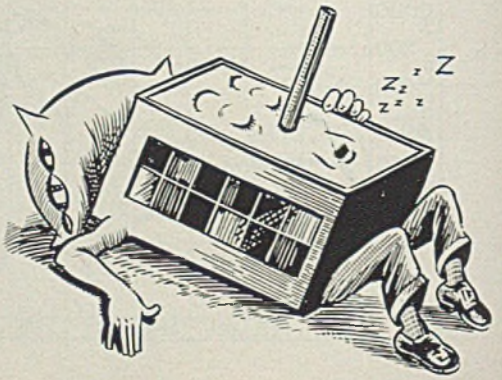
"All of Britain is divided into twelve production areas, which incidentally coincide with the civil defense areas. And each area is divided into districts. There are six districts in London alone, with what we call a clearing office for each one. You wouldn't think of Westminster, for example, as an industrial district, but our Westminster clearing office helps place about £75,000 worth of war contracts in a month. They're mostly for small items, of course, things like screws and primer caps and strikers and tank-engine parts, but orders of big stuff running into the millions would be held up if they had to wait for those parts.

"In Westminster we have a candlemaker doing tank parts, for instance. Some of the candlemaker's lathes are a hundred years old. A fellow who used to make dental pumps—you know, those things the dentist puts under your tongue to draw away saliva—is now making an important part of the mechanism of the Bren gun. Then the fellows who used to make the metal tops of soda-water siphons are very useful, and so are beer-bottle-cap makers, who with the aid of a little jiggery-pokery, change over to cartridge cases.

"A lot of those small fellows are damned good mechanics. A man whose shop has only a couple of machines which he has been using



Today many small American industrial plants face the probability of or already have closed for want of work. Yet every possible production facility should be engaged in needed war work. Here A. J. Liebling tells how England keeps its small plants busy on war work in an article written in England for the "New Yorker Magazine". STEEL reprints it here because of its intense interest at this time



An Englishman says, "We stopped depending on the obvious soon after Dunkerque. Now, when we need more cartridges, we don't wait until we have built a new cartridge factory. We get some from a man who used to make fountain pens, some more from a chap who once manufactured lipsticks." That realistic attitude is much needed in this country where production of essential war materiel is waiting completion of huge new plants while small companies with good production facilities close for want of something to do

for several different operations often proves more adaptable than a big-factory boy who has been used to ordering a special machine tool for each new job.

"I'm afraid that you might get too limited an idea from enterprises as small as those, so I want you to go down to Lancashire to see the same thing done with big factories. Lancashire, you know, used to be at least 70 per cent textile before the war. There were, of course, the textile mills. Then there were the machine shops, which turned out textile machinery for the most part, and there was a good deal of miscellaneous light industry. However, there weren't any steel mills or locomotive plants or motor works. It's only 20 per cent textile now, and it's working full blast—harder than ever before in its history. Some of the mills are still making textiles required for the war effort and for a minimum civilian consumption; the others have been closed down.

"But the machinery plants have been expanded and the textile labor has gone into them. Most of the people have been weavers and spinners for generations and never went near a lathe. There's a sort of sense, though, that people acquire from being around any kind of machinery. They get the swing of the new work much faster than, say, agricultural workers or white-collar fellows turned into a mill. The companies that are allowed to continue making textiles act as trustees for the whole industry. The owners of the closed plants get an indemnity out of the profits of those that stay open. The companies that stay open are pledged to protect the future interests of the closed one—take care of the other fellows' customers as well as possible during the war, for example."

A couple of days later I arrived in Manchester equipped with letters of introduction to the area officer of the Ministry of Supply and the regional controller of the Ministry of Labour. The day I arrived I looked up the area officer, an energetic and astoundingly voluble Scot, who seemed delighted at a chance to show off Lancashire's versatile factories. He had prepared a huge catalogue of people who used to make one thing and were now turning out something different and lethal. We whittled down his list to a couple of typical plants, a large one and a small one, on which we would pay calls.

"The only trouble, from your point of view, is that you can't write exactly what the large places did before the war, because that might put Jerry onto them," he said. I promised not to mention the real peacetime uses of the larger factory I would visit. The other, a fountain-pen factory, the area officer said, was too undistinguished to be identified. He said that an automobile would pick me up at my hotel the next morning. The driver would know the way, and the area officer would telephone the company officials to expect me.

The driver who called for me at the hotel next morning was a trim matron with steel-blue hair and a tailored uniform that would have done credit to a wealthy subaltern. She was a member of the Mechanized Transport Corps, she explained, a voluntary organization of women who supply their own cars and buy their own uniforms. They drive officers and civil servants on official business, and the government reimburses them for the petrol they use. She turned out to be an excellent driver, and since she was Lancashire-born she knew her way around the network of roads that radiate from Manchester to the scores of smaller factory towns around, places with names we never hear in America, with populations of from 25,000 to 150,000. The flatlands that stretch westward to Liverpool and south into Cheshire.

As we drove along the roads, I could not help thinking of the perplexity of a German bomber pilot if he got over this region. Industry is not concentrated, but is almost anywhere, and between the clusters of factories there are stretches of pasture land into which his bombs would drop harmlessly if he missed. It is impossible to blanket such an area with bombs. More and more the British are decentralizing their production, thus taking the sting out of mass raids.

Our first stop was a factory 20 miles from Manchester that once made—or so I'll say—refrigerators and kitchen cabinets. We drove up in front of the old, grimy office, which reminded me of hundreds I have seen in southern New England. Inside the door I found Mr. Bradshaw, the works manager, a stubby, determined little badger of a man who, I soon found out, is proud of his plant's versatility. There were pictures of all sorts of iceboxes on the walls, but in the place of honor on the mantelpiece stood a magnificent 25-pound shell, the leader of the firm's new line. The plant had begun changing over in June, 1940, *after* Dunkerque, Mr. Bradshaw said.

The Chamberlain government, with its policy of business as usual, had encouraged the manufacture of kitchen cabinets for export.

Women Run "Pencil Sharpeners"

The factory had got its first new machines in July, 1940, actually a set of ancient German power lathes. In October, the Ministry of Supply had installed a battery of really new Canadian machine tools. "But we're using 95 per cent of our old equipment as well," Mr. Bradshaw said, "and we're using our engineering brains. The design of weapons is highly specialized, but there's nothing superhuman about making them, provided that you know how to use your machines. That's the engineer's job. Once the machines are set, the operator can't make a mistake.

"We work a little finer on armament jobs than on most peacetime products," he said as he steered me through the back of the office and into the shops. "On the coarser war jobs we work to a thousandth-of-an-inch. On the better grade we work to one or two ten-thousandths. When you have a mechanism with dozens of moving parts a very small error will jam the whole works." He piloted me between rows of machines that looked like monster, power-driven pencil-sharpeners, each putting a point on a bar of steel. Women manipulated the levers controlling the machines, picked away long streamers of steel shavings, and lifted the rough-turned shell from the machines.

"Roughing shell from the blanks," Mr. Bradshaw said in passing. "Women are allowed a maximum of 3 minutes for the operation, but they average 2¼ minutes after they've been here a while. All of them used to be in shops, mills, or paper-box factories. You're interested in what we do with our old stuff? I'll show you our annealing furnaces."

Mr. Bradshaw led me to a shed where, in one of the walls, there

(*Please turn to Page* 82)

Structure

Fig. 1 — Macro-etch through a longitudinal cross section of a crankshaft of an Allison aircraft engine shows flow lines typical of those found in high quality forgings. Part of main bearing No. 2 is at left, pin bearing No. 1 at top center, main bearing No. 1 at right. Photo supplied by Ingalls-Shepard Division of Wyman-Gordon Co., Harvey, Ill.

By G. W. Birdsall

Engineering Editor, STEEL

■ THIS is the first of a series of articles designed to give producers and users of forgings, as well as their suppliers, a background on forgings, forging practice and forging equipment. Subsequent sections will emphasize modern forging techniques and will discuss latest methods for saving weight, for correct design of dies and for otherwise getting improved results in the forging of metals

and Properties of FORGINGS

An analysis of structure of a forging, rolled plate, a casting; explanation of fibering, what inclusions are, where they come from; discussion of grain flow, how it is developed, its effect on physical properties of the forging; what directionality is and what factors influence it

(Section I in a Series on Forgings, Forging Practice and Forging Equipment)

■ FORGINGS are finding an increasingly important field of application for two reasons.

First, the hot working of the metal improves its physical properties, allowing the forgings to be more highly stressed in service, thus increasing the strength-to-weight ratio, the reason why as many as several hundred forgings may be found in one airplane. These increased physicals are brought about by the increased density resulting from hot working and by the breaking down and redistribution of metalloids and nonmetallic inclusions found in the original structure. At the same time, the grain structure of the steel is refined.

Second, and one of the most important advantages of a forging, is the opportunity afforded by the development of grain flow or a fibrous structure in the forging (mechanical fibering). The importance of the fibrous structure is that the physical properties, especially impact strength, are improved still more in the direction of the fiber. Proper design of forging dies and proper forging procedure make it possible to develop the fibrous structure in the direction desired. This means that the strength of a part can be increased still further in those directions most needed. Further, this direction does not have to be in a straight line since it is possible to curve the direction of the fibers not only in two dimensions but also in three dimensions.

Thus, the fibrous structure in a gear blank can be directed as shown in the cross section Figs. 2A and 2B so the fibers radiate from the hub of the gear to the periphery. Also, it is possible to direct the grain flow in the teeth of a large gear so each individual tooth is tied into the main mass of metal by the fibrous structure as shown in 2C.

What Is a Forging? Let's examine a section through a forged part and see. Fig. 1 shows a macro-etch through a longitudinal cross section of a crankshaft of an Allison aircraft engine. The flow lines typical of a forging are clearly visible. Included in this illustration are part of main bearing No. 2 at left, pin bearing No. 1 top center, and main bearing No. 1 at right. The macro-etch of a casting shows no flow lines, indicating that the properties of a casting are the same in all three directions. A macro-etch of a rolled steel plate, rod, bar or other shape will reveal parallel flow lines in the direction of rolling. This means that the rolled material does have a certain directionality given to it in the rolling process and that the physical properties of a rolled material may differ crosswise and lengthwise the fiber structure.

What Do the Flow Lines Show? The macro-etch of Fig. 1 was obtained by sawing through this section, grinding and polishing the surface to a high finish. This then was etched by application of copper ammonium chloride, which attacks only the phosphorus inclusions. The phosphorus thus is undercut, breaking up the light waves that strike the surface to afford the results shown in Fig. 1. Or if hydrochloric acid is used in etching, as is quite common, the hydrochloric acid will attack all portions of the structure but to different degrees. This means that the surface will vary according to the amount of attack, also making the grain flow visible.

The macro-etch thus shows up the inclusions (or segregations of inclusions), which may be formed of carbides, phosphides, sulphides and silica as well as other metalloids and nonmetallic inclusions. While subsequent heat treatment can change the grain structure of the forging, the arrangement of the inclusions cannot be changed by heat treatment (except for carbides). Thus the fibrous structure of the forging is retained regardless of subsequent heat treatment.

The fiber structure of a forging can be likened somewhat to a wood part in which the grain of the wood flows around corners and in three dimensions to provide maximum strength in those directions most desired. It is obvious that an odd-shaped part of wood could be made much stronger if the grain were arranged in that manner than if the grain flowed only in one direction. The idea in forging is that arranging the inclusions in flow lines through the parts arranges the weaker elements in that direction, thus increasing the strength of the steel since the stronger elements of the metal are not separated by weaker elements in the direction of the fiber. This will be explained more in detail further along.

How Do Inclusions Get in the Metal? Inclusions (sometimes called segregates, or just plain "dirt" by the man in the mill), which contain carbon, silicon, phosphorus, sulphur, as well as other metalloids and nonmetallic substances, cannot be avoided as they are inherent in the casting of a steel ingot.

Inclusions: As is well known, the composition of steel resembles both a compound and a mixture since certain elements (alloying elements) are dissolved in the iron particles and certain other elements are not dissolved. Thus any piece of steel in addition to the elements that may have combined with (alloyed with) the iron usually contains separate particles composed of carbon, manganese, sulphur, phosphorus and sometimes silicon (these being commonly referred to as inclusions or segregates). Also, some 10 or 12 other metals, metalloids and nonmetals may be present in the steel.

Metalloids: About 40 of the 92 chemical elements are classed as metals of industrial importance. Some 50 elements come within the definition of a metal as "an element which is hard, heavy, lustrous, mal-

The author extends his appreciation for helpful comment and information given by Dr. George Sachs, professor of metallurgy, Case School of Applied Science, Cleveland; Waldemar Naujoks, chief engineer, Steel Improvement & Forge Co., Cleveland; A. H. Milnes, Bristol Aeroplane Co. Ltd., Bristol, England.

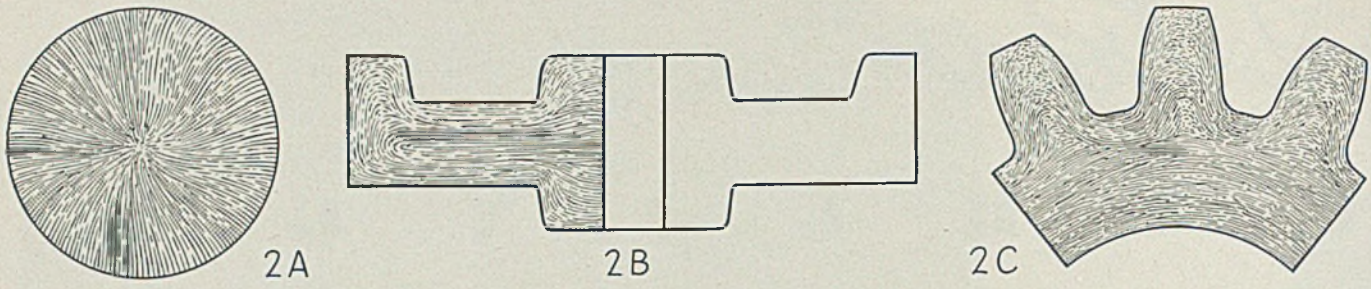


Fig. 2—At A is shown how a radial grain flow is obtained in gear blanks to provide maximum tooth strength. Diametral section at B shows how radial fibers of a forged gear blank can be arranged to flow into rim to strengthen the teeth. While teeth are cut in blanks shown at both A and B, teeth of large gears may be forged prior to finish cutting as shown in C. This further strengthens teeth by tieing them into fiber structure of the rim

leable, ductile, tenacious, and usually a good conductor of heat and electricity". Any element may possess some or all of these characteristics to a degree. Some elements may possess certain of these characteristics to a high degree and lack completely other characteristics. This makes them difficult to classify since they are part way between a metal and a nonmetal, so they are called "metalloids." One authority classes carbon and silicon as such elements.[1] Others say that arsenic, tellurium and antimony are in this class. It appears a matter of opinion.

Nonmetallic Inclusions: While sulphur will combine with iron to form iron sulphide, which dissolves in molten iron, any manganese that is present will rob the iron of sulphur to form manganese sulphide which is insoluble in molten and solid iron. The result is the formation of particles of manganese sulphide as the iron solidifies in the ingot. This is one of the nonmetallic inclusions. Others are silica, alumina and similar substances.

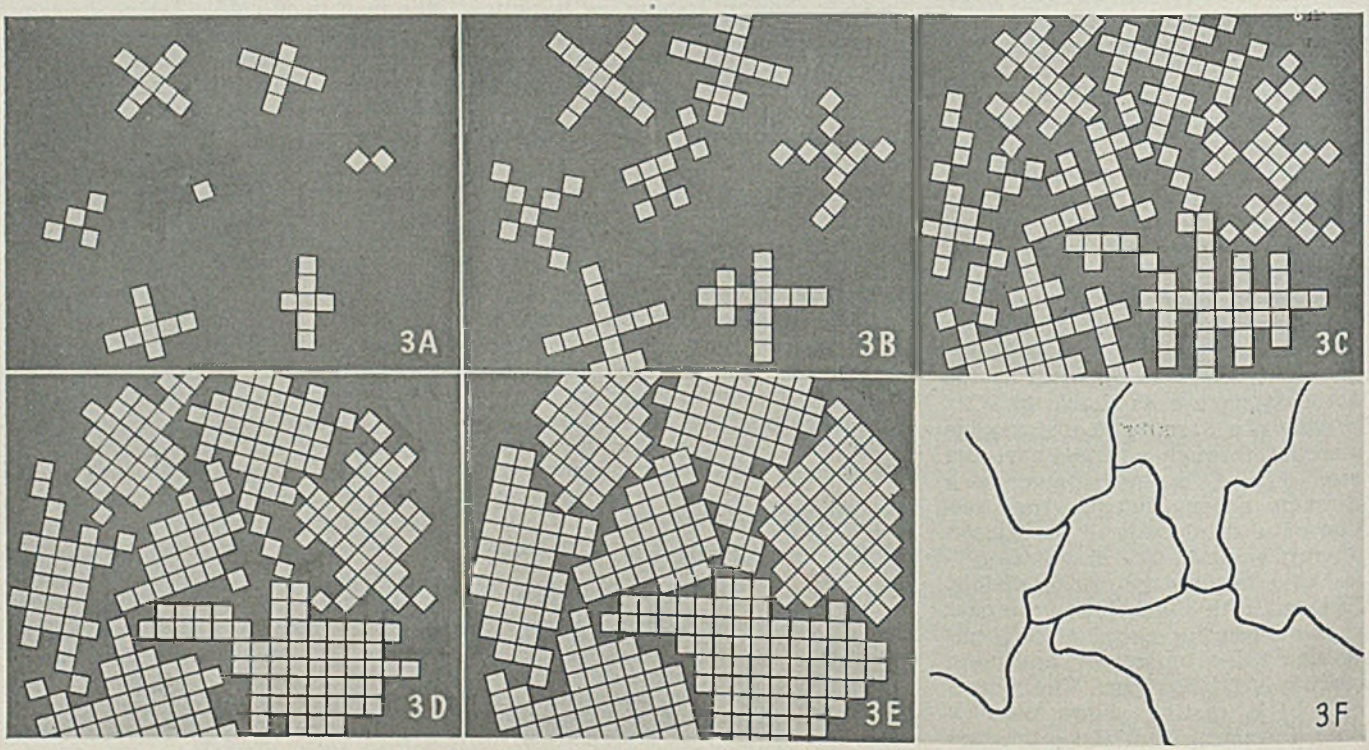
If insufficient manganese is present, some iron sulphide will remain. Since this compound melts below usual forging temperatures, it makes the steel susceptible to cracking (hot short) because its presence as a fluid in the metal robs it of tensile strength. Such material must be worked under compression, and tension carefully avoided during forging. But most steels contain plenty of manganese to avoid this condition.

Of greater importance is that, if the sulphur is high, the manganese sulphide particles may be present in such large amounts as to segregate in vital areas and lower the ductility and impact resistance of the steel. These inclusions, like any other inclusion, may act as stress raisers to make the metal more susceptible to failure, especially by fatigue, particularly if the particle is large, properly shaped and strategically located.

Oxides and Silicates: In addition to sulphur, four other elements present in all steels and commonly regarded as harmful are phosphorus, oxygen, nitrogen and hydrogen. Little is known about nitrogen and hydrogen. Phosphorus forms iron phosphide which dissolves in iron but which tends to lower impact resistance and make the steel brittle when cold, especially in high-carbon steels when phosphorus is above 0.30 per cent.[1] But at the high temperatures employed in steelmaking, oxygen combines avidly with many of the elements which may be present to form a variety of gaseous or liquid oxides which are removed as completely as possible by deoxidizing the steel during its manufacture.

Even under ideal conditions, however, some gas cavities or solid in-

Fig. 3—This schematic representation of the mechanism of crystal growth starts at upper left with a few crystal nuclii or unit cells upon which other crystal unit cells form to make the crystal grow. Note resemblance between grown crystals at lower center and familiar micrograph at lower right



"MORE PRODUCTION from each tool... *Double Quick!"*

. . . *That is the call* we must answer right now—double quick. Making tools that will give uninterrupted production for longer periods of time is a job that starts here in the steel mill and is completed in your tool room. It is a job that you and Carpenter can do best together. Our job does not end with the production of quality *Matched Tool Steels.* Carpenter's help to tool steel users also includes complete metallurgical assistance. And it goes even further than that to include comprehensive printed material that simplifies the selection, heat treatment and use of tool steel for each job. Today, *your* job and *our* job is to—

conserve valuable metals
save time in tool making
train more tool makers
prevent trouble on machines and presses
step up machine output
cut tool and production costs

As the foundation of Carpenter's program of *All Aid To Tool Steel Users* we offer "Tool Steel Simplified"—now used in tool rooms, heat treating departments and machine shops—to make every pound of tool steel answer the call for *More Production—Double Quick.*

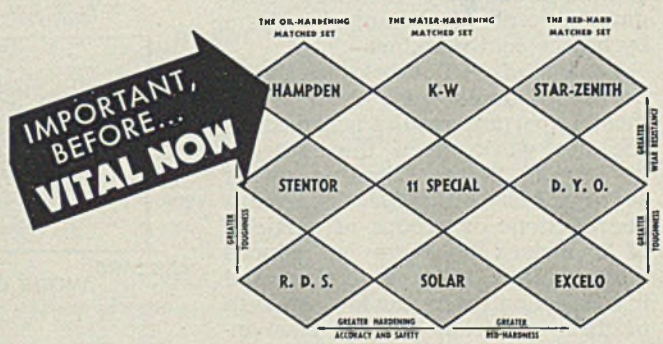
Over 22,500 copies of "Tool Steel Simplified" are helping tool makers and apprentices produce better tools that will do the work *more quickly.* Three chapters on heat treating equipment and procedure make this helpful handbook a high-priority need in every heat treating department. The chapter on "Trouble Shooting" is particularly helpful in quickly locating remedies for common tool troubles. "Tool Steel Simplified" also includes answers to questions like: "How to stop tools from warping?" and "How to make tools wear longer?"—along with a *must* chapter on the importance of The Relation of Design to Heat Treatment.

After you have read "Tool Steel Simplified", you will want each key man and every apprentice in your plant to have a copy of this helpful 315-page "refresher" course for tool makers and training help for new men on the job. "Tool Steel Simplified" costs only $1.00 postpaid in the U. S. A.—$3.50 elsewhere. Put this useful handbook to work in your plant for *More Production From Each Tool—Double Quick.*

THE CARPENTER STEEL COMPANY

Dept. 51 Reading, Pa.

Carpenter MATCHED TOOL STEELS



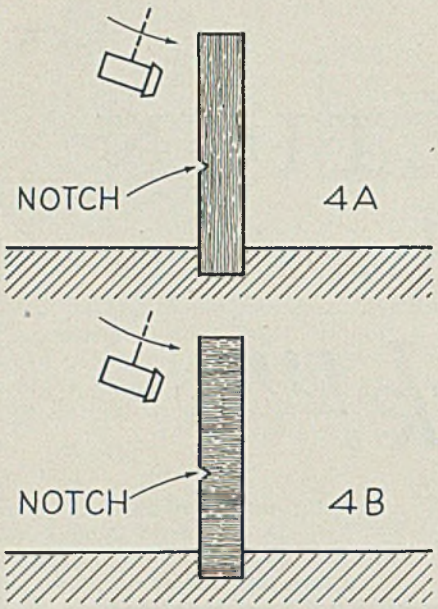


Fig. 4—At A, longitudinal fibers distribute high stresses at notch to give much greater impact resistance than at B where fibers act as stress raisers to concentrate stresses developed at notch, causing early failure as impact is increased

clusions bearing some form of oxygen will be found. These oxides or combinations of oxides (silicates), together with sulphur, form the most common source of solid nonmetallic inclusions in steel. Oxides and silicates, when present in large particles or if segregated, tend to act as stress raisers to cause early failure of the metal in the same manner as sulphide inclusions.[2]

While gas pockets may close and their sides weld together in rolling or forging with no ill effect in the final piece of steel, a defect known as a seam will occur if the walls of the cavity have become oxidized. Like an inclusion, a seam is a likely locus for premature failure.

Those inclusions that are plastic at forging temperatures become elongated into stringers or threads when the ingot is rolled or forged. Those not plastic are broken up and also become distributed as stringers or threads. Thus inclusions, once trapped in the steel, cannot be removed or even reduced in amount by any treatment. But they can be broken up, distorted, elongated or otherwise changed in form by hot or cold working.

Benefit of Hot Work on Distribution of Inclusions: One of the most important results achieved by the hot work given the material in forging is the breaking up of segregations of these inclusions. Segregations or groups of particles of inclusions thus can be reduced in size and distributed or elongated in a direction where the low strength of these materials has the least influence on the physical properties of the final product. That is why macrographs showing the distribution of inclusions (by grain flow lines) are so valuable in studying forgings.

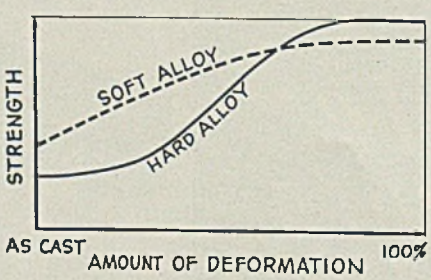
What Is Grain and Grain Flow? Having considered the amount and arrangement of inclusions as shown by the dark portions of an etched section through a forging (such as Fig. 1), let us now consider the other thing that the macrograph reveals—the grain flow, as shown by the light-colored lines between the dark portions.

Crystal Growth: In a molten metal, the atoms are arranged haphazardly. But when the metal solidifies, the atoms arrange themselves in a regular geometric pattern characterized by more or less perfectly formed faces intersecting at precise angles—a process called crystallization. As this action starts at a large number of points in the liquid simultaneously, growth of the crystals in the regular geometric pattern is finally halted by collision with neighboring growths. This mechanism of crystal growth in steel is shown schematically in two dimensions in Fig. 3. Note the last in this series approximates the familiar micrograph in which the dark lines show the grain boundaries.

Result of this crystal growth is a mass of polygonal grains, each grain consisting of hundreds of thousands of extremely small crystal unit cells in which the atoms are arranged in definite patterns. Faces and edges of crystals in a grain are arranged symmetrically with the principal planes of the crystals in each oriented in definite directions as is shown schematically in Fig. 3. Orientation of all crystal cells in any one grain is the same, and usually it is different from that of adjoining grains as would be expected from the random orientation that exists at start of crystallization. See Fig. 3.

Cleavage Planes: Anyone familiar with physical characteristics of crystals (we now are considering the fully grown crystal or grain made

Fig. 5—Approximate relations between strength and amount of deformation for an especially hard and a softer alloy of the same base metal



5

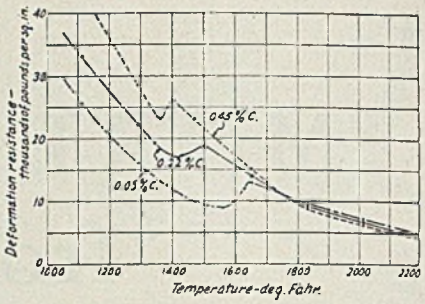


Fig. 6—Here resistance to deformation is plotted against temperature at which the steel is worked. Note the valley as the material passes the transformation point. The three curves are for steels with the three different carbon contents noted

up of thousands of tiny individual crystal unit cells) knows that crystals tend to break along well defined planes, undoubtedly due to the geometric arrangement of the tiny individual unit cells composing the large crystal and to the mechanization of crystal growth. Similarly, failure of steel under stress usually occurs through the crystalline grains, rather than along the grain boundaries, definitely indicating the presence of cleavage planes.

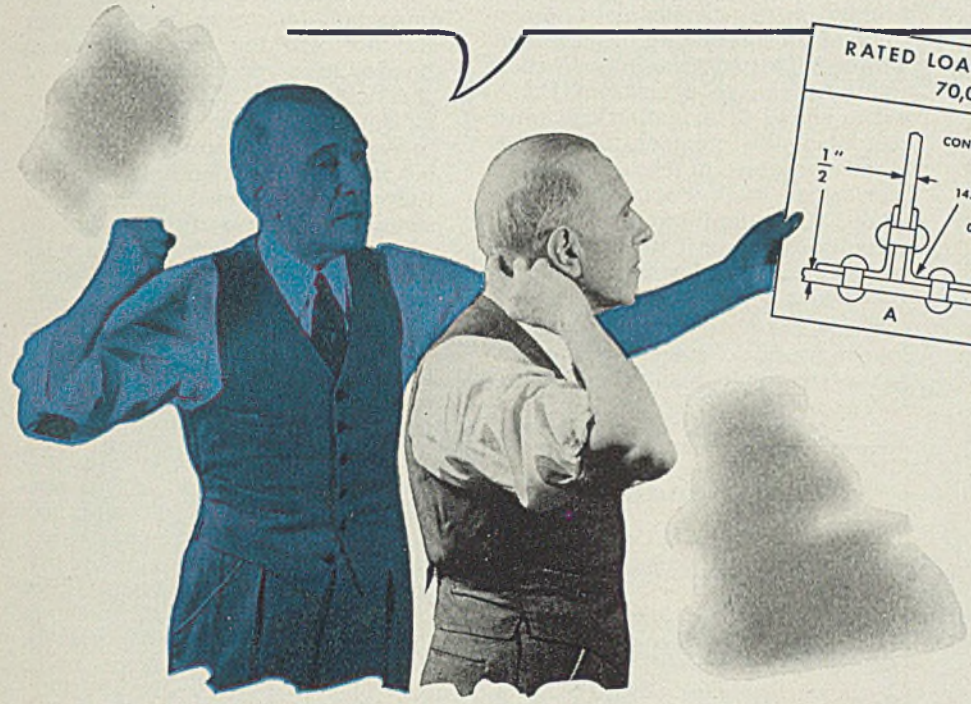
Internal Structure of a Crystal: The geometric pattern which the atoms tend to form when a metal solidifies is known as a space lattice. This will be described in detail in a later section in this series. For the present, its action under stress is of most interest.

Plastic Flow: When a crystal of a pure metal is subjected to a stress of even low magnitude, the space lattice is distorted, and the metal changes dimensions slightly. Removal of the stress will cause the groups of atoms to return to their original position in the lattice and will eliminate the distortion in the metal, provided the applied stress is less than the force which holds the atoms together (this means the stress must be within the elastic limit).

But if the applied force be greater than that holding the atoms together (the elastic limit exceeded), groups of atoms are permanently displaced along slip planes and permanent deformation (plastic flow) occurs. It is important to know that considerable deformation can occur without breaking the atomic bonds and without rupturing the crystal or crystalline aggregate.[3]

This ability of a crystal to deform or flow under stress without rupture varies with the temperature —the higher the temperature the easier the crystal deforms. In forging, this is particularly important for it means that it is possible to elongate the crystals in the direction in which the highest physical properties are desired. *It is these*

then I said to myself—



This looks like . . .
MORE FOR LESS

We've been more or less successful in our methods—but let's assume we're wrong. Let's get a fresh start and prove each step as right before we take it.

ALTER EGO: Fine exercise to prevent manufacturing ruts. Let's start with the two ways of joining two plates at right angle, say. What's the procedure for method "A"?

It's plain to see we hold the plates with angles and rivets. We must drill or punch holes, fit them up, fill them up with rivets and hammer down the heads of the rivets. This requires 14.85 pounds of connecting material per foot of joint.

ALTER EGO: And in method "B" you just weld a bead along each side of the joint. This joint requires only 8/10 of a pound of connecting material per foot. But look closer, what else do you find?

Here's the big point. To get a load capacity of 70,000 pounds per foot, in the case of "A" we must use ½-inch plate—while in "B" we can use only ⅜-inch plate!

ALTER EGO: Isn't it obvious then that welding gives MORE for LESS. Now, how can we get that for our present work and future plans?

A good starter would be to get those Machine Design Studies which are given out by The Lincoln Electric Company of Cleveland, Ohio, so that we can figure out how arc welding can give us MORE for LESS.

ALTER EGO: Literally, "one's other self"—the still, small voice that questions, inspires and corrects our conscious action.

elongated and closely packed crystals (or grains) that appear as the light portion in macrographs of forgings such as Fig. 1.

Effects of Hot Working: As mentioned above, the ability of a crystal to flow under stress increases with temperature. After deformation at low temperatures, individual crystals retain the distortion corresponding to the deformation of the entire body.[2] As deformation increases, slip resistance increases and the metal is said to "work harden."

But if the deformation stress is applied at a temperature above the recrystallization temperature of the metal, an entirely different action occurs for then the structure assumes its original form either during deformation or within an extremely short time thereafter. And the original strength is restored. Thus the occurrence or absence of recrystallization profoundly influences the behavior of the metal, making it possible to classify deformations carried out below the temperature of recrystallization as "cold working" and those done above the temperature of recrystallization as "hot working."[2]

However, the temperature of recrystallization changes with speed of deformation and so depends upon the processing conditions. Thus it is not always possible to draw a distinct line btween cold and hot working. But remember that cold working is characterized by a permanent distortion of the grains which compose the structure whereas hot working is done at such a high temperature that the grains have a chance to grow to restore the original structure so they appear undeformed or only slightly deformed in the forged work. Almost all forging of steel is done at temperatures ranging from 1900 to 2400 degrees Fahr. Obviously these temperatures are well above the temperature of about 1350 degrees Fahr. at which recrystallization or crystal growth starts.

When the deformation (forging) is done at a temperature only slightly above the temperature of crystal or grain growth, the date of recrystallization is so small that the structure is restored only slightly or not at all during deformation, and a strengthening occurs similar to that of cold working. But recrystallization requires a certain amount of time. And because the rate of recrystallization increases rapidly with temperature, evidences of strengthening become smaller, the more the forging temperature exceeds that of recrystallization. This is the reason steel is usually forged at as high a temperature as is practicable without excessive grain growth or burning of the metal.[2]

Forging temperature not only greatly influences the increase in resistance to forging as deformation takes place, but it also determines the initial resistance to deformation, for this initial resistance decreases rapidly with increasing temperatures as a consequence of increasing atomic activity. Some idea of these relations can be had from Fig. 6 which shows deformation resistance plotted against temperature of the metal for steel of carbon contents marked on the curves. These data were from compression tests under a hydraulic press with 30 per cent compression. Deformation velocity was about 6 per cent per second.

While heavy reductions given the ingot greatly decrease the coarse grain size that results in casting the ingot, the primary purpose of hot working in forging can hardly be for reducing the grain size as this depends largely on subsequent heat treatment given the forging. It should be noted, however, that grain size at room temperature depends largely on the grain size before transformation (above transformation temperature).[3] Breaking up large crystals during forging thus tends to produce a steel with a finer grain.

In addition, and possibly more important in a forged part, hot working breaks down the agglomerations or segregations of inclusions and distributes them more evenly through the metal so they have the least deleterious effect (sometimes called "refining" the steel). "Refining" also refers to breaking up large grains. Also, as is evident by macrographs of forged parts (Fig. 1 for instance), the hot work in forging can do much to place these inclusions and porosity in the core of the finished part where they will be subjected to least stress and therefore will least affect the strength of the forged part.

Directionality: One of the most important factors in forging is that the hot working can be designed to produce a mechanical fibering of the material. That is, the weaker substances (porosities as well as inclusions) in the steel can be drawn out into flow lines and placed where they have the least effect on the strength of the structure. At the same time, this hot working elongates the filaments of high strength substances and tends to produce a preferred orientation of the grains with the end effect of increasing the physical properties of the material in the desired direction, as will be explained in more detail.

Unless advantage is taken of mechanical fibering and the directionality that results, the forging may be little better than a good casting. In fact, that is exactly the reason for the failure of certain forged parts in the past. As will be shown in subsequent section of this series, fibering and directionality can be controlled almost at will.

Let it be emphasized, however, that the amount of directionality (difference in physical properties across the grain as compared to those parallel with the grain) depends on a number of factors. Obviously the larger the volume of inclusions, the more pronounced will be the directionality for the same degree of fibering since the "holes" or weak portions of the steel will be larger. The amount of inclusions and the degree of their dispersion throughout the metal depend considerably upon the melting process.

Likewise, the amount of mechanical fibering greatly influences the directionality. Thus if a forged part is made almost entirely by blows or pressure applied so as to produce greatest fibering (as in forging a long part from a billet), directionality will be greater than if the billet is forged or worked equally from all directions (as in forging certain die blocks).

Effect of Directionality: The key to the effect of directionality lies in the manner in which the fiber structure distributes the load stresses. The effect of directionality possibly is most striking in connection with impact tests.

Figs. 4A and 4B indicate why this may be true. In Fig. 4A the fibers run parallel with the bar, the lower end of which is held stationary while the hammer is allowed to swing against the upper portion of the bar above the notch.

With the elongated grains at right angles to the direction of force, Fig. 4A, obviously they are going

(*Please turn to Page* 68)

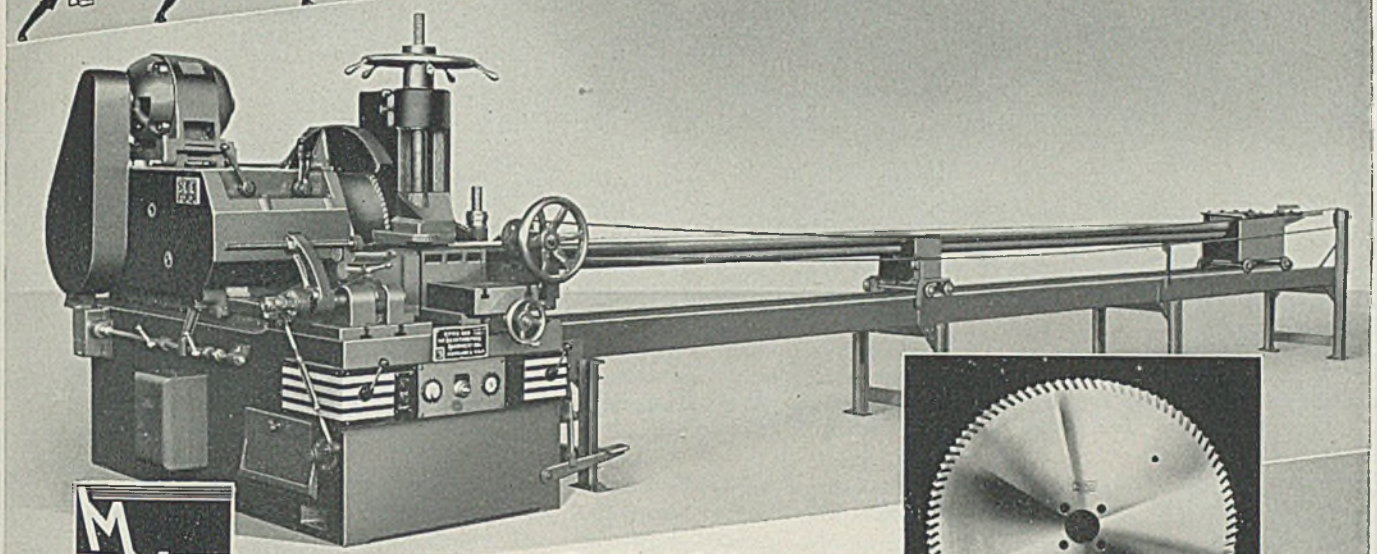
New Handbook

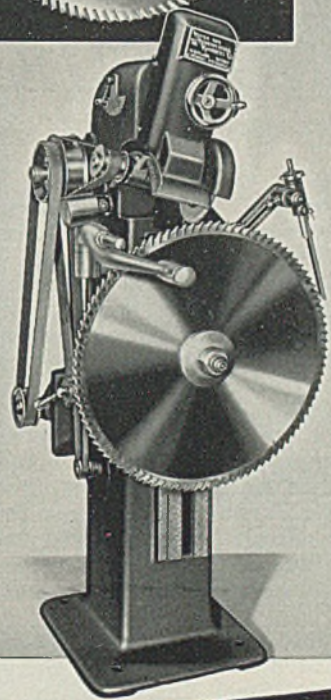
The latest in STEEL's series of ordnance handbooks, "Modern Small Arms", is now off the press. This handbook includes information on various types of automatic rifles, machine guns and sub-machine guns, automatic firearms, cartridge cases and small arms ammunition. It is attractively bound, contains 70 pages, and is priced at $1.00 per copy.

Also available are copies of "Modern Shell Production, Revised" at $1.50 per copy and "Modern Gun Production" at $1.00 per copy.

These handbooks may be ordered separately at the above price, or $3.00 for the set from STEEL, Readers Service, Penton building, Cleveland.

*Triple ON THE ~~DOUBLE~~ QUICK





The Motch & Merryweather Cold Saw cuts A.P. 4150 stock at surprising speeds. Write for production data.

This country was never in such a hurry as it is right now. On the triple quick! No matter how fast you go, it isn't fast enough.

BUT—we've got to do the job *right the first time*. There is no excuse for having to perform any operation twice in order to insure results which should have been obtained in the first place. Today, as never before, speed has to be coupled with accuracy. The Motch & Merryweather Cold Sawing Machine has brought Defense six definite advantages:

(1) a really surprising speed; (2) consistently square ends; (3) no burrs on cut sections; (4) multiple cutting without any slipping; (5) the virtual elimination of scrap material; (6) a stamina which permits running 168 hours a week at maximum range *indefinitely*.

Motch & Merryweather Cold Sawing Machines cut round stock up to 15" and square up to 13½". For the best results, use also Motch & Merryweather Segmental Saw Blades and the M. & M. Saw Grinder.

THE MOTCH & MERRYWEATHER MACHINERY COMPANY
Penton Building . . . Cleveland, Ohio

Built by MOTCH & MERRYWEATHER

THE MOTCH AND MERRYWEATHER MACHINERY CO
CLEVELAND CINCINNATI DETROIT PITTSBURGH

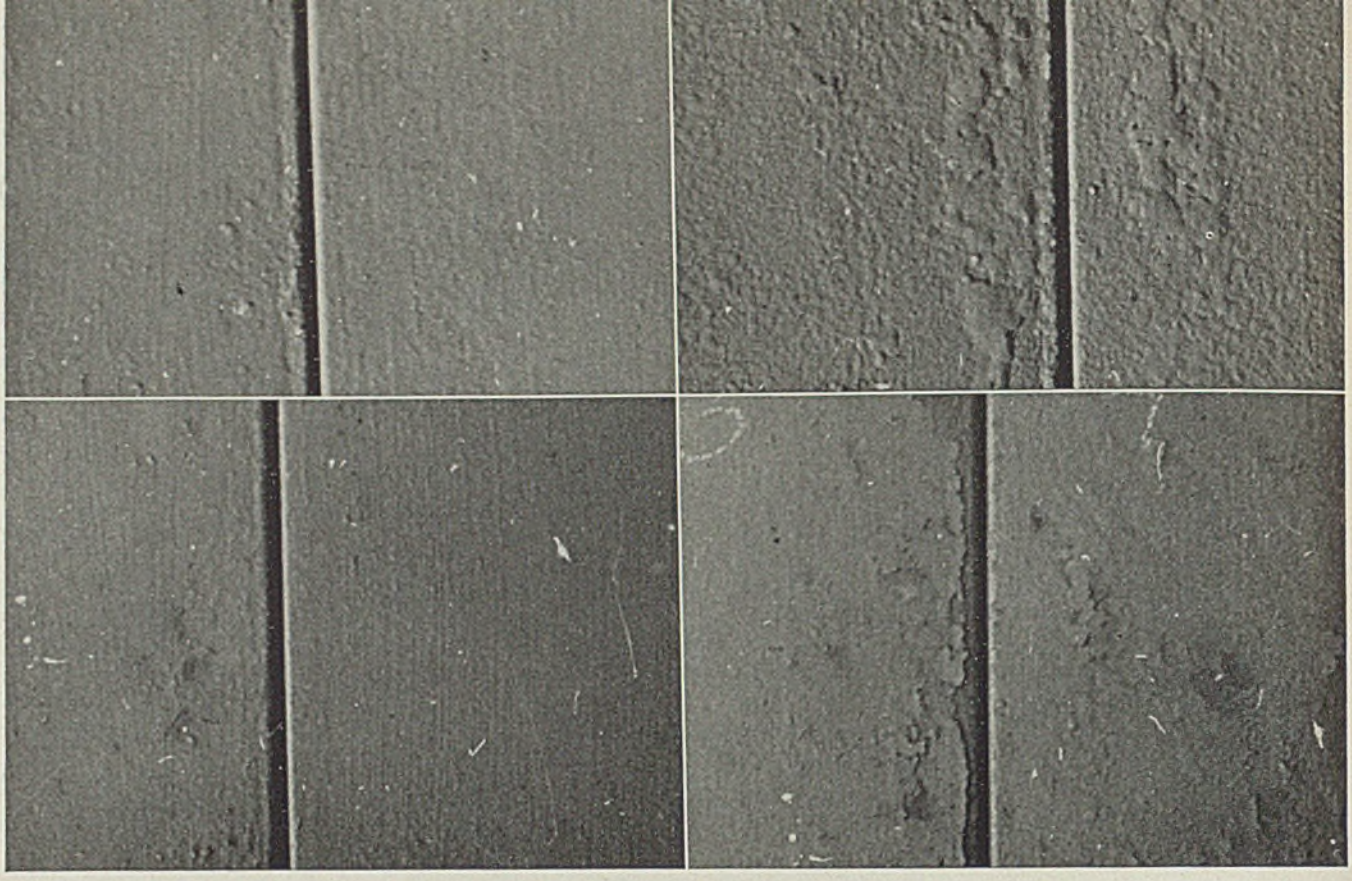


Fig. 1—A, upper left, badly rusted steel, flame cleaned and brush painted, after 12 months. B, upper right, similar specimen but prepared by wire brushing, same exposure. C, lower left, badly rusted steel, flame cleaned and brush painted with another make of paint than A and B; shown after 12 months exposure. D, lower right, same as C only hand wire brushed; note how badly the paint failed in this view

Tests Show Effectiveness of

FLAME CLEANING STRUCTURAL STEEL

■ DURING the last few years, intense interest has been aroused among structural steel fabricators in the development of methods of preparing steel surfaces for primer painting. They have been anxious to find a method which would extend the life of priming paints on structures, and which would be less hazardous, less costly and generally more satisfactory than sand blasting. Many attempts have been made to prepare the surface for painting, involving chemical treatments and mechanical cleaning methods. One method has attracted keen interest —flame cleaning with the oxyacetylene torch.

At Bethlehem, this method was inaugurated in 1938. The British Iron and Steel Institute (in its "Fifth Report of the Corrosion Committee," published in 1938) had reported that by heating weathered steel prior to wire brushing and painting, longer paint life was achieved than was obtained on weathered steel which was simply wire brushed before being painted. The institute had carried out this heating by placing the steel in front of a large gas fire for 45 minutes, the air temperature in the vicinity of the steel being 225 degrees Cent. Temperature attained by the steel was not mentioned.

With this in mind, and acquainted with the oxyacetylene torch method for scarfing billets in the mills, Bethlehem engineers proposed the idea of using an oxyacetylene torch to prepare structural steel surfaces for painting. The investigators believed the chief benefit derived from flame cleaning would be the removal of moisture occurring both in the free and the combined states on the steel surface. Other benefits would be the removal of some scale and rust.

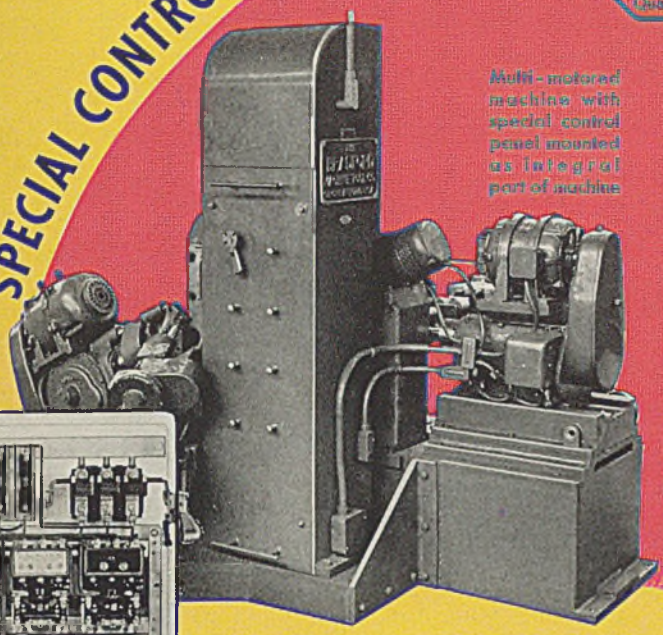
By E. A. TICE
Development and Research Department
Bethlehem Steel Co.
Bethlehem, Pa.

Two investigations were initiated —the first in June 1939, and the second in the spring of 1940. The results obtained (tests are still being carried on) indicate that for steel which has not been allowed to rust, but which has only a normal covering of mill scale, good paint life is obtained both after wire brushing and after flame cleaning. For steel which has been exposed to the weather for a considerable time, the situation is different. Here flame cleaning appears to be distinctly superior to wire brushing as a method of preparing the steel surface for painting.

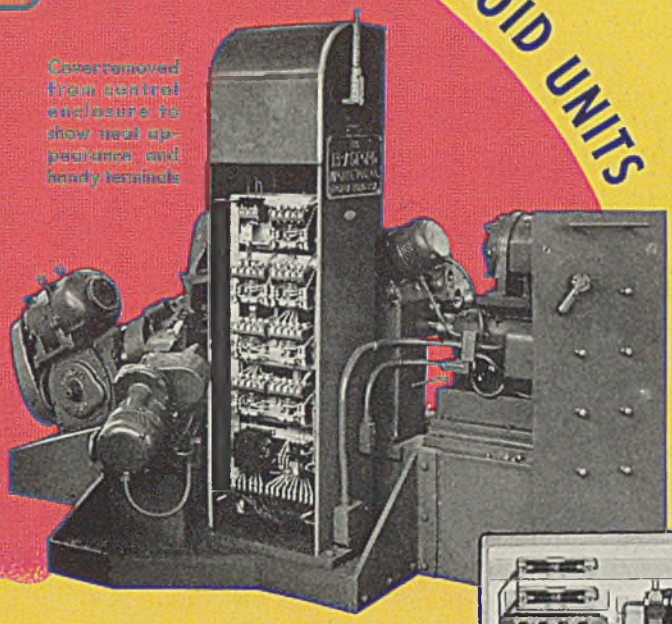
The first series of tests was carried out using a 4-foot length of 6-inch I-beam, of ¼-inch web thickness as the test specimen. One lot was exposed to the weather until considerable rust developed, the other lot was taken directly from the rolling mills with the mill scale intact. Consequently, there were two types of surfaces—new and weathered—on which to make a direct comparison between flame cleaning and ordinary hand wire brushing.

The flame cleaned specimens were prepared by means of an oxygen-acetylene torch, especially developed for flame-cleaning work. This was followed by a light wire brushing and wiping to remove the products left after flame cleaning, and

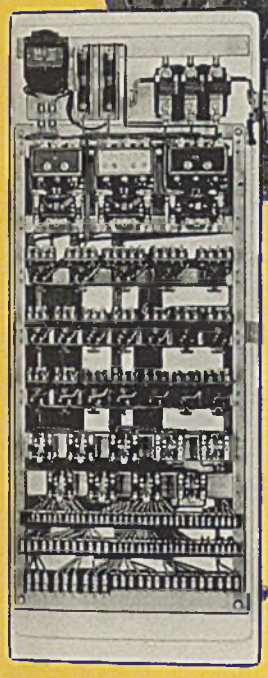
SPECIAL CONTROL PANELS BUILT WITH A-B STANDARD SOLENOID UNITS



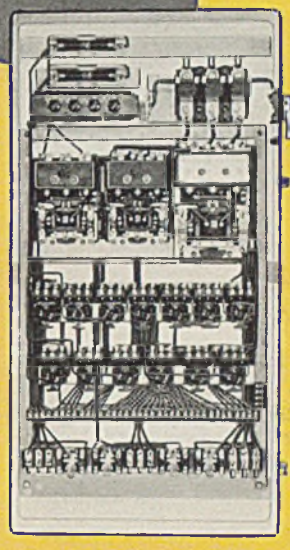
Multi-motored machine with special control panel mounted as integral part of machine



Cover removed from control enclosure to show neat appearance and handy terminals



22-Unit machine tool panel.



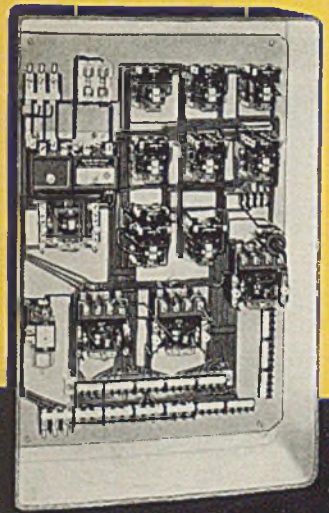
16-Unit machine tool panel.

Get More Output with Automatic Control

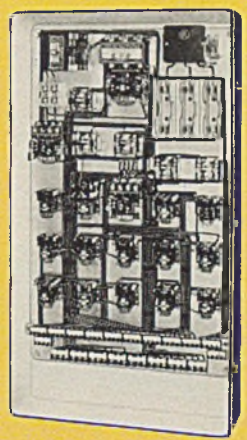
Step up the output of your multi-motored machines with tailor-made, fully-automatic sequence control. Use Allen-Bradley special control panels, assembled from standard units, and thus get any combination of sequence control without costly, experimental design.

Allen-Bradley control engineers have wide experience in such "special" panel design. Moreover, all A-B switches are standard units with long records of successful service. Don't risk the reputation of your machines with untried or more complicated controls. Specify A-B.

12-Unit control panel.

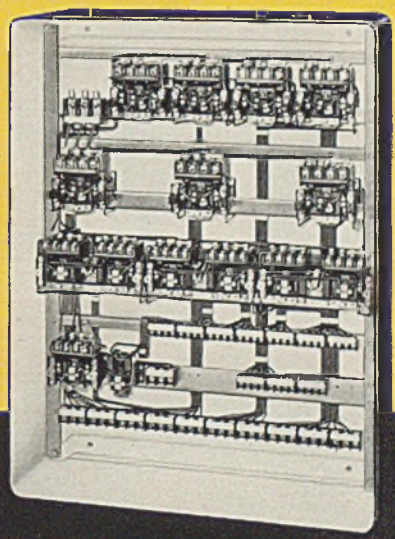


Exterior of control panel showing disconnect switch operated from front of panel.



Open view of 17-unit control panel. Note the convenient terminal connections.

15-Unit tailor-made panel.



ALLEN-BRADLEY

MOTOR QUALITY CONTROL

Made in 5 Sizes up to 50 Hp, 220 V 100 Hp, 600 V

The Allen-Bradley Family

of ACROSS-THE-LINE SOLENOID STARTERS

Did you ever see a finer looking family of motor starters? And such simple design! From smallest to biggest they are alike in attractive appearance, which makes them mighty popular with machinery builders.

With only one moving part . . . with double break, silver alloy contacts . . . with precision overload relays, this family of solenoid starters is leading the parade with a new standard of motor control performance.

Let us send you the "Story of the Solenoid Starter."

Allen-Bradley Company, 1320 S. Second St., Milwaukee, Wis.

STANDARD ENCLOSURES FOR EVERY SERVICE

For general installations

For corrosion-proof service

For water-tight service

For non-hazardous dusts

For non-corrosive hazardous gases

For corrosive hazardous gases

For hazardous dusts

For wall mounting

For pedestal mounting

ALLEN-BRADLEY

SOLENOID MOTOR CONTROL

QUALITY

the specimens were painted while the steel was still warm. The hand-cleaned specimens were wire brushed in the manner usually employed in a reputable shop, removing loose mill scale without dislodging any of the tight scale or the rust discoloration from the weathered specimens.

Five paints were applied as primer to each surface, and duplicate panels were prepared. One set was exposed at Philadelphia in an industrial atmosphere, the other set received an ocean voyage as deck load on a steamship from Philadelphia to Seattle, Wash., and return, and was exposed at Bethlehem for the remainder of the investigation.

The coating thicknesses varied according to the type of paint used. However, for each individual paint the coating thickness applied was the same. Consequently, the dry film thickness throughout the series ranged from 2.0 to 2.8 mils. The panels were brush painted by an experienced painter.

At this time the specimens have been on exposure for 28 months throughout which time they have been examined periodically, and the following observations have been made.

Flame-Cleaning Better

At the Bethlehem exposure, both cleaning methods have afforded good protection to the new steel for all five paints applied, and the effective paint life has not yet been completed. On the weathered steel, however, all five paints failed on the hand-cleaned specimens after 10 to 12 months, but gave 25 to 28 months life on the flame-cleaned surface, with the exception of one paint which failed after 12 months. Disregarding this last paint, flame cleaning on weathered steel has afforded over 100 per cent longer life than hand wire brushing.

At the Philadelphia exposure of new steel, there was no appreciable difference in the life of either the hand wire brushed or the flame cleaned specimens, the average life for all the panels being 20 months, which was considerably shorter than that experienced at Bethlehem. On the weathered steel there was no appreciable difference between the life of the paint on the flame cleaned and on the wire brushed specimens for four of the paints, but on the fifth, flame cleaning gave 100 per cent longer life than hand wire brushing. However, averaging the results for the five paints, the two cleaning methods did not produce any appreciable difference in paint life, the average life being 17 months for both groups.

The effective paint life, averages for the five paints at both locations are shown in Fig. 2.

The second investigation was to determine the effect of flame cleaning on steel in different stages of rusting. Here again flame cleaning was compared with hand wire brushing. Three surface conditions chosen were:

1. New steel, kept dry from the time it came off the rolling mill until it was painted, this time being as short as was within the control of the investigators. In this case practically the entire surface area was covered with mill scale.
2. Steel 50 per cent rusted, which had been exposed to the weather until about 50 per cent of the surface might be considered to have rusted, with the remaining 50 per cent still covered with scale.
3. Badly rusted steel, which was exposed to the weather until the surface was entirely, or at least 95 per cent rusted, not more than 5 per cent of the area being covered with mill scale.

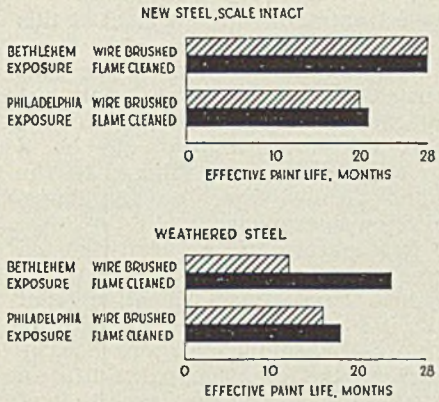
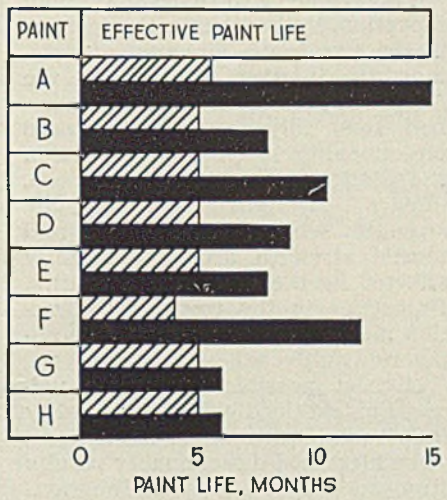


Fig. 2—Results of investigation No. 1 devoted to determining effective life of paints on surfaces flame cleaned and others wire brushed. Specimens were sections of 6-inch I-beams

Fig. 3—Results of investigation No. 2 on badly rusted angle sections. Solid lines show life of specimens prepared by flame cleaning. Cross-hatched lines show life of specimens prepared by hand wire brushing. Note for paint A that life was almost tripled by flame cleaning



Eight primer paints were applied to each of the three types of surface, one lot of which were prepared for painting by ordinary hand wire brushing, and one lot by flame cleaning. These paints were supplied for direct application by brushing. Test specimens were 4 x 4 x ¼-inch angle sections, 1-foot long, weighing approximately 10 pounds per foot. The outside surface of the angle was chosen as the test surface. This afforded two flat surfaces, each 4 x 12 inches, or a total of 0.67-square foot. The steel was exposed to the atmosphere until the desired degree of rusting had been obtained, after which it was stored in a heated shop until painted.

The group of panels to be tested with hand cleaning as the pretreatment were wire brushed by two of the investigators, who took care to remove all loose rust and scale which could be eliminated by this method. This was done very conscientiously, and unquestionably with greater care than that ordinarily used in a shop. Following the cleaning, each panel was wiped with safety solvent to remove any oil or grease which might be present.

Immediately before painting the panels were dusted with a dry cloth to remove any loose particles of dirt from the surface. A surplus of panels was prepared and from this group were chosen only those which in the opinion of the investigators were the most uniform.

Another Test Prepared

Flame cleaning was done with an oxygen-acetylene torch by an experienced operator and was followed by a light wire brushing to remove loose material remaining on the steel. The flame cleaning was conducted at such a rate that the finished steel was painted within 45 minutes to an hour, that is, while it was still warm.

For each condition to be tested, four panel specimens were prepared. Two were brush painted, and two spray painted, the paint being thinned with naphtha for spraying as necessary. All painting was done by an experienced painter. Each panel was coated with a definite weight of paint so that upon drying it would have a dry film thickness of 0.0025-inch, plus or minus 10 per cent. In brush painting, paint can and brush were weighed before and after painting; in spray painting, the panel was weighed before and after painting. The balance used had a capacity of 10 pounds and a sensitivity of 0.2-gram so the weight of paint applied was easily controlled.

Panels dried in the laboratory for approximately one week. They were then exposed to an industrial atmosphere at Bethlehem, placed at

a 45-degree angle, facing south. They have been exposed 16 months at this writing. Bimonthly the panels have been graded, using the Swedish standards for rating the failure. It was agreed that when a panel reached a score of six, it had served its effective life and would require scraping and repainting. Therefore, the effective paint life shown in Fig. 3 is the average of the months of exposure which elapsed before the four panels (two brush painted, and two spray painted) had reached this condition.

Results: The new steel has shown little or no failure on either the wire brushed or the flame cleaned surface, quite clear evidence of the advantage of painting on the non-rusted surface. No discrimination can be made between the two surface treatments on new steel at this time.

The majority of the 50 per cent rusted specimens have not yet reached the end of their effective life, but there appears to be a greater tendency to failures on the hand cleaned than on the flame-cleaned specimens.

In the case of the badly rusted steel (100 per cent rusted), all panels have failed. Effective paint life for each condition, see Fig. 3, shows that flame cleaning has increased the effective paint life an average of 80 per cent over that of hand cleaning for paints tested.

The pictures in Fig. 1 were taken at one year's exposure and show the condition for two of the paints on the 100 per cent rusted steel, both with wire brushing and flame cleaning. Note the bad flaking and the large bare areas on the wire-brushed specimens, in contrast to the much better appearance of the flame-cleaned specimens.

Note that on the wire-brushed surface, the composition of the paints tested apparently had little or no effect on the paint life, since they all failed so rapidly—whereas on the flame cleaned surfaces, the paint composition played a vital part in prolonging the life.

It is evident that flame cleaning prior to primer painting is beneficial for steel which has been weathered as it has produced up to 100 per cent longer life than the ordinary hand cleaning method. When applied to new steel, flame cleaning shows protective life equal to that of hand cleaning.

Structure of Forgings

(*Concluded from Page* 62)

to distribute the stresses at the apex of the notch over a much greater volume of metal than at Fig. 4B, where they act as "stress raisers" to increase the stress at the notch, causing failure at a lower impact value. The effect can be likened to the difference between difficulty in breaking a piece of wood with grain lengthwise and the extreme ease with which it can be broken when the grain is crosswise. The fiber or "grain" structure of the wood distributes the stresses in a manner similar to that of the fiber structure of a forging.

While a large number of variables determine the exact amount of the difference in physical characteristics obtainable lengthwise as distinguished from crosswise the fiber structure, it can be said in general that those mechanical characteristics that depend upon the ductility of the metal (such as elongation, contraction in area and resistance to impact loading) increase in the longitudinal direction with increased hot working of the metal, whereas no change or some decrease is usually to be expected in the transverse direction. Ultimate strength and yield strength change little for they usually will be found about the same in the longitudinal and transverse directions.

As mentioned previously, the amount of directionality or difference between longitudinal and transverse properties of the material depends not only on the particular analysis of the steel but also upon the amount of reduction or hot working during forging. Ductility values (and thus directionality) of a forging generally decrease from the outside to the core, since the material near the surface is worked more (and is also cleaner) than that near the core. The difference in amount of work given material near the surface and that near the core depends largely upon the forging technique—that is, whether the force used to reduce the forging is applied for a very brief time, which allows only the surface layers to flow, or whether the force is applied over a comparatively longer time, which transmits the forces further down into the core to cause flow at lower levels in the material. This is the primary difference between "impact" forging with hammers as compared with "press" forging in such units as the hydraulic press. Of course, many other factors such as cost, speed, size and expense of equipment also enter into consideration.

Results of a number of investigations indicate in general that the physical properties in the direction of the fiber are generally improved by forging—particularly by reductions up to 3 to 1 in cross section from the ingot and to a slight additional extent also by further reductions up to 10 to 1.

Transverse Properties: Without exception, the mechanical properties in the transverse direction of forgings are inferior to those in the longitudinal direction.[3] In low-carbon steel forgings, a pronounced directionality has been reported in the elongation, reduction in area, impact strength and fatigue strength, while yield strength and tensile strength are only slightly affected by the direction of testing. Properties in the transverse direction may be either favorably or unfavorably affected by forging.

Highest possible transverse values are obtained with high-quality ingots and with small reductions, since increased directionality results from maximum working. Inherently soft low-carbon alloys appear to yield better transverse properties than the harder alloys.

Thus in selecting material for a large complicated forging, it is not always best to choose the strongest alloy available. Note from Fig. 5 that the strength may be greater for the hard alloy but that almost 100 per cent deformation is required to get to that point where the hard alloy passes the soft alloy. Fig. 5 presents approximate relations between properties of an especially hard and of a softer alloy of the same base metal.[3]

In general, the harder the alloy, the greater is the scatter in the ultimate tensile strength and elongation values in the transverse and longitudinal directions. In extremely ductile alloys, possessing a high reduction of area when tested in tension, these differences in the ultimate tensile strength and elongation disappear, but they still persist to a high degree in the reduction of area and in notched-bar impact values. The hardness and yield strength, on the other hand, are nearly the same in the longitudinal and transverse directions for a given alloy in a given condition.[3]

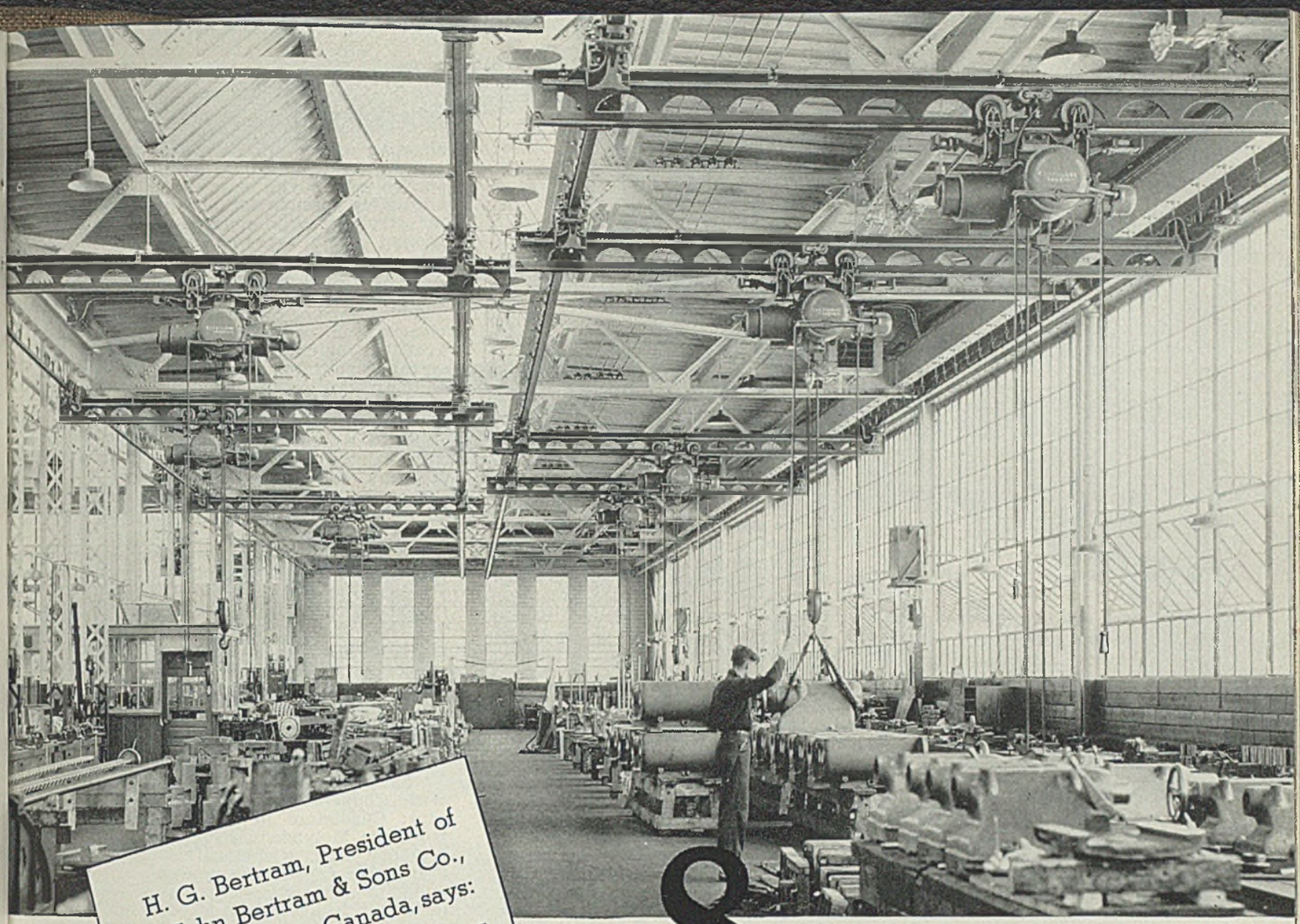
It should be emphasized that the above discussion does not purport to include details of all factors that may enter into the subject of the properties of forgings, nor that the explanations given are 100 per cent complete for certain factors have been merely mentioned or completely ignored in order to simplify the discussion.

References

1—F. T. Sisco, "Modern Metallurgy for Engineers", Pitman Pub. Co., New York.

2—Erich Siebel, "The Plastic Forming of Metals", STEEL, Nov. 6, 1933.

3—George Sachs, Kent R. Van Horn, "Practical Metallurgy", published by American Society for Metals, Cleveland.



H. G. Bertram, President of The John Bertram & Sons Co., Limited, Dundas, Canada, says:

"We have always been very pleased with the installation you made and it has very considerably assisted our war work.

"The front bay with the eight cranes is the ideal layout for unit assembly work."

8 CRANES . . . . IN ONE SHOP BAY

To secure maximum crane service in the unit assembly department, The John Bertram & Sons Co., Limited, Dundas, Ontario, have installed two parallel runways with four cranes on each. This installation provides crane facilities for double the number of workers possible with conventional wall-to-wall cranes. Though not interlocking, the cranes may easily be so arranged.

Thus considerable time usually spent by costly, skilled mechanics waiting for crane service is greatly reduced and production of vital war machinery speeded. This is another of the manifold ways that Cleveland Tramrail equipment can be used to advantage.

GET THIS BOOK!

BOOKLET No. 2008 . . Packed with valuable information. Profusely illustrated. Write for free copy on your company letterhead.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
1125 EAST 283RD ST. WICKLIFFE, OHIO.

MANUFACTURERS OF • CLEVELAND CRANES • CLEVELAND TRAMRAIL • STEELWELD BENDING PRESSE

CLEVELAND TRAMRAIL

OVERHEAD MATERIALS HANDLING EQUIPMENT

Possible Alternates for Nickel, Chromium, Alloy Steels

■ LAST fall the Office of Production Management, now replaced by the War Production Board, requested the American Iron and Steel Institute to undertake a study of possible alternates for chromium, nickel, and chromium-nickel constructional alloy steels. Immediately an informal committee of metallurgists was appointed to confer and perform certain experimental work. This committee included metallurgists selected from the Technical Committees of the Institute and of the Society of Automotive Engineers Inc., meeting with interested manufacturers.

A report of the findings of this committee has been issued as No. 5 in the Amercian Iron and Steel Institute's series of Contributions to the Metallurgy of Steel. It is titled "Possible Alternates for Nickel, Chromium and Chromium-Nickel Constructional Alloy Steels." Copies may be had at 50 cents from the Institute's headquarters at 350 Fifth avenue, New York.

A digest of the conclusions reached by the committee, with analyses of the alternate steels, follows:

Possible alternates are confined to constructional alloy steels containing not more than the following percentages of the following elements: Nickel 5.25; chromium 3.99; manganese 2.00; silicon 2.25; vanadium 0.5; molybdenum 1.00.

The alternate steels do not embrace the following types of steel: Low-alloy high tensile steels which are furnished as flat rolled products and which require no heat treatment; stainless steels or irons such as the high chromium or chromium-nickel types; medium chromium (2 to 10 per cent chromium) steels which sometimes contain other elements and which are used to resist scaling at elevated temperatures; any class of tool steel.

The selection and application of a steel of a given composition is seldom dependent upon a single property or characteristic of the steel; it is usually the result of a compromise involving many factors. Size of section is of prime importance, the hardenability characteristics of the steel; the effect of various elements in large sections in the heat treated, normalized, or normalized and tempered condition; creep characteristics; resistance to mild corrosion; wear characteristics at low hardness values or when fully hardened; resistance to notch sensitivity or fatigue at room temperature or at low temperature; response to heat treatment, annealing, machining and many other similar properties and characteristics.

The use of alternate steels may make necessary changes in established methods of fabrication or heat treatment procedures or both, or may even make necessary changes in engineering design. Some types of steel are fabricated by torch cutting, bending, forming, dishing, drawing and other similar operations and the effect of these must be weighed carefully in selecting alternate steels.

For some uses a specific amount of a given element or group of elements is indispensable, while for other uses it may be more advantageous to make use of small quantities of several elements, thereby effecting conservation of all.

It is not the purpose of this report to present the most convenient alternates possible for one type of industry; rather, its purpose is to present certain types of steel which can serve the broadest possible field with the least technical complications.

As a means of conserving alloying elements in order to make them available for essential military uses certain arbitrary restricted limits were placed upon individual elements, when used in alternate steels, by the Office of Production Management in Amendment 2 dated Dec. 20, 1941, to Supplementary Order M-21-a, as follows:

"(1) Except pursuant to a specific Preference Rating Certificate or Preference Rating Order carrying a preference rating of A-10 or higher and duly issued or extended to the Producer, or pursuant to specific written permission of the Director of Priorities.

(i) no Producer shall melt, and

(ii) on and after Jan. 1, 1942, no Producer shall deliver any alloy iron or alloy steel containing any one or more of the following elements in the following amounts:

"Manganese in excess of 1.65 per cent; Copper in excess of 0.60 per cent; Chromium in excess of 0.60 per cent; Molybdenum in excess of 0.60 per cent; Nickel in excess of 0.60 per cent; Cobalt, tungsten or vanadium in any amount specified or known to have been added to obtain a desired alloying effect."

On Jan. 13, 1942, Priorities Order M-18-a relating to chromium was amended as follows:

(e) **Restrictions on Melting and Directions for Deliveries.** Hereafter no person shall melt more than two tons of ferro-chromium in any month except as specifically authorized by the Director of Priorities. The Director may from time to time specifically direct the manner and quantities in which deliveries of ferro-chromium or any other chromium shall be made or withheld for particular uses or for particular persons. Such directions will be made to insure the satisfaction of all defense requirements of the United States, both direct and indirect, and they may be made in the discretion of the Director of Priorities without regard to any preference ratings assigned to particular contracts or purchase orders. The Director of Priorities may also take into consideration the possible dislocation of labor, and the necessity of keeping a plant in operation so that it may be able to fulfill defense orders and essential civilian requirements. In making any deliveries of chromium with respect to which no specific directions have been issued by the Director of Priorities, each producer, processor, and dealer must give preference to defense orders as required by the provisions of Priorities Regulation No. 1, as amended from time to time, and must be governed by any prefer-

(*Please turn to Page 99*)

The other four sections of "Contributions to the Metallurgy of Steel"—all published at intervals since May, 1941 were entitled: "Possible Substitutes for Nickel Steel," "Direct Consumption of Aluminum in the Steel Industry," "Problems Involved in the Conservation of Manganese" and "Possible Substitutes for Zinc Coatings."

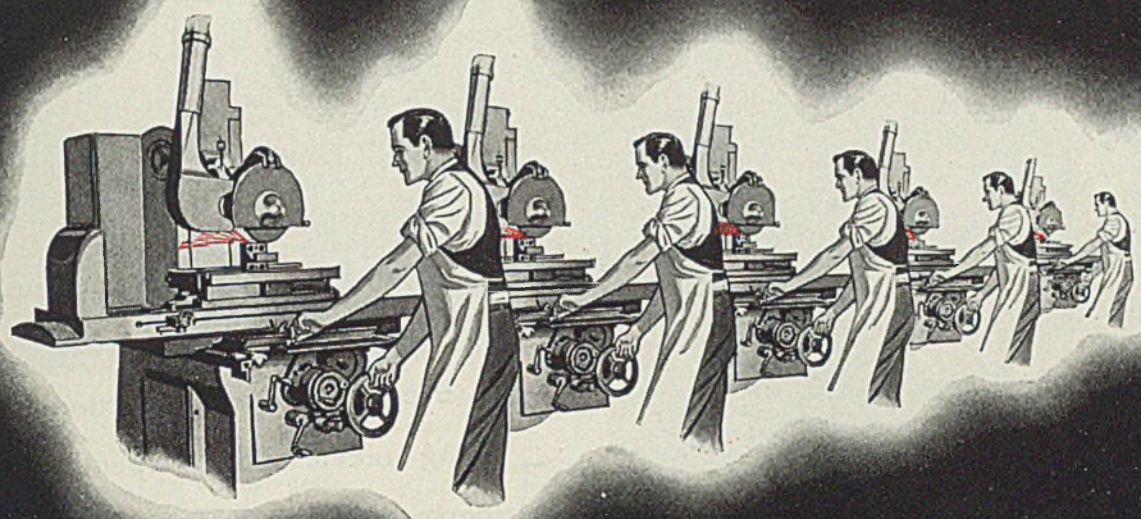
Des.	C	Mn	Mo	Ni	Cr
NE 8024	0.22/0.28	1.00/1.30	0.10/0.20	.....	.....
NE 8124	0.22/0.28	1.30/1.60	0.25/0.35	.....	.....
NE 8233	0.30/0.36	1.30/1.60	0.10/0.20	.....	.....
NE 8245	0.42/0.49	1.30/1.60	0.10/0.20	.....	.....
NE 8339	0.35/0.42	1.30/1.60	0.20/0.30	.....	.....
NE 8442	0.38/0.45	1.30/1.60	0.30/0.40	.....	.....
NE 8447	0.43/0.50	1.30/1.60	0.30/0.40	.....	.....
NE 8547	0.43/0.50	1.30/1.60	0.40/0.60	.....	.....
NE 8620	0.18/0.23	0.70/0.95	0.15/0.25	0.40/0.60	0.40/0.60
NE 8630	0.27/0.33	0.70/0.95	0.15/0.25	0.40/0.60	0.40/0.60
NE 8724	0.22/0.28	0.70/0.95	0.20/0.30	0.40/0.60	0.40/0.60
NE 8739	0.35/0.42	0.75/1.00	0.20/0.30	0.40/0.60	0.40/0.60
NE 8744	0.40/0.47	0.75/1.00	0.20/0.30	0.40/0.60	0.40/0.60
NE 8749	0.45/0.52	0.75/1.00	0.20/0.30	0.40/0.60	0.40/0.60
NE 8817	0.15/0.20	0.70/0.95	0.30/0.40	0.40/0.60	0.40/0.60
NE 8949	0.45/0.52	1.00/1.30	0.30/0.40	0.40/0.60	0.40/0.60

Note. The following additional element specifications apply to all the basic open-hearth steels shown above: Phosphorous 0.040% max.; Sulphur 0.040% max.; Silicon 0.20/0.35%.

As soon as sufficient experience has been gained and production records are available on these steels they will be standardized by the General Technical Committee.

For significance of above table see Page 100.

2 TO 5 TIMES MORE PRODUCTION PER MAN PER MACHINE



Courage to try a new Grinding Wheel may solve your labor and machine shortage now

AT THIS CRITICAL TIME in war production, Radiac comes to your aid with a new type of precision grinding wheel. This new wheel, called Por-os-way, is different from any wheel you have ever tried before.

Properly used it takes deeper cuts, breezing through .010″ or more. It grinds 100 to 400% faster, increasing production per man per machine 2 to 5 times. But that's not all. Por-os-way shows little tendency to load or burn the work. Here's the reason. Por-os-way is made by a new patented process. The structure, instead of being "sandy" and compact is "stringy" and porous—something like a sponge. Millions of air cells allow the air to keep every grinding contact cool. Yet Por-os-way is hard, tough, holds the corner and requires very little dressing—due to a new vitrified bond.

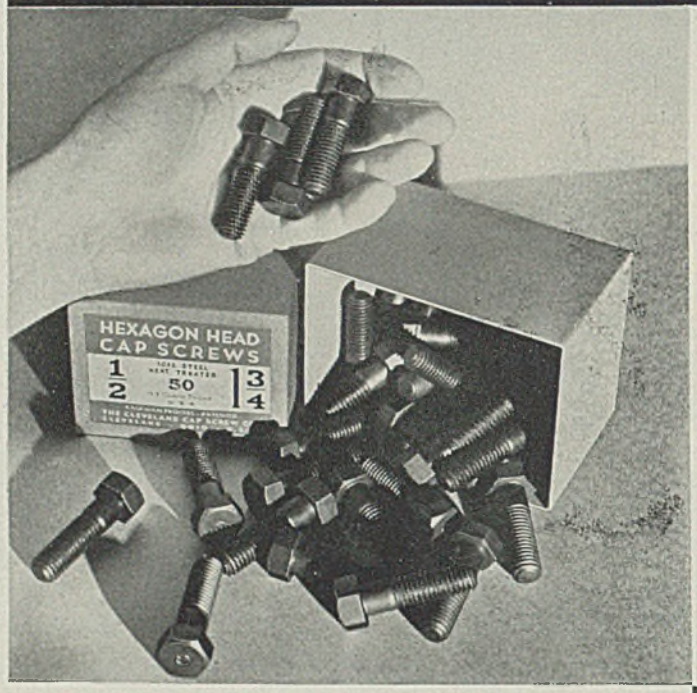
Por-os-way grinds hard alloys with ease; copper, aluminum, wood, rubber, plastics and other soft materials with minimum loading. See this wheel. Try it and learn how much faster and cooler it grinds. Write today for a trial demonstration on your machines. A. P. DE SANNO & SON, INC., 436 Wheatland Street, PHOENIXVILLE, PENNSYLVANIA.

POR-OS-WAY* *a new* **RADIAC* PRODUCT**

ASK FOR A DEMONSTRATION

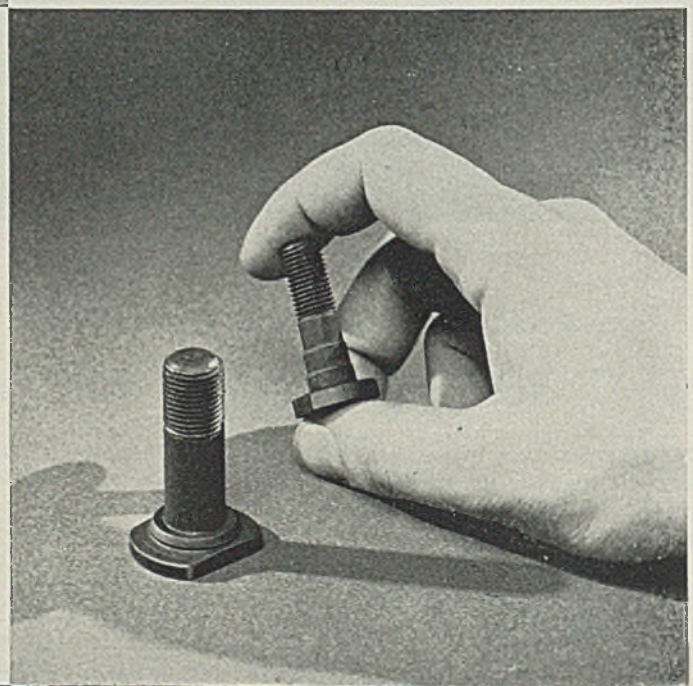
*T. M. REG. U. S. PAT. OFF.

FOR DEFENSE ★ ★ ★ ★



Production of standard and special headed and threaded products has been stepped up 240% in the last eight months. And we are not satisfied yet. Every possible step to increase further production is being taken. This dependable source of cap and set screws will continue to be one of satisfaction.

The Kaufman Process, our own plant development, continues to make possible fast, economical production of special parts, in addition to regular cap and set screws. Illustrated on the right is such a special bolt for tread plates on tanks and tractors. Designed in our own plant, it eliminates a costly, impractical forging.



CLEVELAND CAP SCREWS

SET SCREWS • BOLTS AND NUTS

Address the Factory or our Nearest Warehouse: Chicago, 726 W. Washington Blvd. • Philadelphia, 12th & Olive Streets
New York, 47 Murray Street • Los Angeles, 1015 E. 16th Street

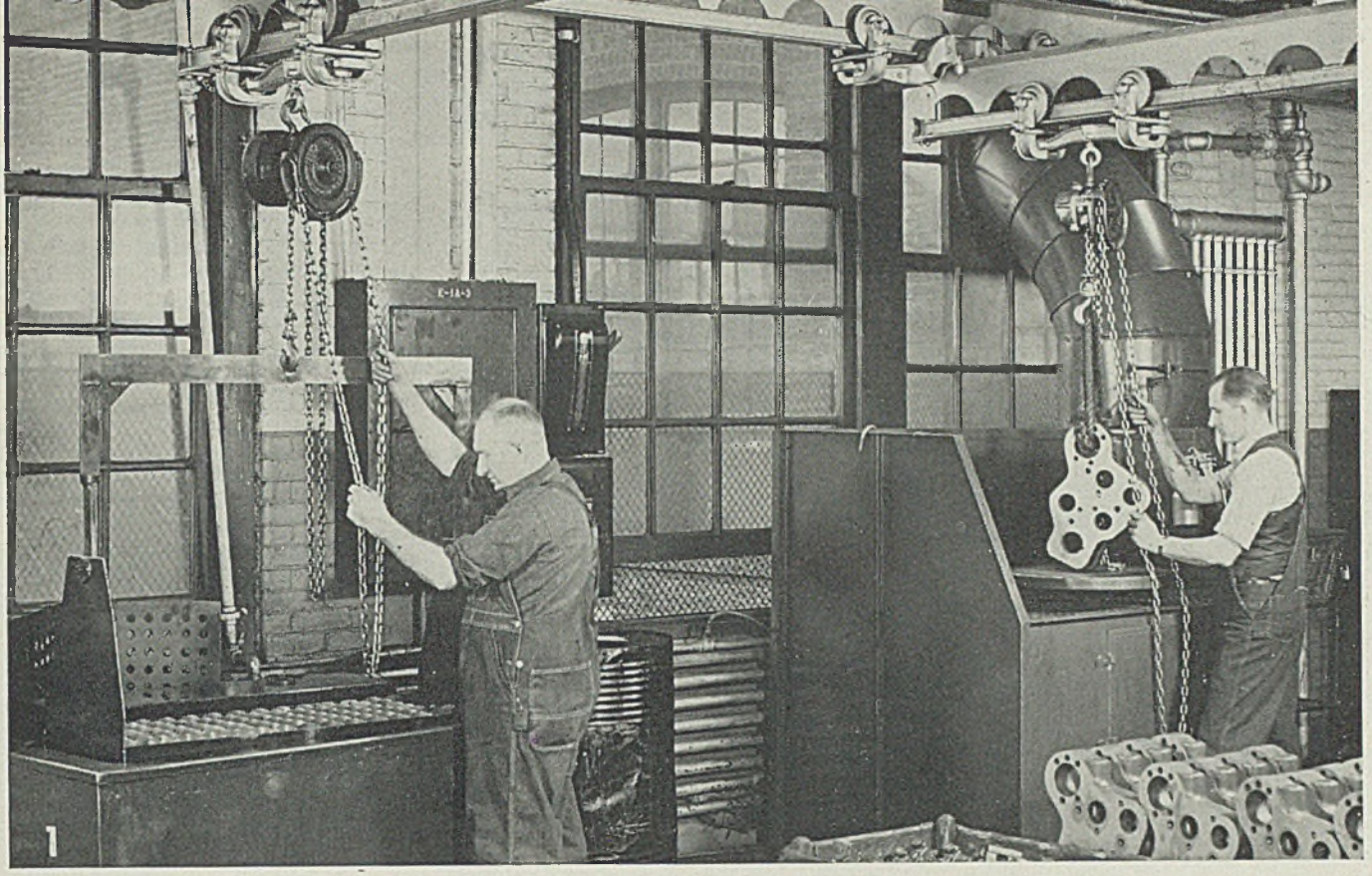


Fig. 1—Two tramrail bridges in finishing department

BUILDS MACHINE TOOLS FASTER

.... with modern mechanical materials handling aids

By C. L. PETERSON
Cleveland Crane & Engineering Co.
Wickliffe, O.

■ AS ORIGINALLY constructed, the plant of the Warner & Swasey Co., Cleveland, is housed in a 4-story building. The first story is devoted to heavy manufacturing and the remaining floor space to lighter manufacturing operations. When the company erected a new building and made an addition to its lower floor some months ago, an excellent opportunity was afforded to install the most up-to-date materials handling equipment.

The materials handling methods in general are quite simple. Forgings and castings are delivered to the plant at the receiving room on the first floor. Machining operations are performed immediately to avoid need for storage. Finished parts are stored in the stockroom in the basement or delivered directly to various assembling departments. Electric and hand-lift trucks are generally used for this purpose. Heavily constructed electric trucks, however, are used for handling all large castings. Bar stock is delivered to a special storage building located across Carnegie avenue. To get material across this heavily congested thoroughfare, a subway was constructed under the street so that plant trucks have a free passage at all times.

Manufacturing schedules require 24-hours-a-day operation. The turret lathes here produced go into the plants of defense manufacturers. Orders already booked ahead run well into the latter part of 1942. As may be imagined, the company is

Fig. 2—A battery of hand-operated tramrail cranes in the heavy duty vertical milling machine department at Warner & Swasey plant, Cleveland

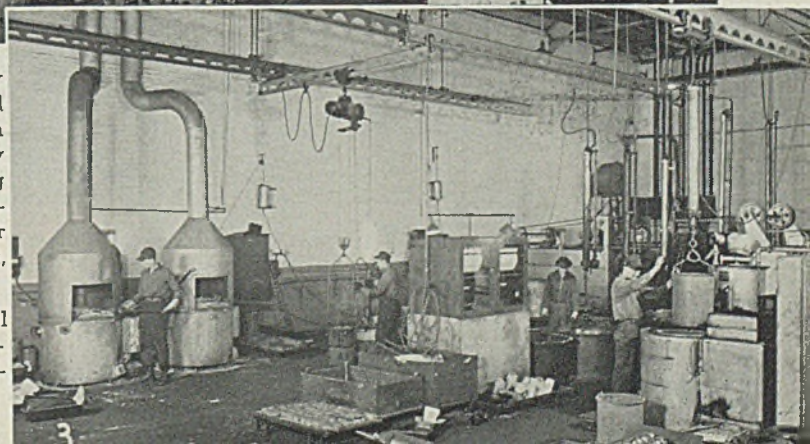
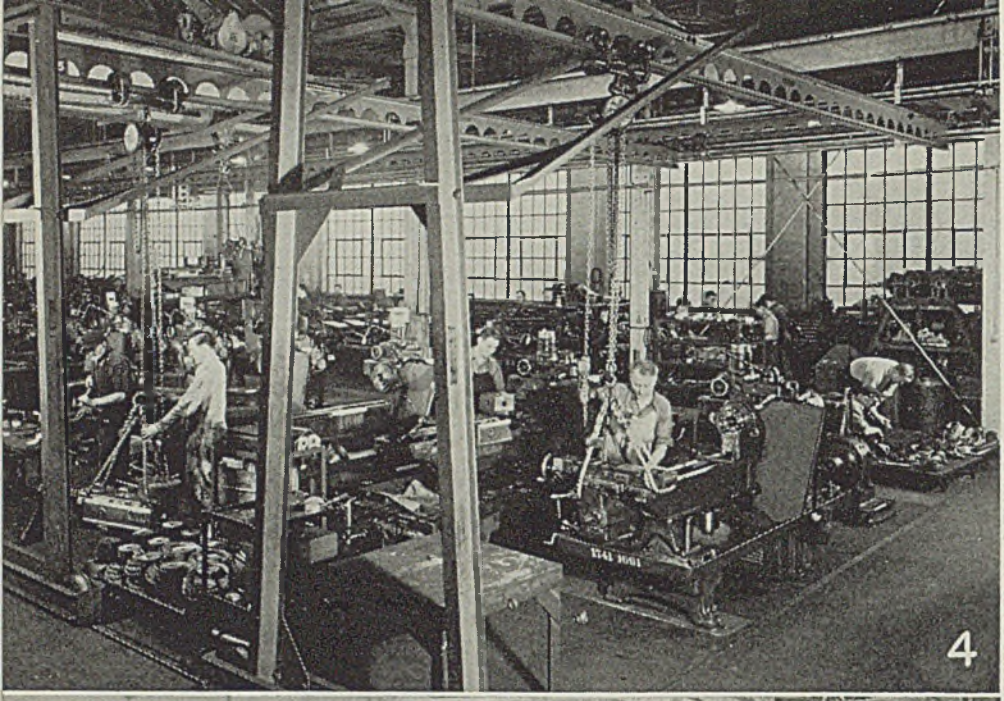
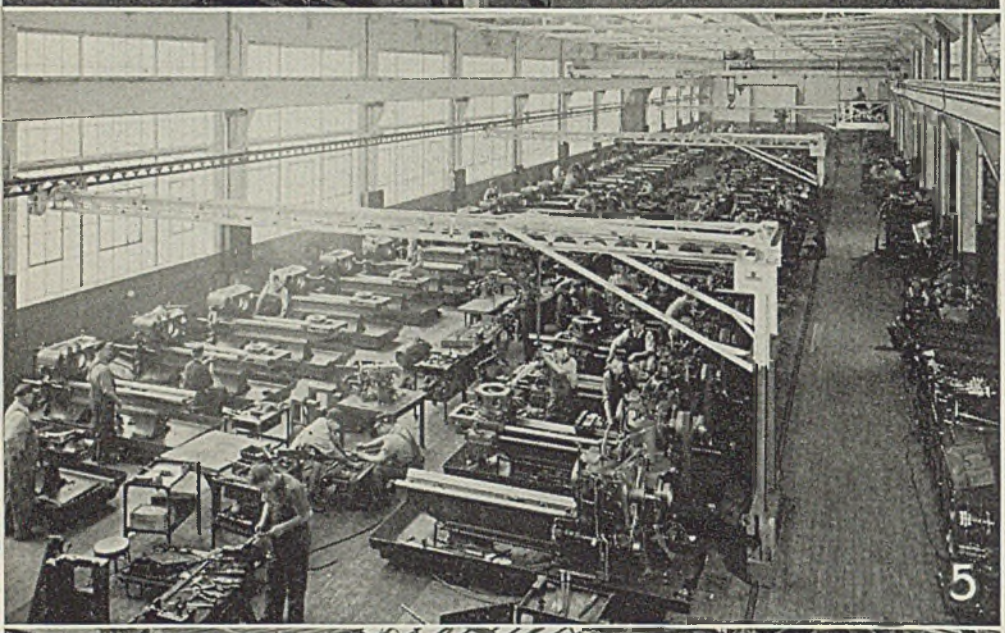


Fig. 3—Monorail handling equipment in heat treating department





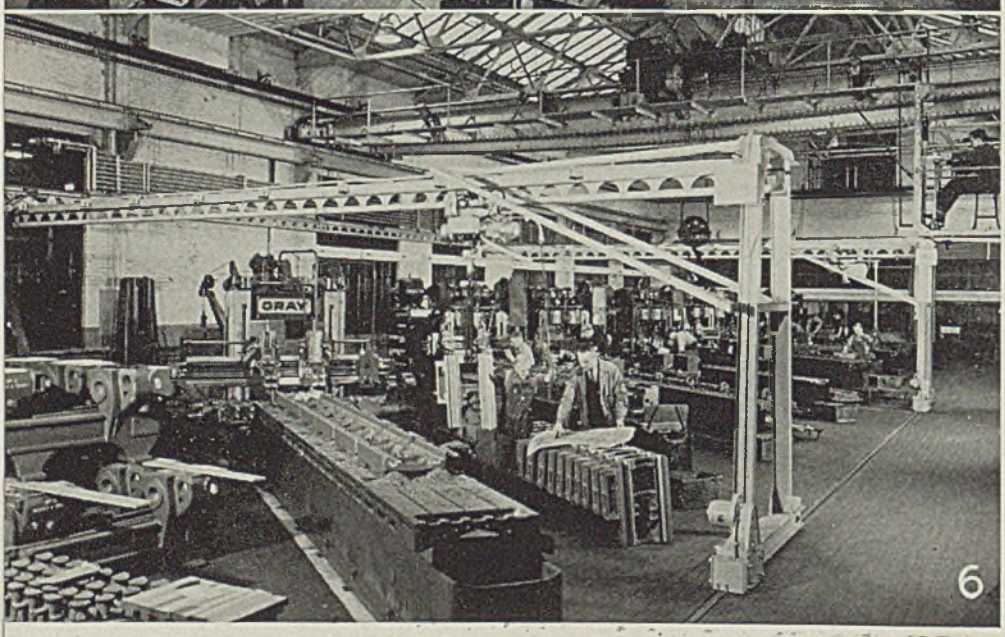


Fig. 4—Large single-leg gantry cranes serving assembly floor. Note use of rope slings to safeguard surfaces of finished parts

Fig. 5—Gantry cranes and overhead crane in heavy duty turret-lathe assembly

Fig. 6—Gantry and overhead cranes in planer department

hard pressed to get the utmost production from its machine tool equipment and thus every means is employed to reduce the time spent in moving materials about the shop.

The accompanying illustrations show a number of monorail bridge and gantry cranes recently installed on the lower floor and built by Cleveland Crane & Engineering Co., Wickliffe, O. In Fig. 2 is a battery of hand-operated tramrail cranes in the department where a large number of heavy duty vertical milling machines are used for finishing flat surfaces on large aprons, gear boxes, head units, etc. As is shown, the cranes are fitted with hand-operated chain hoists which prove effective for lifting castings, fixtures, etc., which weigh up to 300 pounds.

Bridges Placed Under Lights

Since the chain hoist can be moved, both transversely and longitudinally, the work can easily be picked up and placed where necessary. This arrangement proves quite satisfactory inasmuch as no floorspace is obstructed. Attention is called to the fact that the crane bridges are located so they travel below the lights. A sufficient number of bridges assure the operators that a unit will always be close at hand. Note four visible in Fig. 2.

These tramrail cranes are used to expedite the handling of parts that enter into various assemblies. The frequent use of the rope sling in this work removes all danger of marring highly finished surfaces.

The spindle and grinding departments are served by two hand-operated tramrail type single-leg gantry cranes which take care of all local handling such as loading and unloading turret parts. The spindle department uses the gantry cranes constantly and occasionally makes use of a large 10-ton overhead crane for extra-heavy lifting. The fixtures for use on both grinders and lathes are lifted into position with gantry cranes.

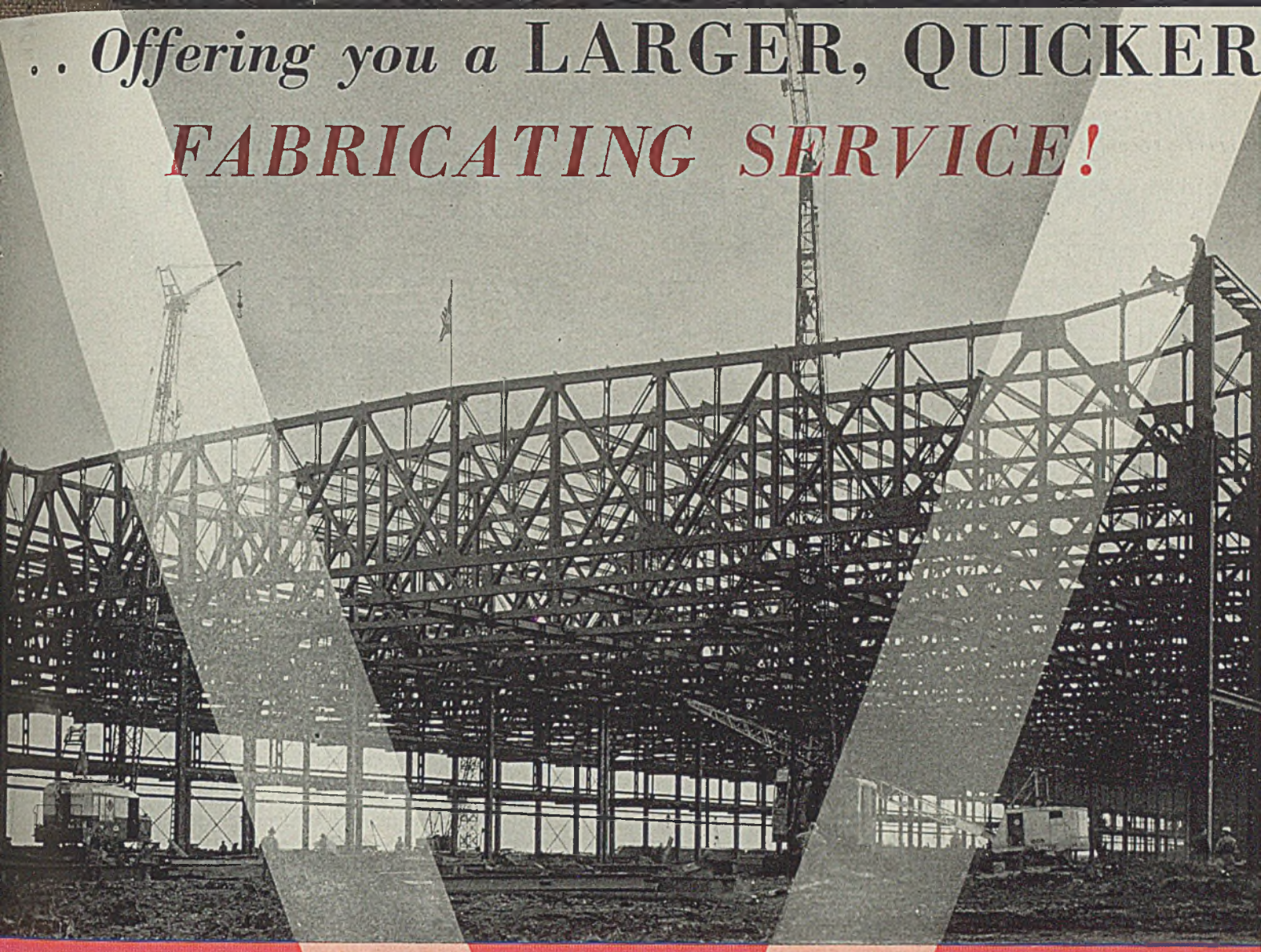
The overhead view of the heavy-duty turret lathe assembly line shown in Fig. 5 shows how the gantry cranes are installed and also how the 10-ton overhead crane operates over them. There are four motor-driven tramrail gantry cranes in this department where complete sub-units are assembled and fitted to the turret lathe bed. A vast amount of hand fitting and scraping on the turret lathes calls for a large amount of localized lifting and handling, thus the "down" time usually spent in waiting for a large crane is reduced.

Referring to the view of the planers department in Fig. 6, note the planers are located at an angle to conserve floor space. In this de-

(*Please turn to Page* 98)

. . *Offering you a* LARGER, QUICKER

FABRICATING SERVICE!



Tulsa Aircraft Assembly Plant

THE construction problem of industry today is to build swiftly and efficiently—a task that demands full use and close cooperation of all available facilities.

Four V Structural Steel Companies are organized to help speed this program of industrial expansion through their combined resources of time, men and equipment. They have capacity to produce 8,000 tons of fabricated structural steel per month.

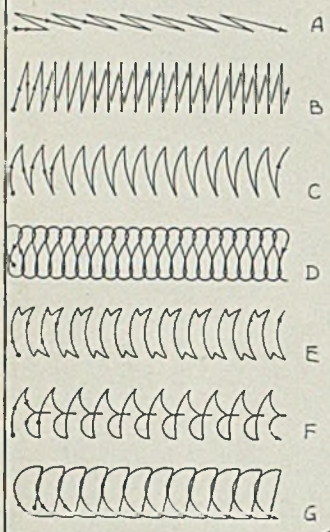
Thus Four V offers another needed source for the fabrication of mass tonnage *under the supervision of a single engineering and production staff, and with responsibility centered in one management to secure top efficiency.*

Each associate in the Four V Structural Steel Companies contributes a background of broad experience and proved ability, which in combination makes the organization outstanding in its capabilities. Many thousands of tons of structural steel have rolled from their shops into the rapidly expanding construction of munitions, ordnance and aircraft plants — thousands of tons more are in production.

If you have a problem of structural steel fabrication, the Four V organization is ready to help you solve it . . . quickly and efficiently. Wire, phone or write today.

Four V STRUCTURAL 4 STEEL COMPANIES

37 W. Van Buren Street CHICAGO, ILLINOIS

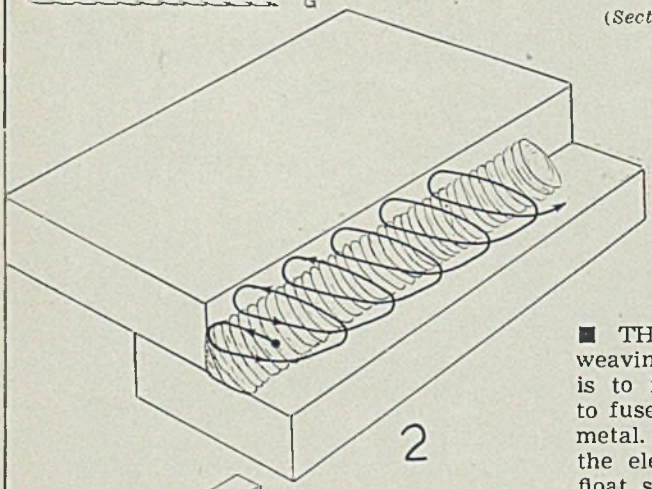


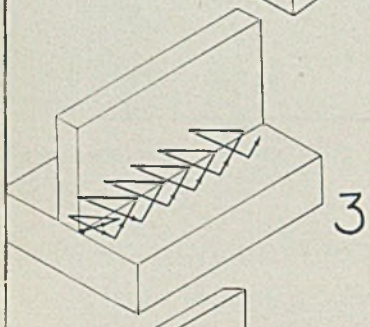
WHEN, WHERE and HOW TO WEAVE

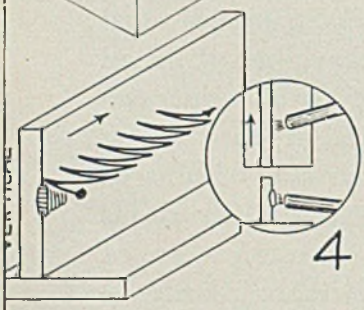
The Welding Electrode

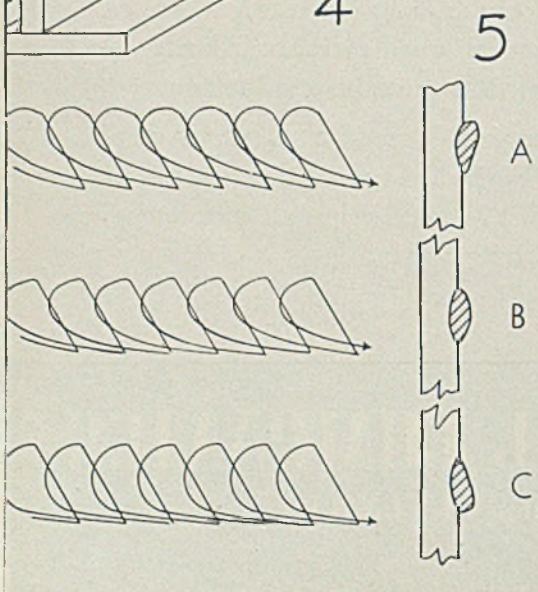
(Section 11 in a Series on How To Get the Most from Arc Welding)

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









■ THE PRINCIPAL purpose of weaving the electrode when welding is to fill the joint completely and to fuse the added metal to the base metal. Also weaving or oscillating the electrode may be employed to float slag out of the molten metal and to afford an opportunity for gas to escape, thus avoiding porosity.

Some gas and slag are usually present when steel is melted. The weld metal must be kept molten for a short period of time if this gas is to escape and if the slag is to float to the surface to produce a sound weld. To obtain these desired results and still maintain a narrow bead, a slight oscillation or movement parallel to the bead is employed. This oscillation also helps to assure penetration at the edge of the weld in making the joint. Such a motion is diagrammed at A, Fig. 1. For purposes of illustration here, a rather large sidewise motion is shown, but in practice this motion is practically all lengthwise.

For larger beads various motions are employed as will be described. In considering the various weaves and the reasons for using them, it will be helpful if the three general types of electrodes are kept in mind. Classified as to type of bead or behavior of the metal as it is deposited, these three general classifications are:

Flat Bead: This is deposited by the general purpose electrode. In operation it penetrates the base metal considerably, tending to produce a bead with a flat upper surface. The molten metal from such an electrode stays put fairly well in making horizontal welds.

Convex or "Bulgy" Bead: This type of bead is deposited by electrodes that do not penetrate the work so much, resulting in a bead with a convex or bulging upper surface. It is especially suitable for the first bead deposited in multilayer joints and for welding work which fits up poorly since the weld metal it deposits stays put exceptionally well. This "sticky" characteristic makes this type of electrode particularly suitable where a certain amount of space may exist between the two parts to be welded as the weld metal will bridge a considerable gap.

Concave Bead: This type of deposit is produced by those electrodes that penetrate least of all. The weld metal from this type of rod is exceptionally fluid and is particularly well adapted for positioned-fillet welding and for filling up welds in thick plate which previously have been sealed at the bottom of the joint. This sealing is important since molten metal from this

Fig. 1—Seven different types of weaves utilized for controlling deposition of weld metal

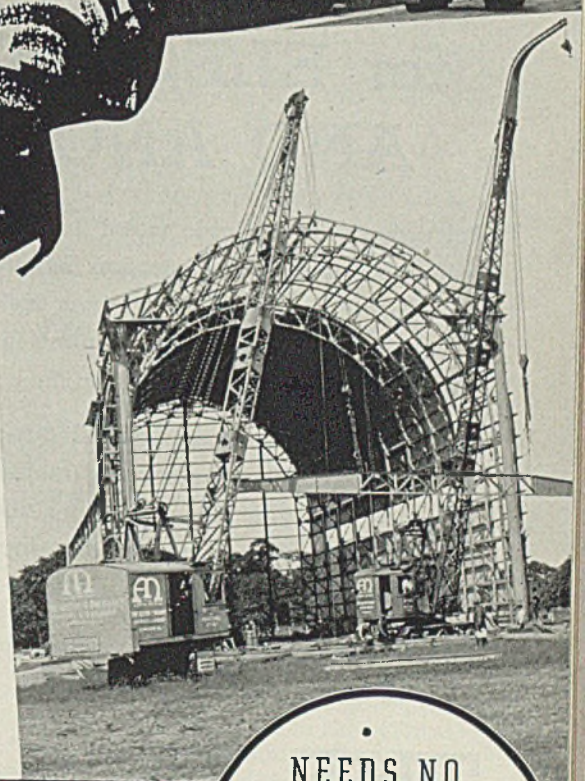
Fig. 2—Looping proves helpful in this type of fillet weld

Fig. 3—Controlling the heat input to the two different plate masses being joined is accomplished by this type of weave

Fig. 4—A type of weave that is helpful in controlling shape of deposited bead on vertical surfaces. Inset shows position of the welding rod in relation to the plate itself

Fig. 5—Three variations of the loop produce three different bead cross sections to indicate how weave influences form of bead deposited

You can't have too much DEPENDABILITY on today's jobs



PRESSURE is on the country! Pressure is on us—on you! Every machine that can be turned out tomorrow was needed yesterday. Under such conditions the most minor delay is costly beyond that of ordinary times. More than ever, features of design and operation that can give you an advantage in output or in reduced maintenance help toward getting the job done.

Northwests have been proved by the big steel erectors and industrial companies of the Country. Such firms as the Austin Co., Bethlehem Steel Co., Standard Oil Co., Inland Steel Co., Chicago Bridge & Iron Co., Chrysler Corp., General Motors Corp., Pennsylvania R. R., Illinois Central R. R., and countless more of like calibre have proved Northwest dependability. *Northwests stay on the job.*

Northwests bring you features that are exclusively Northwest—features that speed material handling and get things done.

Ask for our booklet that pictures the type of work you have to do. No obligation.

NORTHWEST ENGINEERING COMPANY

1805 Steger Building · 28 East Jackson Boulevard · Chicago, Illinois

NORTHWEST

NEEDS NO EXPENSIVE TRACKS OR OVERHEAD EQUIPMENT

UDYLITE

Headquarters

for ELECTROPLATING, POLISHING AND ANODIZING INFORMATION

For prompt, dependable metal finishing information, call on Udylite. No organization is better equipped to give you information gained from installing plating, polishing and anodizing departments in many leading manufacturing plants throughout the country.

Trained plating engineers and electrochemists are at your service. These men *know* metal finishing and they can help you plan a new installation or revise your present one for greater efficiency. They know, also, that you want information quickly.

Udylite has a complete line of equipment . . . second to none in terms of quality and efficient performance.

and supplies . . . for every metal finishing need. Salts, acids, anodes, buffing and polishing materials—everything required.

Call Udylite for prompt service on your finishing requirements. You pay no more for Udylite dependability.

❶ *Laboratory where efficiency of Udylite finishing processes is maintained by constant control.* ❷ *Design and layout department where clients may obtain the advice of experienced metal finishing engineers.* ❸ *Laboratory where all Udylite products are tested under actual plant conditions.*

THE UDYLITE CORPORATION

1651 E. Grand Blvd., Detroit, Mich.

New York
60 E. 42nd Street

Chicago
1943 Walnut Street

Cleveland
4408 Carnegie Ave.

type of rod is so fluid that it will run through even a small opening. Thus it can be used only on work that fits up accurately or that has had the bottom of the joint sealed by a bead of the first or second classification above.

Viewed from the behavior of these three different classes of electrodes, some welders call the first a "cold" rod and the last a "hot" rod since weld metal from the latter acts as if it were "hotter" because it is much more fluid.

Also the first and third classes above have been likened to ordinary solder and to silver solder, since ordinary solder is often used to seal a joint or a part which does not fit together tightly. But just as type No. 3 above cannot be used unless the joint is sealed, so silver solder can not be used unless the joint fits tightly because it also is extremely fluid and leaks out. For this reason the joint is usually fitted sufficiently tight to hold the material in by capillary action.

Now going back to the different types of beads, most weaving is done for the purpose of laying down a wide bead, as was originally pointed out. This means it is necessary to weave the electrode slightly from side to side, at the same time proceeding forward along the line the bead is to be made as shown in F, Fig. 1.

Various types of weaves and motions to produce different results are illustrated in Fig. 1. Some operators find it much easier to weave in a crescent motion like that shown at C instead of the B motion. The results in either case are substantially the same, and their use is largely a matter of preference. Similarly, the figure-8 motion shown at D is preferred by some welders.

Certain weaving motions are desirable to accomplish certain results. Such a weave is shown at E. The slight hesitation at each side of the weave allows a slight building up or working of the metal into the edges of the joint. Perhaps the most commonly used weave it that at C. But many welders have their own ideas as to the best types of weave for various purposes so the two other weaves shown in F and G are also found in use.

In learning to make any of these weaves, it is suggested that 5/32-inch rod be used with ¼-inch plate or flat pieces of scrap. Practice motions A, B and C (Fig. 1) until a narrow bead of proper shape, of sound metal and with a surface of even ripples can be produced. Then practice working beads ½-inch to ¾-inch wide, using a B weaving motion. Subsequently, movements C and D may be followed until a bead of sound metal with smooth rippled surface and proper penetration is obtained.

While studying weaving techniques, practice weaves of the type shown at E in the form of a bead on flat plate. The motions should become second nature and the operator should become so familiar with them as to be able to do them automatically when required. Such a bead may be smooth and rippled like those shown under B, C and D. If a wide bead is made with such a weave, the metal at the edge of the bead will be a trifle higher than at the exact middle.

To practice lap welding, place two pieces of plate so that they overlap about 2 inches, first using ¼-inch and then ⅜-inch thick material. Tack weld the plates together, using 3/16-inch electrodes. Then weld them, using one of the weaving motions—A, B or C (Fig. 1). Make the bead on ¼-inch plate with one pass. Use two passes on ⅜-inch plate.

Welding thus, on the edge of one plate and in the middle of the other, it will be found necessary to hold the arc a bit longer on the horizontal plate in order to get proper penetration. Weld on one side only so the joint may be broken by prying the plates apart from the back for careful inspection. If arc blow should be encountered as the weld progresses from the start, it usually can be overcome by changing the angle of the electrode gradually from the 60 degrees to 90 degrees or more so the flame of the arc will blow ahead in the direction of travel.

It is necessary that the weld be smooth in appearance and penetration be complete. The bead must go into the corner. When broken there should be no pronounced black spots, lines or holes as these indicate improper fusion and penetration.

In welding the ⅜-inch plate, lay a bead of approximately ¼-inch size in the corner—using the same method as before. After this is completed, clean the weld thoroughly by brushing and place the second bead on top of the first, using the weaving motion of B or C (Fig. 1). Then break the weld and examine as before.

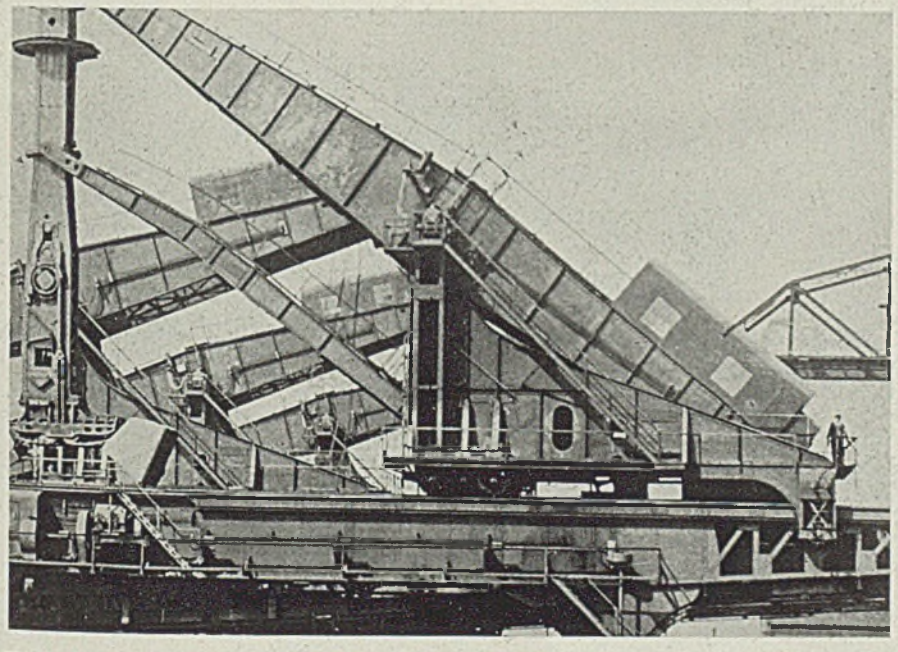
To obtain the correct fillet in heavier lap welds and not allow the metal on the upper side to run away and pile upon the bottom, a looping weave shown in Fig. 2 should be used.

Another type of weave often useful is for the "T" or fillet weld between a horizontal and a vertical plate. Obviously, heat will be conducted away in the horizontal plate faster than in the vertical. Therefore it is necessary to put more heat in the horizontal than in the vertical plate. To do this, simply slow down the movement as the rod is passed over the horizontal plate.

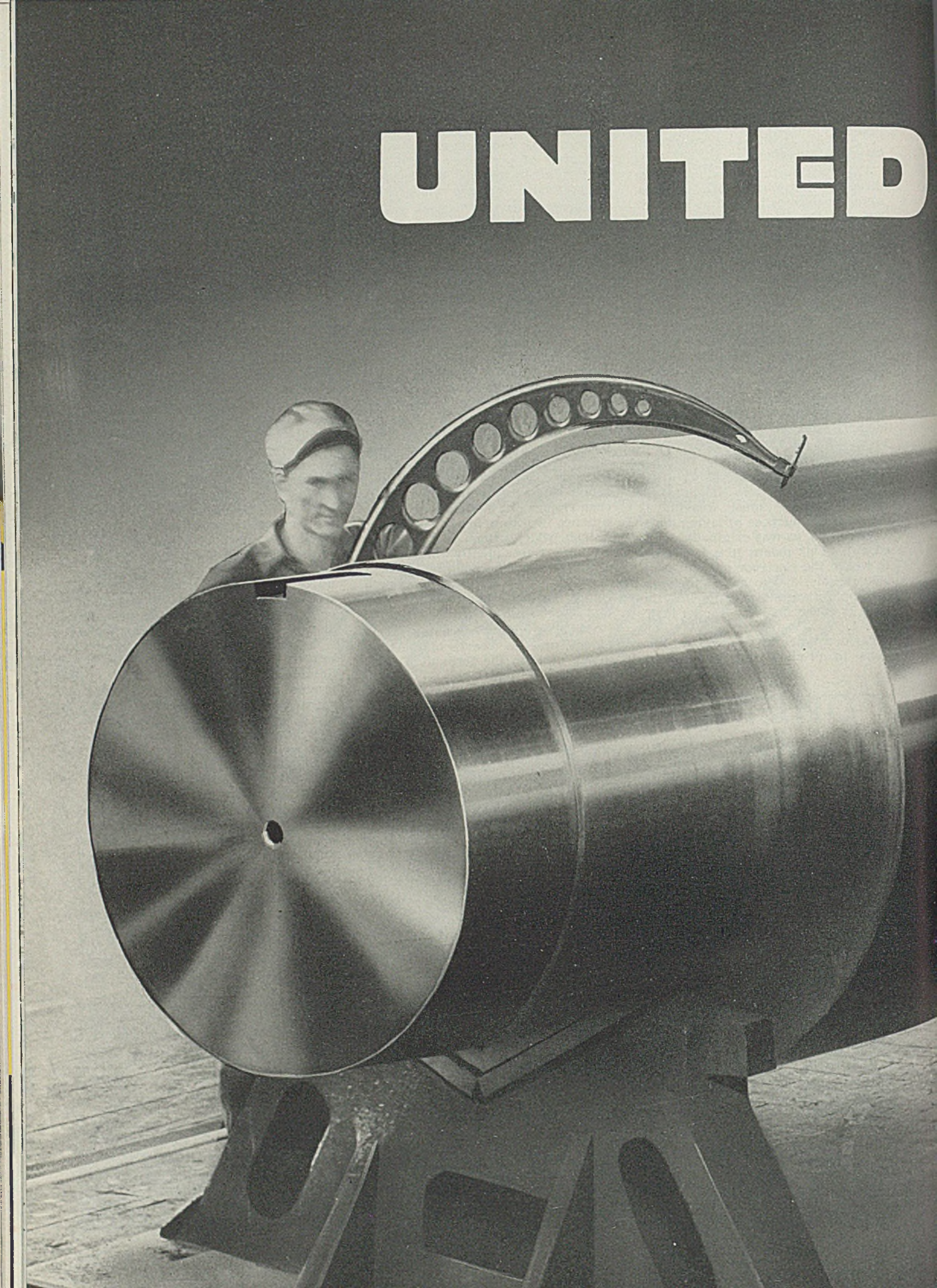
This method for controlling heat input will be found useful in many other places. Remember that you

(*Please turn to Page* 85)

Foiled by a Welder



■ When the intermediate hoist gear broke on this giant ore unloader, at least 8 hours was saved by not removing the gear for repairs. This was possible because the gear could be welded while in position. Thus, the unloader went back into action after a shutdown of only 4 hours instead of 12 hours that would have been required to remove the gear. A Westinghouse Flexarc welder was used in the operation


UNITED


keeps them rolling
THERE'S A
CORRECT TYPE OF UNITED ROLL
FOR EVERY PURPOSE
IRON ROLLS
"Unefco" Green Wabblers, Grain and Chill
United Nickel Chill
United Moly. Chill
United Special Process
United V.
United H. D.
United Straight Chill
Lincoln Special
United Unidense
STEEL ROLLS
United Special Steel
United Carbon Steel
United Adamite
United Van. X
United Super X
United Regal X
UNITED
ENGINEERING and FOUNDRY COMPANY
PITTSBURGH, PA.
DAVY AND UNITED ENGINEERING COMPANY, LTD., SHEFFIELD, ENGLAND
DOMINION ENGINEERING WORKS, LTD., MONTREAL, P. Q. · UNITED INTERNATIONAL, S. A. PARIS, FRANCE

Small Plants in War

(*Continued from Page* 55)

was a row of furnace doors. "We can get a temperature of 900 degrees in them," he said. "We used them for putting the vitreous enamel on steel. We did a lot of enamelling, naturally, making kitchen stuff. Now we use the same furnaces for hardening tank armor.

"We're using the same furnaces to harden solid-armor-piercing shot for anti-tank guns, too. It's an 18-pound shot of solid steel. The ordnance people take lots at random and test them. Out of six shots fired against 2½-inch armor, at least four have to go clean through without breaking up. Quite a change from kitchen enamel.

"Now I'll show your our tin shop. We used to do a lot of light cylindrical stuff—you know, home equipment, like sanitary cans. Well, now we make sea-markers for the Admiralty and the R.A.F. A sea-marker is a light metal cylinder with powdered aluminum inside. When it's dropped on the sea from an airplane, the impact drives the aluminum up through the top. It spreads over the water, forming a big, shiny disk and that marks the position of the crippled German submarine that the pilot thinks is down below the surface. The pilot flies home, gets more bombs, comes back to finish the job. Ingenious, what?"

All the workers in the tin shop were girls, wearing green smocks. Most of them seemed to be of high-school age. "We had about 1200 workers before the war," Mr. Bradshaw said. "The number dropped off to 700 while we were changing over, but now we have 2000.

"Naturally there are very few peacetime plants that can simply go over to war work without alterations. They aren't balanced, as we say. That means that if you're making a product that requires a great deal of milling and not so much boring, or a lot of boring and not so much milling, you may not have the correct proportion of machines for a war job. But the fellow over the hill, making a different product, may have a surplus of the machine capacity you need for your war work, and you may have just what *he* needs.

"So you marry demands and capacity. Maybe out of 100 assorted factories you get the equivalent of 20 modern, balanced armament plants. It would take years to build the new plants, whereas with a little jiggery-pokery you can begin getting stuff out of the old ones in a few weeks. With our furnaces, for example, we can do the hardening for several factories that aren't equipped for it.

"It's like one artisan borrowing a tool from another. We have a second plant about 2 miles away from here, a former textile mill that the government has fitted up with the best sort of new machinery, American stuff. They turned it over to us to run because by the time they had got it equipped we had built up a lot of experience in war production. That's another point. If we had waited for a new plant to be built, we wouldn't have had the experience."

We went out to the car, and my M. T. C. driver, following Mr. Bradshaw's directions, took us to the newly equipped plant. The machines there, I noticed as soon as I went in, were for the most part glossy gray and displayed in large letters of names of such familiar points of origin as Milwaukee and Cincinnati. There were also a couple from Plainfield, N. J., and one friendly steel beast from Nashua, N. H.

"We get shell fuzes from a shop that once turned out baby buggies, fuze components from costume-jewelry fellows," reports an Englishman. "In the first year of the war, those little fellows used to swarm into the Ministries looking for work and we would send them away. Now we hunt for them and think up things they can do with the sort of plants they have."

"The machines on this side of the room," Bradshaw said, "are turning out incendiary bullets for machine guns. An incendiary bullet is practically a miniature infernal machine. You can see for yourself how complex it is." As he said this, he picked up from the foreman's table a large-scale drawing of an incendiary bullet and showed it to me. "There are eight separate operations," he said, "and they are all down to a thou' or finer. The machines in this row do the eight simultaneously and turn out the finished bullet. It's like grinding out sausage. That's what you can do with the right kind of machine when you can get it." He looked slightly contemptuous of such easy success.

He took me to another part of the plant, where girls were making the components of fuzes for 25-pound shell. "There are 34 separate parts to a fuze," he said. "We make them all here and then assemble them. The government inspectors, those girls in the khaki smocks, test samples of each sort of component, and then they test samples of the finished fuzes."

He picked up a fuze and showed me how it worked. There was a minute chamber at the bottom, which was to hold the detonating charge. This chamber, Bradshaw explained, had a roof 1/5000-inch thick. There was a steel pin perpendicular to this roof, and, as Bradshaw pointed out, when the shell hit, the impact would drive the pin against the roof of the detonator, through that delicately milled five-thousandth, and into the explosive.

A Watchmaker's Job

"It's very simple," he said, "so simple that you couldn't even handle the thing without blowing yourself to bits if we made it that way. So we have a steel disk with a shutter in it between the pin and the roof. When the gun is fired, the shell begins to rotate, and when the rotation reaches a certain speed the shutter winks back. It's all based on centrifugal force. The pin drops through the hole and rests against the detonator chamber, and the shell explodes at the precise instant of contact. It's a watchmaker's job, and we turn them out by the hundreds of thousands."

My driver and I left Bradshaw at his new plant. Miles before we arrived at our next destination, the country ceased to look industrial. After two or three inquiries we arrived before a weathered red-brick building with a small brass doorplate that bore the legend "Robinson Pen Company" in script. I marched into a cubbyhole of an office where an old chap in worn striped trousers and office coat was at a high desk. For the anteroom to an arms factory, the decor was perfect Hitchcock. To carry out the motif, the old chap insisted on seeing my identity card, my alien-registration certificate, and my passport. Finally, he pushed a buttton in the panelled rear wall, and a concealed door opened before me, something I had never expected to see except from a seat in the Rialto theater.

Mr. Robinson, the head of the firm, who met me inside, was in his early forties and the son of the founder. The firm had existed in a modest way for 40 years, making

COPPER ALLOY BULLETIN

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER-BASE ALLOYS

Prepared Each Month by the Bridgeport Brass Co. "Bridgeport" *Headquarters for BRASS, BRONZE and COPPER*

New Uses Seen for Duronze II as Substitute for Copper-Tin Alloys

Properties of Bridgeport's Copper-Silicon Alloy Suggest Applications in Spring Parts Instead of Phosphor Bronze

Under present conditions, industry is faced with the problem of finding substitutes for tin in its various uses as a pure metal and in alloys. How soon the lack of tin will become a serious problem is difficult to determine, but it seems probable that some curtailment will be necessary.

In the wrought copper alloys, the greatest use of tin is in the phosphor bronzes, which contain from 3.5 to 10% of tin. While substitutions for tin in some fields may be difficult to accomplish, in the case of phosphor bronze much work has been done to provide suitable substitutes.

Possible Substitutes

As in many other cases, substitution necessitates sacrifice of certain characteristics, and may result in improvements in other characteristics. There are several alloys which have been used in place of phosphor bronze in industry, and the selection of a substitute depends largely on the nature of the application. In most applications of phosphor bronze, spring characteristics are necessary. Nickel silver has been used as a substitute, particularly in flat spring clips. Nickel, however, is so much more important in other uses that nickel silver also has become difficult to obtain. High brass may also be used for such purposes, but has certain disadvantages in the possibility of stress corrosion failures and in somewhat lower fatigue life.

Considerable study has been given to the use of silicon bronze alloys, such as Duronze II, in place of phosphor bronze. Fig. 1 shows the relative rolling characteristics of Grade A phosphor bronze and of Duronze II (3% silicon-copper alloy). It is notable that the silicon copper is appreciably harder and stronger, but that the elongation of the phosphor bronze is greater, particularly in the annealed and less severely cold worked condition.

Annealing Characteristics

The annealing characteristic curves (Fig. 2) also indicate similar differences in physical properties. It is probable that some of these differences are due to the retarded rate of recrystallization and grain growth in the silicon-copper alloy. It seems clear, however, that Duronze II is a stronger and somewhat less ductile alloy than Grade A phosphor bronze. In so far as flat spring clips and spring materials in general are concerned, the greater strength of the silicon bronze is advantageous. If comparisons are made with the properties of 8% phosphor bronze (shown in the Alloys of Copper column in the December, 1941, COPPER ALLOY BULLETIN), it may be seen that they are very similar to those of the 3% silicon alloy. There is therefore no reason why silicon bronze spring clips cannot be produced of equal hardness or even greater hardness than phosphor bronze.

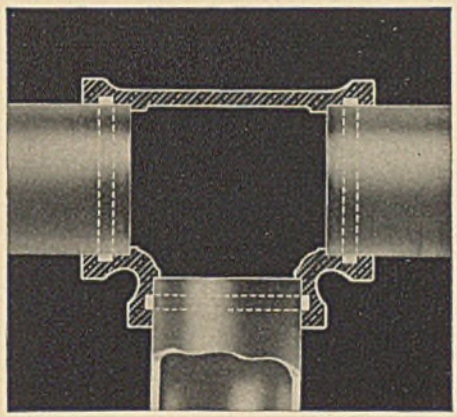
(Continued on page 2, column 2)

Installation, Service Advantages Offered by Bridgeport Tubing

Economical installation and durable service are among the advantages offered by Bridgeport "Navy-Type" copper tubing which is widely used for modern marine construction and maintenance.

The range of wall thicknesses of this tubing meets all U. S. Navy test pressure specifications from 100 to 4,500 pounds. Connections are made with threadless Bronze fittings joined with pre-inserted rings of Sil-Fos Brazing alloy, thus providing a stronger, tighter connection that dependably withstands vibration failure.

Bridgeport copper tubing is produced in types, sizes and gauges suitable for conveying water, oil and steam; for sanitary systems and refrigerants; and for other special uses outlined in U. S. Navy and Maritime Commission specifications. Full information on this tubing, as well as condenser and heat exchanger tubes, will be sent on request.



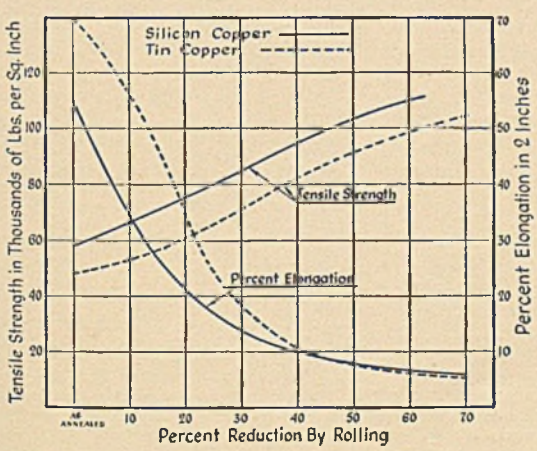


Fig. 1. Comparative rolling characteristics of 5% tin-copper alloy and Duronze II (3% silicon-copper alloy).

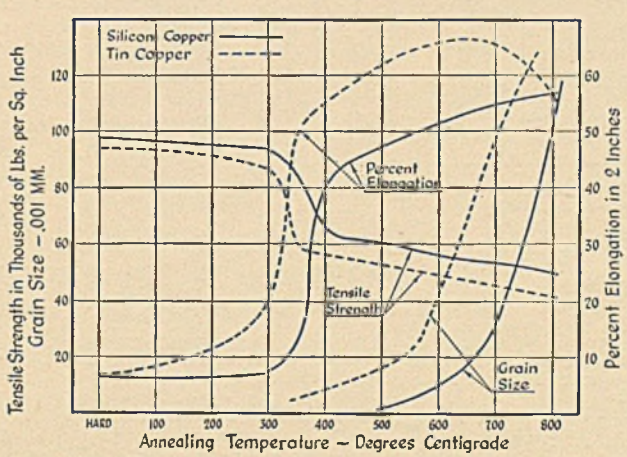


Fig. 2. Comparative annealing characteristics of 5% tin-copper alloy and Duronze II (3% silicon-copper alloy).

COPPER ALLOY BULLETIN

ALLOYS OF COPPER

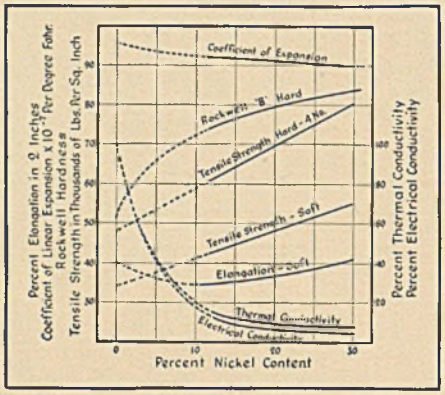
This is the thirty-first of a series of articles on the properties and uses of the copper alloys.

ALLOYS OF COPPER WITH NICKEL

Copper and nickel alloy to form solid solutions in all concentrations. Hence usable alloys can be made with nickel contents from less than 1% to more than 99%. Only alloys containing less than 50% nickel are considered copper alloys. As the high mutual solubility does not make for great changes in properties as the nickel content is increased, relatively few copper-nickel alloys have any considerable commercial use.

The curves below show approximate values for physical properties of the commercial alloys containing 15-20% and 30% nickel. Data for alloys containing less than 15% nickel consist of interpolations of the data for the 15% nickel alloy and pure copper.

The first additions of nickel to copper do not have any very marked effects on its physical properties. Tensile strength increases slowly, and the real advantages of copper nickel are obtained only with higher nickel contents. Addition of nickel tends to increase corrosion resistance under some conditions, and improves resistance to oxidation at elevated temperatures. The high electrical resistance makes the alloys suitable for resistance wire. All of the properties are very nearly equaled, and in some cases surpassed, by alloys in which zinc replaces some of the copper. Since such alloys are cheaper than cupro nickel, they are quite generally used in place of it. Chief use of cupro nickel is that of the 30% alloy for condenser tubes in marine service. This alloy is standard in the United States Navy for this purpose.



Physical properties of cupro nickel. Dotted lines indicate estimated values.

Bronze Welding Helps Maintain Production

The difficulty of getting replacement parts has given added importance today to the use of bronze welding for the repair of broken equipment. Manufacturers in many lines have found that Bridgeport Bronze Welding Rods make strong, lasting welds on jobs of any size, large or small.

Such satisfactory results are obtainable with Bridgeport rods because they are pure, reliable and uniform. They may be used on all cast iron, steel, and bronze work. The Bridgeport Brass Company has published a "Manual on Bronze Welding Alloys" which will be sent to you on request.

Memos on Brass—No. 25

The term "brass" includes a great variety of copper-zinc alloys and a surprising range of physical properties which can be greatly modified by:

(1) Changing the composition.
  (a) Modifying the proportions of copper and zinc.
  (b) Additions of small amounts of lead, tin, aluminum, iron, arsenic, etc.

(2) Changing the temper—ductility, hardness, strength, etc.
  (a) Heat treatment to produce various gradations of softness and ductility.
  (b) Cold working (reduction by rolling or drawing without subsequent annealing) to produce various gradations of hardness and stiffness.

Uses of Duronze II

(Continued from page 1, column 2)

There are, of course, other factors which are important in the proper functioning of flat spring clips. The physical properties indicate that Duronze II has a forming capacity at least equal to that of phosphor bronze. These bending and forming characteristics have been checked by actual bending tests which show that the silicon bronze will take bends of about the same severity as phosphor bronze. Fatigue characteristics are determined by endurance tests, and the data obtained indicate that there is not an appreciable difference in the endurance limits of the two alloys.

The properties of these alloys, with reference to their use in springs, will be considered further in a future issue of the COPPER ALLOY BULLETIN.

NEW DEVELOPMENTS

A soldering-iron stand is said to speed operations on small parts. The iron is held in an adjustable clamp while a 30-inch pipe acts as a chimney to carry off fumes. A hood at bottom of the pipe is provided with a magnifying glass or with ¼-inch plate glass and has two lamps underneath it to illuminate the work. **(No. 290)**

A new vise with fast opening and closing jaws is designed particularly for high production milling, drilling and tapping operations on small parts. Two levers are used, one for forcing the work against the jaws and the other for locking them. Three sizes, 4-, 5-, and 7-inch, are available. Maximum working openings with both jaws are 1 13/16, 2 5/16 and 3 13/16 inches. **(No. 291)**

A drill container consists of a brass cylinder with a solid bottom and a knurled rotating top with individual compartments for drills from No. 1 to No. 60. A small knob in the top is positioned in a slot to bring an internal finger under the drill desired. The assembly is 5 inches high and 2 3/16 inches in diameter. **(No. 292)**

A new low-temperature paste has been designed that is said to clean as it fluxes and to be quick acting in the soldering of all nonferrous metals. **(No. 293)**

Pipes or tubes can be bent or straightened without the use of heat or auxiliary equipment, it is reported, with a portable hydraulic pipe bender. Curvatures are limited only by the radii or bending shoes. One handle and one release valve control the ram. It bends 7 sizes of pipe and when equipped with attachments is claimed to perform scores of maintenance and production jobs. **(No. 294)**

A portable metal saw with a continuous saw blade has been developed. Three speeds allow the cutting of almost any shop material and no coolant is required, the maker asserts. Made in two sizes. **(No. 295)**

Tinning and cleaning can be done in the same operation, it is claimed, with a new tinning compound. No acids or fluxes are necessary, and paint does not have to be removed, it is reported. **(No. 296)**

A metal cutting machine, which occupies four square feet, has been designed for high speed cutting on rounds, squares or tubes of brass, bronze, or copper. The cutting wheel or saw blade is driven by a two-speed electric motor which develops 2½ and 5 horsepower. Drive is through five V-belts. **(No. 297)**

A motor-driven lathe has been designed with a six-position turret having six 1½-inch diameter tapped holes in each turret face for mounting various sizes of tool holders. It also has a plain saddle on which a variety of tool posts or other fixtures can be mounted. Either worm drive or direct drive is available. **(No. 298)**

This column lists items manufactured or developed by many different sources. Further information on any of them may be obtained by writing Bridgeport Brass Company, which will gladly refer readers to the manufacturer or other source.

pens without trying to advertise them. "We use very rudimentary machinery," he said. "I expect you'll find it amusing. But it's so simple that it's adaptable. We employ girls almost exclusively—always have. Most of them work on a small, electrically driven hand lathe that can be quickly reset for a great variety of operations. But the girl has to pay constant attention to what she's doing; it's rather like work at a sewing machine.

"Then we have the machines on which we used to stamp out gold nibs for pens. We're still making some pens. As a matter of fact, they need a certain number in the war effort. Making pen nibs is rather fine work. I'll show you." I followed him down a steep flight of stairs into a basement which, again in the Hitchcock tradition, was unpredictably large and high. There must have been 150 girls down there working at machines, and above the collective racket I could hear a radio loudspeaker blaring "Only Forever." "The girls like the radio on loud like that," Robinson said.

He took me to one side of the room to watch a machine that he said was normally used on pen nibs. "This is what we do on it now," he said, shoving a box of tiny copper disks with raised edges toward me. "These are the primer caps for a sensitive incendiary shell, a 1-pounder used in anti-aircraft guns. They are the last bit fitted to the loaded shell. The explosive is so sensitive that just a microscopic roughness on the edge of the disk will set off the charge. A few workers in arsenals are walking around without hands now because of those shells. The flat surface of the disk is 4/10,000-inch thick and the edges 2/10,000-inch. The whole thing is about ⅛-inch in diameter. There's never been an accident with our disks. Only one other firm has been able to make them, and that happens to be a gramophone company."

As I was telling Mr. Robinson about the plants I had visited earlier that day, he picked up a small object that a girl had just taken from her lathe and placed in the box before her. I recognized it immediately. "Why, that's one of the incendiary bullets that they're turning out on those big American machines at Bradshaw's place," I said. "Yes," he said, "but *we* break the job down into four operations, and a battery of four girls with hand lathes turns out the same bullet that Bradshaw's machine does in one operation. It isn't quite as fast or as cheap, but the bullets meet the same tests. In fact, I think we have rather fewer rejections than they.

"Those big specialized machines are efficient, of course, but there aren't enough of them in the world. Also, they cost the government upward of £1000 apiece. Actually, our production costs are about 10 per cent higher. But the country needs all the production it can get, and it can only get production by using us all. I suppose you saw them make all the parts for the fuze up there and then assemble them. Well, we assemble the same fuze here from parts made in little shops in a dozen parts of England. The 34 parts are contributed by 26 different factories. Separately, the things look like small articles you'd pick up on the hardware counter of a Woolworth's."

I said goodbye and started back to Manchester with my M.T.C. driver. On the way I had plenty of time to think of the deadly trifles that might someday come out of zipper and razor-blade factories in the United States.

The Welding Electrode

(*Concluded from Page* 79)

can put more heat into one plate than the other by moving the arc slower on that plate. Too, it often is desirable to direct the arc more on one plate than the other just as here it is detected more on the horizontal plate than on the vertical one to compensate for heat loss.

To see that full penetration is obtained in the corner, particularly important in a weld of this type, specimen welds can be made and broken. The operator should make sure that he can produce a solid, homogeneous, uniform, triangular weld with full penetration in the corner before attempting to make heavier welds with multiple passes.

When a welder has become proficient in making such welds, he then can attempt to make multiple pass fillet welds. To do this, first make a single pass weld of about ¼-inch size and then ply the second pass or bead over the first. Use a weaving motion as shown in Fig. 2 for the second pass.

Another way of making a heavier weld is to use three passes with a sequence of beads. In making each pass, an oscillating motion such as that shown in A (Fig. 1) can be used. Heavy beads, up to ½-inch size, can be made in one pass, using the weaving motion shown in Fig. 3.

Horizontal welds on vertical plates must be used on some occasions, particularly in field welding girth seams in large storage tanks. A detailed description of the technique employed follows:

To simulate working conditions, tack a vertical plate to a flat plate as shown in Fig. 4. Hold the electrode approximately perpendicular to the vertical plate, but pointing backward and upward about 15 to 20 degrees, as shown in the inset in Fig. 4. Strike the arc at the lefthand end of the vertical plate and draw the arc along the vertical plate in a horizontal line, attempting to make the arc deposit molten metal on the vertical plate. While it is comparatively easy to maintain the arc while doing this, it is rather difficult to get a smooth well-shaped bead, the tendency being for the molten metal to run down the plate on the bottom side of the bead. Cutting down the current may help in getting a bead of the best shape.

The slight weaving motion shown in Fig. 4 may be used to assist in overcoming irregularity of the bead. Another trick is that in which the welder "crowds" or shortens the arc at the top of the weave. The welder should study the effect of this operation and employ it where it appears useful as its proper use often distinguishes the expert welder from the "ordinary" operator.

Wider beads require more extensive weaving motions such as the three shown in Fig. 5. Note the type of bead deposited with the various weaves. These illustrate well how weaving is employed to control deposition of weld metal.

(*Concluded Next Week*)

Materials To Protect Against Air Raids

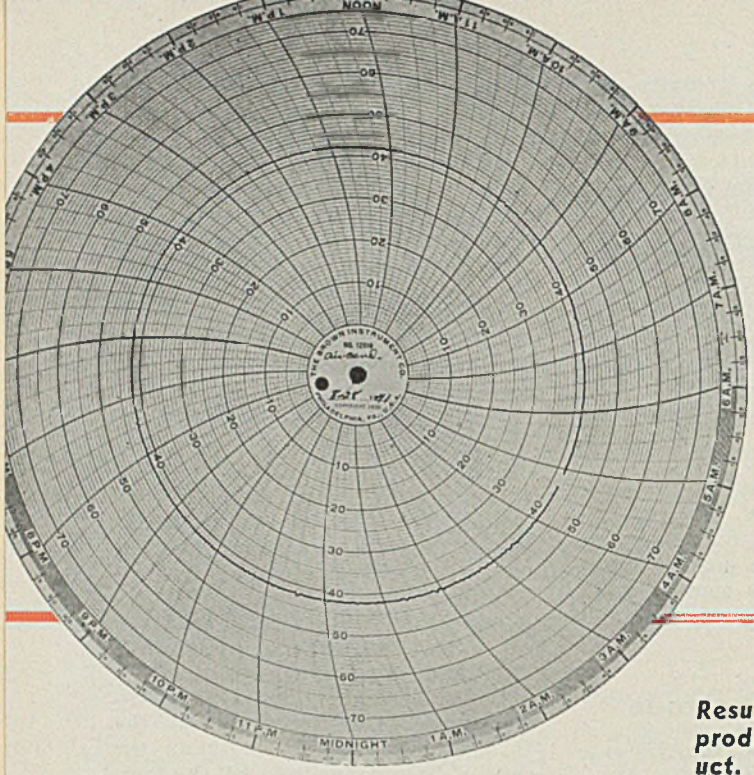
■ Philip Carey Mfg. Co., Lockland, Cincinnati, announces a complete line of materials to provide protection both to property and personnel during air raids.

Included in the line is a coating for overcoming reflected light, a blackout board for arresting flying glass, a blackout coating that prevents glass from shattering, an emergency blackout paper for covering damaged windows and a new Rejuvo camouflage system.

The coating for stopping reflected light is applied as paint and is recommended for both inside and outside application. It is particularly desirable for use on the outside surface of skylights.

Of laminated asphaltic composition, cut to window size, the Carey blackout board for stopping flying glass is for interior application. It is easily installed, resists moisture and condensation, and besides providing protection, solves the blackout problem.

For more permanent blackout treatment, the company recommends the double-purpose coating which in addition to cutting out light prevents glass from shattering. Termed the laminated system it consists of the application of a thick film of asphaltic coating in which is embedded an asphaltic-saturated fabric membrane. The emergency blackout paper is offered in rolls so it can be applied quickly in event a blacked cut window is smashed.



AIR CONDITIONING

Improves

Furnace Performance

Results contemplated from use of dry blast include larger production, lower fuel consumption and more uniform product. Advantage of conditioning the blast under a 3-grain moisture content to secure maximum output and fuel economy is open question. Details concerning location of conditioning equipment in relation to blowing engines are presented

By F. C. WOOD

Manager, Air Conditioning Dept.
York Ice Machinery Corp.
York, Pa.

■ NEARLY 50 years ago, according to the records, experimentation began to prove a theory, namely, that drying the air for blast furnace use would improve furnace performance. In 1894 James Gayley first patented a method for extracting moisture from air for blast furnaces, and in 1904 publicly announced the results of his experiments with a 40,000 cubic foot of air per minute dry blast system. He showed an increase in the furnace output from 358 to 447 tons of iron per day— 27 per cent increase; and a reduction in coke consumption from 2147 to 1726 pounds per ton of iron—a 19 per cent fuel rate saving. Furthermore, material savings in blowing engine horsepower had resulted from the cooling of the air supplied to the blowing engine.

Gayley's method of simultaneously drying and cooling the air employed a York ammonia compression-type refrigeration system. Excess moisture present in the blast air was removed by condensation on refrigerated pipe coils. These coils were encased in an insulated chamber through which the air was drawn on its way to the blowing tubs.

The initial and operating cost of this first plant and other plants installed about this time was judged to be excessive. However, in 1904 refrigeration was an infant industry, and the phrase, "air conditioning," had yet to be coined. Hence, by comparison with modern equipment and methods, these early plants were in the same category as the automobile of that period compared to the streamlined model of today.

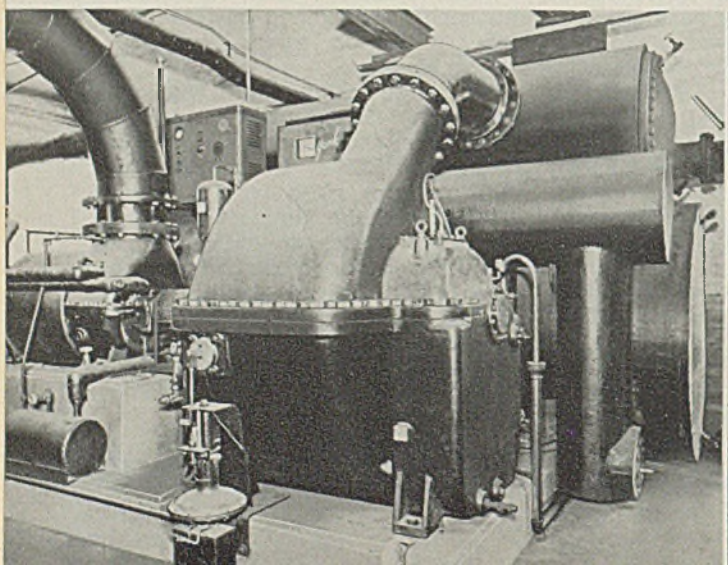
Summarized, the expected results from air conditioning of the blast furnace are:—

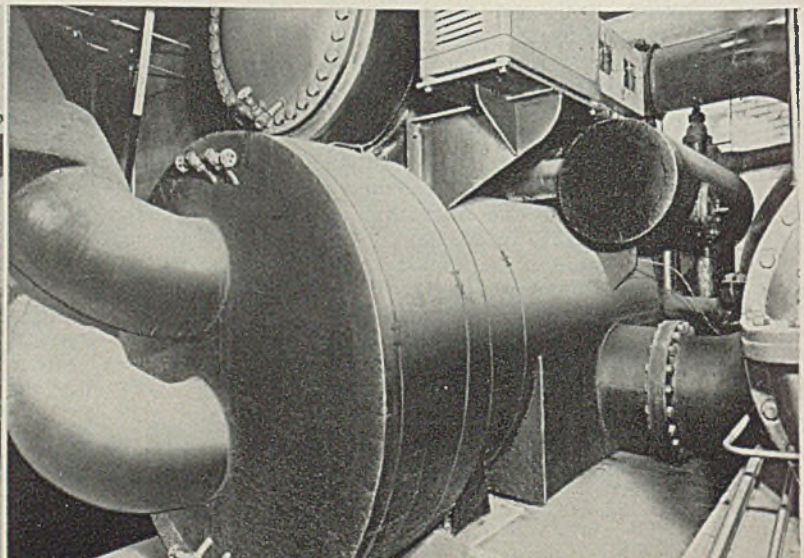
1. Increased iron output.
2. Decreased coke rate.
3. Greater uniformity in product through improved regularity in furnace operation.

An often quoted theory to explain increased production and coke savings with air conditioning, is that reduction in the moisture content of the air saves the heat formerly required to decompose the water vapor. This "wasted heat" is now available for useful purposes. Hence,

Fig. 1. (Left above)—Chart showing dew point temperature in degrees Fahr. of conditioned air going to blowing engines

Fig. 2. (Left below)—York-type turbocompressor refrigeration plant for chilling water which is steam-turbine driven. Fig. 3. (Right below)—Refrigeration plant showing water chiller, condenser and auxiliaries





HOW TO KEEP PIPE LINES WORKING

...round the clock!

These Bulletins Help Train Piping Crews; Aid in Getting Better Service From Valves and Fittings

VICTORY demands round the clock production! And while the burden will have its toll of plant equipment, industry's pipe lines—*its life lines*—must not fail in this task.

Keeping pipe lines working means getting better service from valves and fittings. That demands *more* and *better trained* men to keep up with and ahead of wear and tear. And that's where Crane Shop Bulletins are helping industry. These Bulletins, designed especially for maintenance workers, are full of practical pointers on installation and care of piping. They help train new men—improve the work of veterans as well.

The Bulletins are being widely used in maintenance shops and employee training schools. In the hands of your men, they will also help prevent piping trouble—*and keep production moving!*

Crane Shop Bulletins are offered to every plant—big and small—to help *speed* Victory. No charge—no obligation! For your supply, just call your local Crane Representative—or write to us.

CRANE

CRANE CO., GENERAL OFFICES:
836 S. MICHIGAN AVENUE, CHICAGO

VALVES • FITTINGS • PIPE
PLUMBING • HEATING • PUMPS

NATION-WIDE SERVICE THROUGH BRANCHES AND WHOLESALERS IN ALL MARKETS

Today Bonderizing is Doing a More Important Job Than Ever Before

Send for this New Book

WITH present-day shortages of protective metals—tin, zinc, cadmium and chromium—Bonderizing and other Parker Processes are taking on a bigger load.

In addition to protecting millions of peace-time products—automobiles, refrigerators, air conditioning equipment and scores of other major items—Bonderizing is protecting fighting equipment in the air, on land and on the sea.

When the question of protective finishes arises, Parker may be able to solve your problems. The Parker Laboratories have been working for years on the best methods of metal protection. Send for the new Bonderizing book. It tells you how it is applied and provides proof of the results to be expected. Get your copy today.

PARKER RUST PROOF COMPANY
2158 E. MILWAUKEE AVE. . DETROIT, MICHIGAN

PARKER PROCESSES
Release Vital Defense Materials

From the Parker Laboratories has come the solution to some perplexing finishing problems, caused by the shortage of strategic metals. They are showing the way to effective product protection and appearance maintenance with phosphate coatings.

PARKERIZING provides protection from rust on hundreds of mechanical parts of all types of equipment—replacing zinc and cadmium.

BONDERIZING provides a rust-inhibiting base for all types of organic finishes on sheet metal, with absorbent qualities to assure maximum adhesion. It provides possibilities for decorative effects with enamel or lacquer—replacing chromium.

PARCO LUBRITE provides an oil-retaining coating on friction surfaces that resists wear, working into an excellent bearing surface—releasing aluminum and tin used on engine parts.

PARKER *Processes* **CONQUER RUST**
BONDERIZING • PARKERIZING • PARCO LUBRIZING

more ore is reduced per pound of coke burned, from which it follows less pounds of coke are consumed per ton of iron output and more space is available in the furnace for ore. Thus, output has been increased and rate of fuel consumption decreased.

This theory has its limitations in application, since there is strong supporting evidence that drying the blast to less than approximately 3 grains per cubic foot does not give proportionately improved output and fuel economies. Evidently a law of diminishing returns affects profitable gains at this point.

Furthermore, it is claimed by some operators that too dry air is detrimental to performance, causing the furnace to "hang." Another argument holds that uniformity of product through improved regularity of furnace operation is the prime advantage of air conditioning. Since controlled moisture content accomplishes this result, then there is no apparent advantage in drying the blast below 3 grains.

The foregoing indicates that regularity in the operation of a blast furnace is of prime importance—greater, according to many authorities than increased output and decreased fuel consumption. Regularity in working the furnace is affected by variables in the raw materials. Because of its widely varying moisture content, the air charged into the furnace provides the greatest variable in the raw materials used. Other raw materials in the charge vary only a few per cent. Fig. 7 graphically illustrates daily and seasonal variations in the moisture content of the outside air for Detroit for 1940. It will be noted that daily variations during the summer months ranged from 6.5 to 3.5 grains of moisture per cubic foot of air. Therefore, a 500-ton furnace supplied with air at a constant rate of 50,000 cubic feet per minute would be supplied with moisture at a rate which varied over the day from 2800 to 1500 pounds of water per hour or nearly 100 per cent variation.

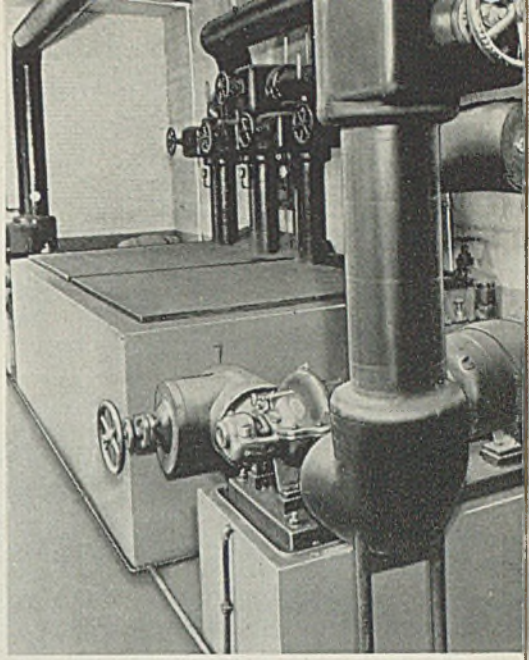


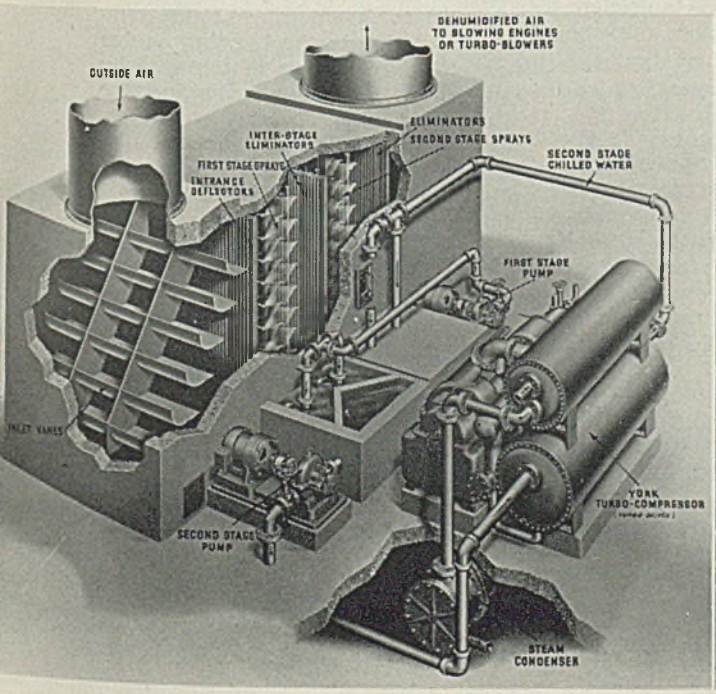
Fig. 4—Side of concrete dehumidifier showing sump box and chilled water pump

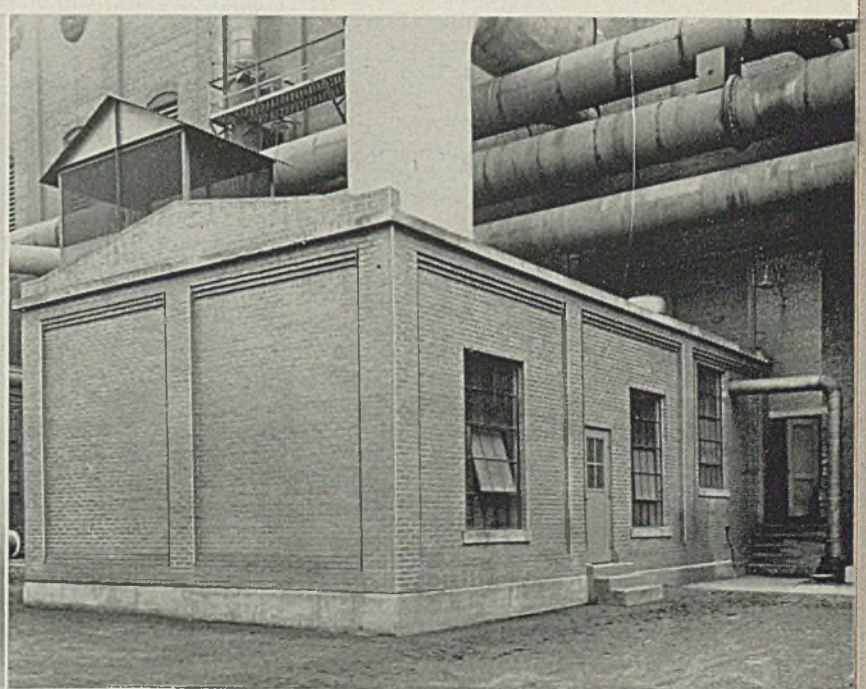
Early dry blast systems, as their name implies, stressed only reduction of the moisture content of the air. By contrast, the design of modern systems gives recognition to the importance of year-round maintenance of a uniform moisture content of the blast, to improve regularity in the operation of the furnace. Thus, modern systems are, in a true sense, *air conditioning* systems. Moisture content is controlled within close limits in the modern plant, necessitating the addition of moisture to the air (humidification) in the cold, dry winter months, and the removal of moisture (dehumidification) during other periods of the year.

Fig. 1 is a chart recording the performance of a blast furnace air conditioning system recently installed. The chart shows the dew point temperature (which is a measure of the moisture content) of the conditioned air to the blowing tubs maintained over a 24-hour period. Outside air varied from 8.1 to 5.1 grains moisture per cubic foot during the same day. The chart speaks for itself as a record of the close control of moisture content possible with modern air conditioning equipment. This uniformity of control at 3 grains moisture per cubic foot may be maintained continuously day and night, 365 days per year if the operator so desires, regardless of variations in outside atmospheric conditions.

Common practice in the case of modern plants is to place the air conditioning apparatus on the air inlet side of the blowing engine. The air is thereby cleaned of dirt, dust and contamination on its way to the blowing engine. When refrigeration is employed, and the air is cooled as well as dehumidified, the cold, dense air results in savings

Fig. 5. (Left below)—York-type air conditioning system for maintaining a moisture content in the blast of 3 grains per cubic foot. Fig. 6. (Right below)—A building of this size houses the refrigerating and air-conditioning equipment





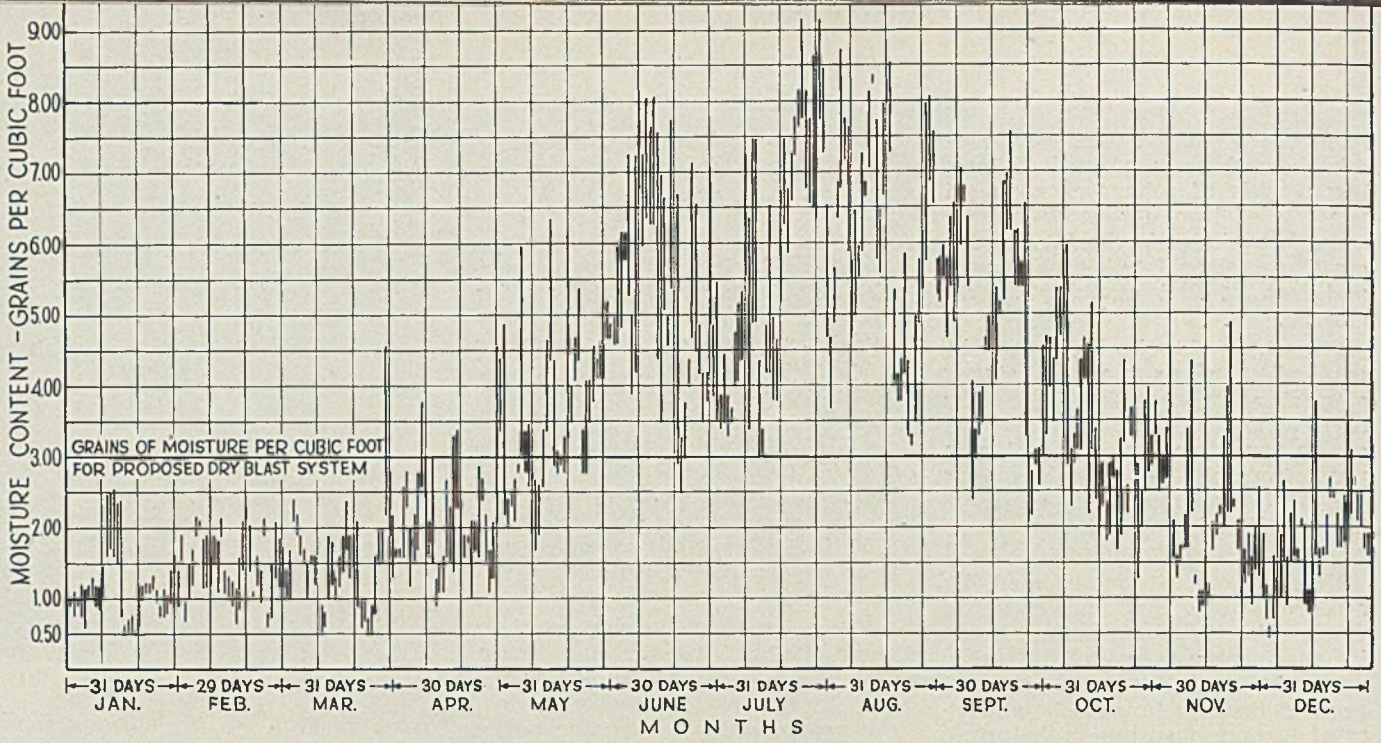


Fig. 7—Chart showing variations of moisture content of atmosphere at Detroit during 1940 as reported by the U. S. Weather Bureau

in blowing engine horsepower. The reason for this is that colder air requires less volume for the same weight delivered to the blast. Hence, the speed of the blowing engine can be reduced, requiring less horsepower. This horsepower saving often is sufficient to operate the refrigeration machine.

Fig. 5 illustrates a typical modern air conditioning system for a blast furnace, employing an air washer type dehumidifier supplied with chilled water from a refrigeration plant. The air washer is located on the inlet side of the blowing engine. Plants of this type have been installed in the past three or four years to air condition approximately 10 furnaces for a half dozen different steel companies. The plant illustrated is usually designed to maintain a uniform moisture content of the "wind" of 3 grains per cubic foot year-round, although some plants have been installed to produce a 4 and 5 grain content.

The air washer, shown in Fig. 5, is constructed of concrete to resist corrosion, and also to prevent pulsations where reciprocating blowing engines are used. Two stages of water sprays are provided and arranged counter-current flow to the air flow. In the case of a 3-grain plant, chilled water is pumped to the first spray stage at a temperature of about 39 degrees Fahr. The air in passing through the spray stages, condenses out its excess moisture and is finally saturated at the required dew point temperature of 41 degrees corresponding to 3 grains per cubic foot. Accurate control of this dew point and moisture content, as noted on the chart Fig. 1, is accomplished automatically by dew point thermostatic regulation of the chilled water temperature and refrigeration plant capacity. In the winter months, when the moisure content of the air is less than the design condition of 3 grains, moisture automatically is added to the air by heating (with a steam water heater) the spray water. The same dew point thermostat regulates the heat added to the water, by varying the steam supplied to the water heater.

The refrigeration system shown in the illustration and required to chill the water is typical and consists of a turbocompressor refrigeration machine with water cooler and condenser. The compressor shown is driven by a steam turbine operating condensing. Service water is required for the steam and refrigeration condensers. Other types of refrigeration systems may be employed to chill the water, and where steam is not available in sufficient quantities, the compressors may be motor driven.

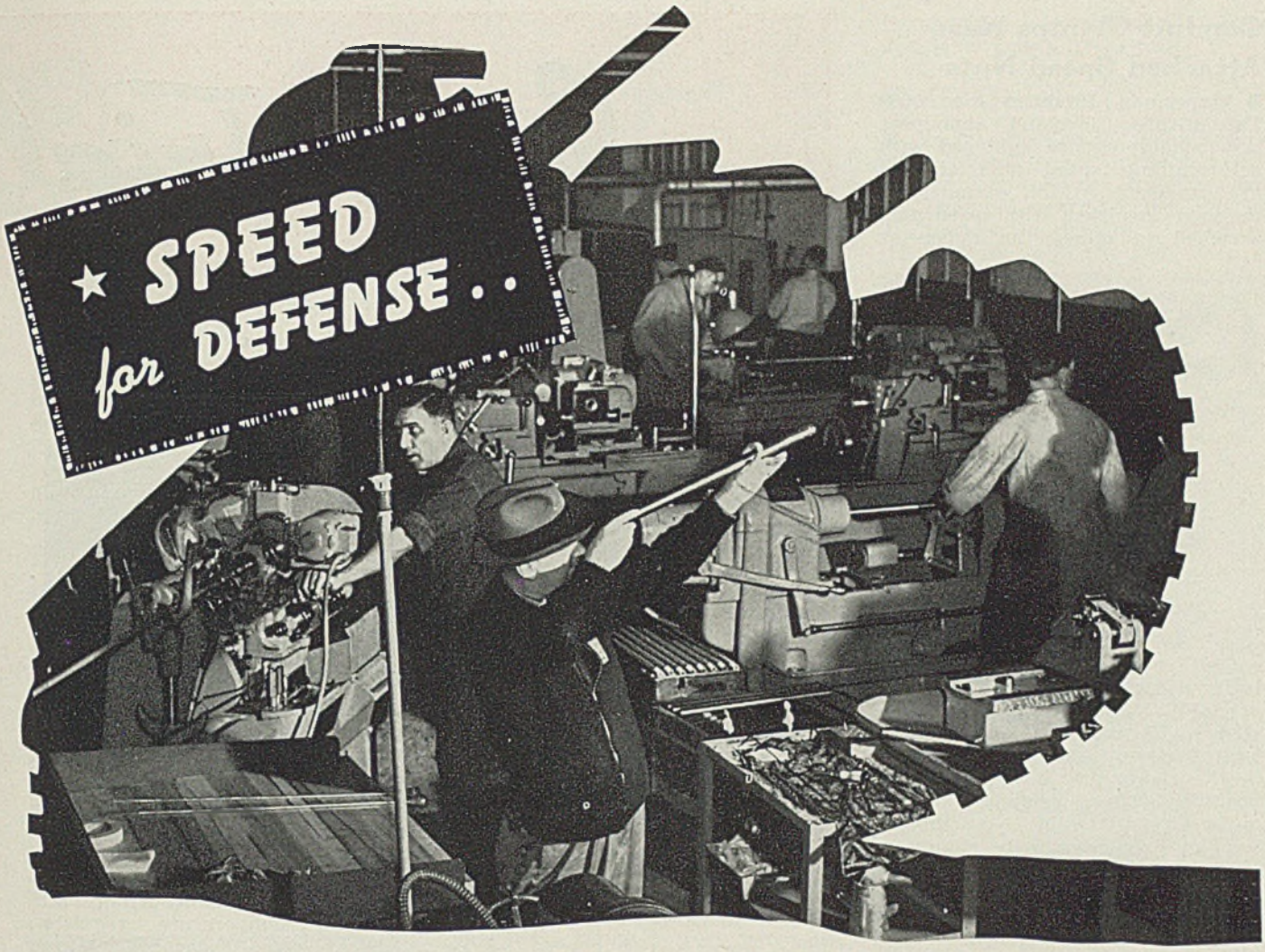
Figs. 2, 3, 4 and 6 illustrate a recent installation by York Ice Machinery Corp. This plant was installed to condition the 55,000 cubic feet per minute of blast for a 600-ton furnace, from an initial moisture content of 11 grains to a final content of 3 grains per cubic feet at 41 degrees Fahr. dew point temperature. The total cooling capacity installed was 625 tons refrigeration, which is being supplied by a York turbocompressor water-cooling system, driven by a steam turbine. The installation of this plant was completed in the summer of 1941.

The absorption system of blast furnace air conditioning accomplishes the required moisture removal from the blast by absorption through contact of the air with a hygroscopic salt solution. Steam is required for regeneration, or reconcentrating the solution and service water for cooling the reconcentrated solution.

The pressure dehumidifier air-conditioning application consists of a steel dehumidifier located on the discharge or pressure side of the blowing engine. This is applicable where the requirements for moisture removal call for an equivalent moisture content at atmospheric pressure less than 3 grains, down say to 1 grain per cubic foot, which corresponds to a dew point temperature of 16 degrees Fahr. To avoid the use of a brine or nonfreeze solution, with attendant maintenance difficulties, the dehumidifier is located on the discharge side of the blowing engine where the increased pressure raises the moisture vapor pressure and consequently, the dew point temperature, to a level which permits the use of chilled water for the required dehumidification. A portion of the heat present in the air (200 to 300 degrees Fahr. temperature) due to the blowing engine heat of compression is removed by contact with sprays using service water, for example, at 70 to 85 degrees Fahr. The balance of the cooling and dehumidifying is accomplished by a chilled water refrigeration system, in the manner previously described and illustrated for the 3-grain plant.

The successful application of air conditioning to blast furnaces is evidenced by the fact that several of the steel companies who have completed their trial periods are now placing "repeat" orders for other of their furnaces.

The recent action of OPM in calling for 10,000,000 tons of increased steel producing capacity should further stimulate interest in air conditioning as a means to obtain part of this increase with existing plant facilities—at the same time "paying its way" in fuel savings, and better products.



IN TIMES LIKE THESE *Don't Chance Poorly Finished Products*

SPECIFY A PROVEN FORMULA FOR DEFENSE MATERIALS

★ **ANODEX** The fastest method and approved compound for removal of grease and all inorganic dirt from ferrous metals—machine gun and aeroplane engine parts.

★ **METEX** Recommended to be the most thorough compounds for cleaning all types and calibers of brass shell cases.

★ **SOLVTEX** The pre-tested, rapid action degreaser solvent substitute and special compounds for washing machines.

★ **METALEX** A well balanced compound for cleaning bearing surfaces before finishing—suitable for brass or steel.

HAVE A MacDERMID ENGINEER ASSIST YOU WITH YOUR PROBLEM . . . . AMPLE SUPPLIES FOR DEFENSE ORDERS . . . . WRITE FOR DATA SHEETS.

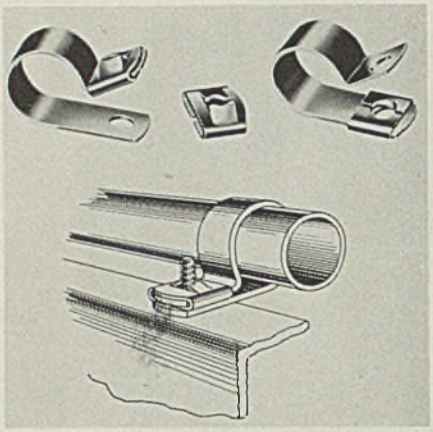
SALES AND SERVICE from COAST TO COAST
New York . . . Cleveland . . .
Los Angeles . . . Chicago . . .
Newark . . . Detroit . . . St. Louis
Philadelphia . . . Toronto, Can.

MANUFACTURED SOLELY BY
MACDERMID
INCORPORATED
WATERBURY • CONNECTICUT

Industrial

Conduit Clamps Have Attached Speed Nuts

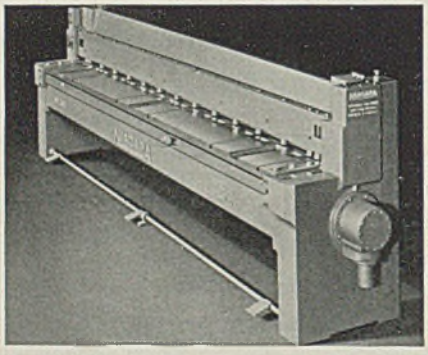
■ Tinnerman Products Inc., 2039 Fulton road, Cleveland, announces new conduit clamps equipped with self-retaining speed nuts. Clamps are standard AC-755 except that they are furnished with speed nuts attached to either the upper or



lower leg of the clamp for faster assembly. This joining unit is designed with extrusions on the lower legs of the nut that snap into a hole in the clamp and hold the nut in position. This development eliminates much handling. Now the assembler handles only the clamps, a screw, and screw driver where formerly he had to handle the clamp, the screw, a lock-nut, a screw driver and a wrench.

Power Squaring Shears

■ Niagara Machine & Tool Works, 637 Northland avenue, Buffalo, has placed on the market a new line of series No. 3 power squaring shears embodying many design refinements. Because of these improvements, units in the line provide sheared edges and narrow strips that are straight and parallel to within thousandths of an



inch. They also operate at a speed of 80 strokes per minute. High production squaring and trimming in each unit is assured by instant-acting sleeve clutch, quick-acting ball bearing and self-measuring back gage. Drive mechanism including flywheel, gearing, clutch, eccentrics and connections is enclosed and operates in oil. Shears are offered in 4 to 12-foot cutting lengths with capacities 14 to 18 gage.

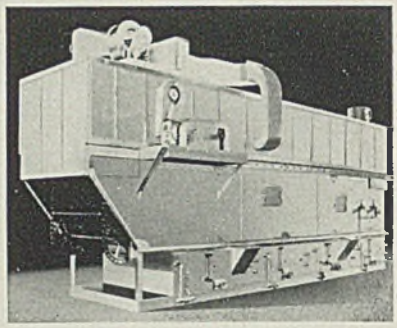
End-Brush for Cleaning Aircraft Rivet Holes

■ Osborn Mfg. Co., 5401 Hamilton avenue, Cleveland, has placed on the market a tiny brush designed particularly for the aircraft industry for cleaning small areas around rivet holes, bolt holes, etc. It is used to clean areas where good metal-to-metal bond is required. The development consists of a tiny end-brush made of wire and incorporates a special pilot rod to fit into the hole. Tests prove that the brush

does not clog—that it does a good job, speeding up the cleaning operation 700 per cent inasmuch as there are approximately 1,000,000 rivets and numerous bolted connections in a $50,000 military plane.

Processing Machine for Aluminum Alloy Sheets

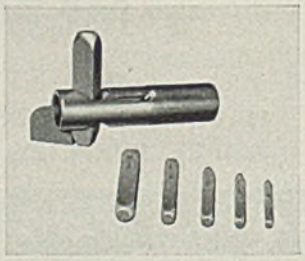
■ Detroit Rex Products Co., 13005 Hillview avenue, Detroit, announces a 2-strand cross-rod conveyorized Detrex processing machine for cleaning and preparing aluminum alloy sheets used for aircraft. It provides a hot alkali wash, hot water rinse, hot chromic acid dip, hot water rinse and oven dry-off. On this unit the oven is placed over the top of the dip tanks, with the return flight of the conveyor passing overhead through the oven back to the loading-unloading station. Another feature of this simplified set-up is that both steam and acid fumes are positively withdrawn from the plant. The machine is fabricated of steel plate. The oven paneling is insulated with fiber glass. Multipass steam coils heat the hot alkali tank, hot water rinse tanks and chromic acid tank. Each tank is equipped with a gage glass, drain valve, direct-reading dial thermometer, and quick-opening clean-out door. The alkali and chromic acid tanks are equipped with charging hoppers. Large inspec-



tion doors are provided over the tanks and large access doors are located at the rear end of the unit (one over the final hot water rinse tank and one in the oven). The hot chromic acid tank is supplied with a direct-acting, self-operated temperature regulator. Duct work and blower are arranged to exhaust from each end of the washer, and from the chromic acid stage. The dry-off oven is heated by a blast heater arranged for high pressure steam.

Hand Tool Holder

■ M. E. Cunningham Co., 172 East Carson street, Pittsburgh has placed on the market a new adjustable hand tool holder for holding square or octagon shaped tools such as steel hand stamps, chisels, etc. It is adaptable for holding any size piece from ¼ to ¾-inch and other ½-inch ranges up to 1¼



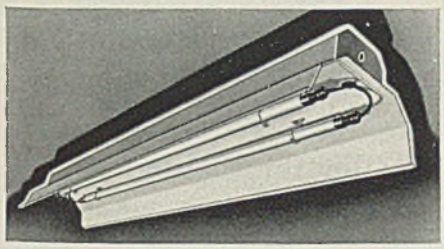
inches square. The holder is said to eliminate possibility of split or smashed fingers usually caused by foul hammer blows. It can be furnished with a leveler on the front to allow the operator to make several impressions in a straight

Equipment

line. Holder is of steel tubing slotted through in a V shape. A coil spring fixed inside one end of the tubing provides the holding power with the aid of a rubber plug also mounted inside the tubing at the opposite end.

Fluorescent Unit

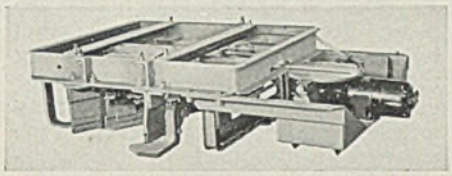
■ Benjamin Electric Mfg. Co., Des Plaines, Ill., announces an improved RP fluorescent unit which features higher lighting efficiency. Because of this it is suitable where high mountings or wide spacings of the fixtures are required. A full wave rectifier type circuit employed in the lamp effectively minimizes flicker and stroboscopic effect at the source without need of special balancing devices. Also the use of separate starters are unnecessary. Units are offered in either single or twin lamp



types. Both are open-end models of special porcelain enamel. They require 85-watt lamps and are 65¼ inches long.

Track Switch

■ Cleveland Tramrail Division, Cleveland Crane & Engineering Co., Wickliffe, O., has introduced a new electrically operated type H-track switch for use with cab-operated, gravity or automatic dispatch overhead materials handling systems. Its use enables the operator to preset the switch at some distance ahead while traveling. Likewise, indexes on gravity or automatic dispatch carriers may be set to actuate trippers which will cause one or several switches to take the position desired. The switch is of welded steel. It consists of two main assemblies—an outer supporting frame and an inner sliding frame. The outer frame bolts rigidly to the superstructure. The inner assembly, carrying a straight and a curved rail, rides on multiple easy-operating rollers, and



is set in position by a motor-driven cam through a lever arrangement.

Drying Lamp

■ Westinghouse Lamp Division, Bloomfield, N. J., announces a new 100-watt infra-red drying lamp for use where relatively low heat intensities are required in quickly drying paints and heating other materials. It will supplement the previously announced 250, 500, and 1000-watt drying lamps. Unlike the widely used 250-watt R-40 bulb lamp, it does not incorporate a self-contained reflector, but must be used with a separate reflector.

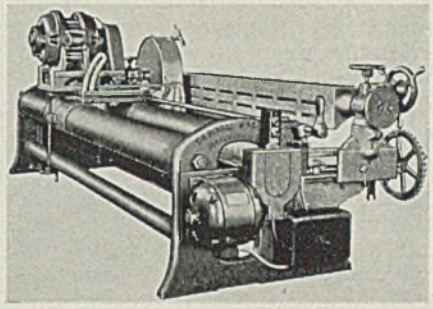
Tool Stand

■ Penn Metal Corp., 36 Oregon avenue, Philadelphia, has placed on the market a new 3-shift tool stand designed to keep tools right on the job for 24-hour war production. Each of its three drawers locks separately—a single drawer for each

shift which makes each man responsible for his own tools. Of all-welded steel construction, the stand has 12-gage steel shelves and heavy angle legs. Its drawers are 18 inches wide, 16 inches deep and 5 inches high. Overall size of each unit is 30 x 18 x 32 inches.

Knife Grinder

■ Capital Machine Co., 2801 Roosevelt avenue, Indianapolis, announces an improved style grinder for grinding veneer knives up to 213 inches in length. Basically, the machine is of the same design as the former model. It, however, now features a reversing motor for providing the forward and reversing action of the main screw feed. Its arbor carriage travels on 8-inch cast iron tubes, traveling on two bearing surfaces, 13½ inches wide. The emery wheel, mounted on the carriage, is arranged so it may be swiveled around to grind a flat surface or any amount of concave desired. It is driven by a motor also mounted on the carriage. Work is fed automatically as fine as five-

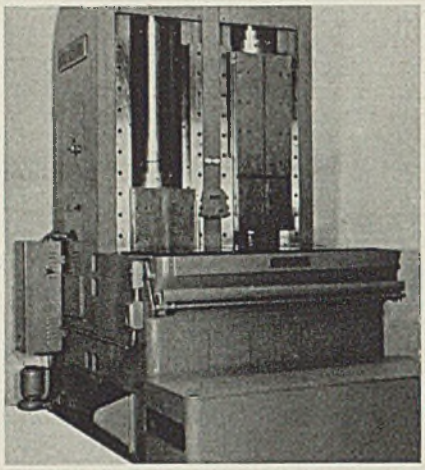


thousandths of an inch or much coarser. In addition to veneer knives, the unit will grind any flat knife or shear blade than can be put on the machine.

Broaching Machines

■ Colonial Broach Co., 147 Jos. Campau, Detroit, announces a new standard line of dual-ram broaching machines suitable where extremely high production is required, and where one operator can handle feeding and removing a part from one ram while the other is on its down stroke, doubling output. Units in the line, known as the VAD series, are offered in 11 sizes ranging from 3 tons and 36-inch stroke up to 25 tons and 66-inch stroke. Column widths of dual-ram machines are greater than in former types. The machines also embody a new cylinder design. The main drive motors are vertically mounted internally, reducing amount of installation space. Construction of the receding table mechanism has been improved, allowing for the installation of chip wipers and providing a finish machined pad on the front for mounting auxiliary units such as cams, for automatically operating clamps, locks and support jacks on fixtures. Longer travel of the receding table has been provided in the larger machines of the line. Both the dual

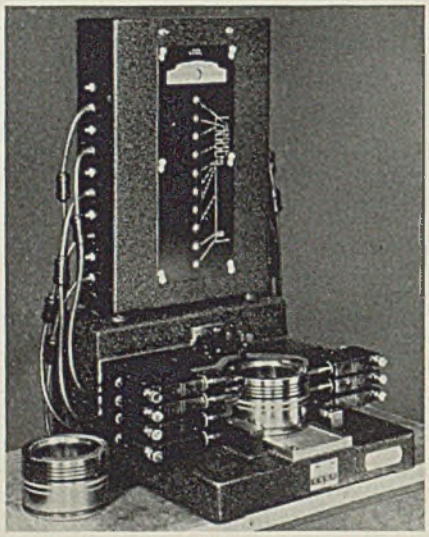
safety control and emergency knee bar are supplied on all machines. Operation of the rams in each machine is continuous. Welded steel construction is util-



ized for such parts as the column and table. For greater ease in installation, all machines are equipped with crane hooks at both top and bottom.

Checking Instrument

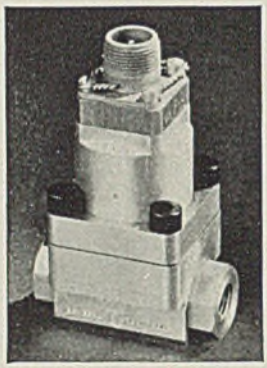
■ Sheffield Corp., Dayton, O., announces a Multichek instrument for checking simultaneously ten dimensions of an aircraft piston. It embodies ten gaging heads, three of which are in the back of the gage. The front gaging units check two minor diameters of the oil ring grooves, outside diameter at bottom skirt, outside diameter of piston, outside diameter at upper oil ring grooves, outside diameter above compression ring grooves and outside diameter at compression ring grooves. The gaging heads at the rear check the width of



compression grooves. Each of these has a wedge-shaped gaging point, which is inserted into one of the grooves. The distance of insertion determines the groove width. Each gaging unit operates independently, and has its own signal light on the panel. When a light shows red, its gaging unit has designated that a certain dimension is undersize; when it shows green, the dimension is oversize; and when amber it is within tolerance. All signal lights are connected to a master light on the top of the panel. When any one signal light shows an off dimension, the master light goes red; when all of the lights are amber the master light stays off.

Electric Valves

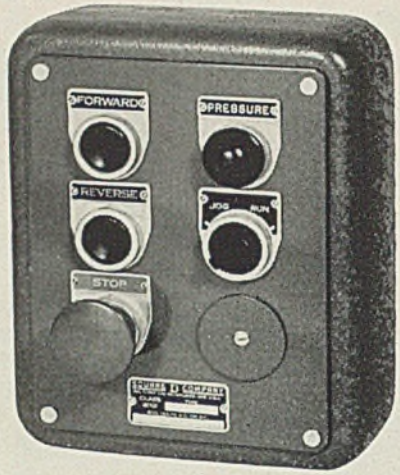
■ General Controls Co., Glendale, Calif., announces a new series of PV electric valves specifically designed for positive valve operation on moving equipment and vibrating machines. The valves should not be confused with modified stationary valves or alternating current type valves. Main consideration govern-



ing their design was to provide positive operation regardless of vibration, movement or substantial increases in acceleration (as expressed by factor "g"). They are generally of the 2-wire current failure type for handling liquids, gases and vapors, including refrigerants, greases, gasoline, alcohol, anti-icing fluids, etc., under pressures from a fraction of a pound to 1500 pounds or more. Operation in any position, packless, drip-proof, design, and minimum current consumption are additional advantages.

Push-Button Stations

■ Industrial Controller Division, Square D Co., 4041 North Richards street, Milwaukee, now offers a new series of class 9001, type M push-button stations and enclosures for use by machine tool manufacturers. These are provided with enclosures of heavy cast construction to provide ample protection against accidental damage. Enclosures are available for 3, 6, 9, 12 and 16 push button, selector switch, or pilot light control units. Each may be furnished as an assembled station or as an enclosure only, in which the machine tool manufacturer can fit units from stock to fill his immediate needs. The enclosure consists of a cast iron case, gasket and steel cover plate, drilled to accommodate



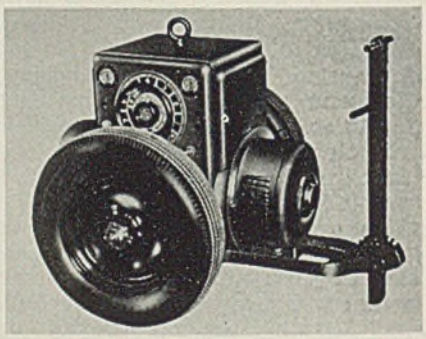
standard drip-tight control units. The case may be drilled and tapped for conduit entrance in five locations.

Electric Hoist

■ Chisholm-Moore Hoist Corp., Tonawanda, N. Y., announces a new Meteor heavy duty electric hoist available in capacities of ½-ton and up. Some of its important features include: Streamlined design that provides compactness and eliminates excess weight, aeroplane type cooling fins, brake, fully enclosed weatherproofed design, and for extra safety, enclosed safety-type hook blocks, and an electrical system that permits only 110 volts to pass through the push-button station.

Trailer for Welders

■ Hobart Bros. Co., Troy, has placed on the market a new two-wheeled, lightweight, pneumatic-tired trailer for moving 200, 300 and 400-ampere electric drive welders to different locations. Trailer

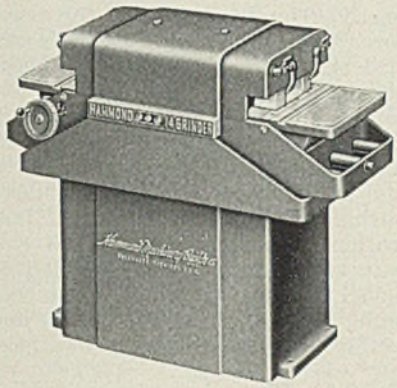


is designed so mounting of welder is accomplished by inserting three bolts in the frame of the trailer which register with the three holes in the legs of the welding machine. Combination tow bar and standing support of the unit is equipped with a hand-operated ratchet for

locking support arm in position. Unit is easily moved by hand. It measures 54 inches long, 45 inches wide, 27 inches high (over tires); 13-inch axle center.

Carbide Tool Grinder

■ Hammond Machinery Builders Inc., 1611 Douglas avenue, Kalamazoo, Mich., has placed on the market a new No. 14 carbide tool grinder which is said to be faster and more accurate in its work. It is offered for either wet or dry grinding and comes in two models — cup wheels both sides or cup wheel one side and straight wheel on the other side. Tables are mechanically controlled and angular setting of each is established by a hand wheel graduated to degrees. A crank handle moves the table in or out from the wheel. Uniform distance between the operator and the wheel face is maintained by the co-ordinated movement of the wheel hood

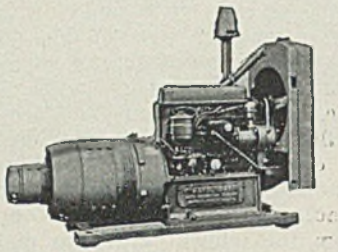


and sludge pan with the table. The table measures 22 x 12 inches. The machine itself is 56 inches wide, 50 inches high and 32 inches deep. Developed for use on the table is a new compound protractor tool gage. It not only slides in the table slot parallel with the wheel in a regular manner, but it also has a cross slide for sliding toward the wheel. The latter permits use of the protractor when grinding parallel or at a slight angle with the tool. This protector provides angles from 0 to 90 degrees. The machine is powered by a 3-horsepower reversing motor and is multi-V-belt driven. The coolant pump of the coolant system is driven by a ¼-horsepower motor. Spindle speed of the machine is sufficient to provide a speed of 5000 surface feet per minute.

Power Plants

■ Kato Engineering Co., Mankato, Minn., has introduced newly designed Katolight plants in the 7½ and 10 kilowatt sizes at 1200 or 1800 revolutions per minute and in 15 kilowatt sizes at 1800 revolutions per minute for use as auxiliaries. These are available as either self-

excited or with separate exciter attached. The self-excited type can be made self-cranking by connecting it to an 18 or 24-volt battery, however, more prompt shipment can usually be made on the separate exciter type. The separate exciter generator is mounted on the end of the alternator and bell. Exciter armature is carried on the tapered shaft extension of the main generator shaft. Accessible direct current brushes, both from frame



and armature are easily removed. Units are of roomy design and feature motor of high starting capacity. The driven end of the armatures on all 4-cylinder plants is carried on a pilot bearing which keeps armature core centered up or concentric with engine crankshaft. Torque is transmitted from engine to armature through heavy driving pins which are set in rubber bushings with metal liners. Illustration shows the 10 kilowatt size with separate exciter attached. This model is 66 inches long by 41 inches high and 20 inches wide and weighs approximately 1200 pounds.

Power Truck

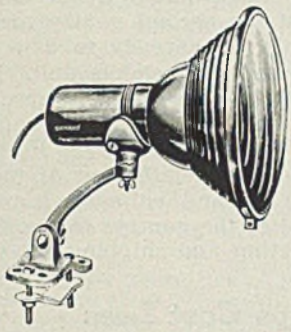
■ Clark Tructractor Division, Clark Equipment Co., Battle Creek, Mich., is now offering a light weight, compact power truck that lifts, carries and tiers loads weighing up to 1 ton especially useful for plants unable to use heavy material handling equipment due to weak floor construction. Called the Clipper, it is

offered in six models in capacities 1000, 1500, 2000 pounds with lifting heights of 60 to 108 inches. Gas-powered for 24-hour continuous service, its engine is of the 4-cylinder type. Other features include front wheel drive, rear wheel steer, hydraulic lift and tilt. Self starter and hydraulic brakes are standard

equipment. The driver rides on a comfortable spring suspended seat with all controls within easy reach.

Defense Floodlight

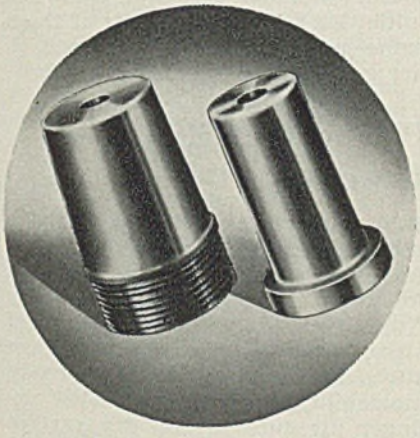
■ Steber Mfg. Co., 1020 West Adams street, Chicago, has introduced a new No. 3500 floodlight for defense duty. It can be used on defense projects of all types to prevent sabotage and subversive activities. The floodlight has a reflector of heavy gage spun steel which features a copper and nickel base plating with



chromium on top. The lens is attached to the reflector by means of a detachable ring. Outside of the floodlight is finished with aluminum Ultranamel. A bracket also is included with the unit. It is of the triple purpose type for allowing wall, cross-arm or pipe mounting.

Blast Nozzle

■ American Foundry Equipment Co., Mishawaka, Ind., is offering a new low-priced Long Lyfe abrasive blast nozzle which is equipped with an extremely hard abrasion resisting ceramic insert. The latter is said to have a hardness density equal to many metals, and its manufacture is not affected by the



present scarcity of materials. The new nozzle is being offered in sizes of 3/16, 1/4, 5/16, 3/8, 7/16, 1/2, and 5/8-inch. Two types are available: The flange and screw type adapters can be supplied for fitting the nozzle to any type of air blasting equipment.

Builds Machine Tools

(*Concluded from Page 74*)

partment, tramrail motor-driven gantrys are used for loading and unloading these 20-feet planers. Large turret lathe saddles, carriages and cross-slides are easily set up on the planer beds. Work handled on these particular planers is usually placed on the beds in gangs, necessitating a large loading and unloading operation. Thus the use of motor-driven gantry hoists is important here to the handling operations. The large bed castings shown in the left foreground are handled by the overhead crane which also can be seen in Fig. 6.

The handling facilities in Fig. 3 are interesting for a hand-propelled monorail bridge at left is equipped with an electric hoist while at the right is a hand-propelled monorail carrier that uses an air-operated hoist. This equipment is employed for loading and unloading electric furnaces in the heat treating department. The air-operated hoist is used in connection with the lead tempering furnace. Several cyanide furnace and oil quenching baths are also to be found in this location.

Two tramrail bridges that serve the finishing department are shown in Fig. 1. At the right, the workman is lowering a 250-pound multiple turning head onto a revolving table where he can easily spray-paint all portions of the surface. Use of the hand crane prevents the finely ground surface from becoming marred.

In Fig. 4 is a section of the assembly floor where the smaller high speed turret lathes are fitted and assembled. In the foreground, a workman uses the hand-operated tramrail single-leg gantry crane to fit a carriage unit to a bed. At the left, on the second gantry another assembler gets ready to fit a hexagon turret and saddle unit. Here the rope slings help balance the load. In the left background, a large overhead crane is lifting a finished turret lathe out of the assembly line and will carry it around the end of the gantrys to the finishing, testing and shipping areas.

Lamps Cost Less Give More Service

■ Besides increasing the rated life of its 100-watt fluorescent lamps to 3000 hours, Hygrade Sylvania Corp., Salem, Mass., is now offering these units for $1.15 less than when they were first brought on the market.

According to the company, a year ago these same units with a rated life of 2000 hours each listed at $3.75. Now they are being offered for $2.60 each including the bonus of 1000 extra hours of performance, due to engineering and manufacturing accomplishments. A company spokesman stated that prices on other sizes introduced some time before the advent of the 100-watt size have been reduced in a series of reductions approximately 60 per cent from the initial list price. Rated life of these same units has been increased 66 per cent during the same period.

Plastic Material Repairs Patterns

■ A plastic material which can be used to repair damage to or to effect alterations in wood or metal foundry patterns is reported by Nuplastic Co., 1707 West Hubbard street, Chicago. It is said to have such features as tough texture, ready moldability, prompt adhesion by finger pressure to any dry surface regardless of smoothness, no shrinkage, no drying out, self-smoothing finish and increasing tenacity with time.

The material can be dissolved in naphtha and utilized to seal wood surfaces. It is packaged in sections for small applications and does not dry out.

Possible Alternates

(*Continued from Page 70*)

ence ratings assigned to particular contracts or purchase orders.

In addition, the following comments are pertinent:

Manganese: As a means of conserving low-carbon ferromanganese a limit of 1.00 per cent manganese was set for steels in which the carbon content does not exceed 0.25 per cent.

For steels in which the carbon content exceeds 0.25 per cent a limit of 1.65 per cent manganese was set.

Silicon: Because of the reported uncertainty of a continuous supply of ferrosilicon containing a consistent percentage of silicon and the steel industry's limited experience in the use of steels containing a relatively high percentage of silicon the committee has adhered to the general practice of specifying a silicon content of about 0.20 to 0.35 per cent, except in the case of the 9200 series.

Nickel: Small quantities of nickel are recoverable from recurrent alloy steel scrap turnover. By combining the incidental or recoverable nickel from scrap with small quantities of pure nickel or of other elements a saving in the over-all use of all such elements will be made. Therefore a maximum nickel content of 0.60 per cent is recommended for alternate steels.

Chromium: Because of the possibilities of conservation inherent in the use of small quantities of several alloying elements as stated above a maximum chromium content of 0.60 per cent is recommended for alternate steels. (On Feb. 4 chromium was placed under complete allocations.—The Editors).

Vanadium: This element is completely restricted under Priority Order M-23-a dated Dec. 20, 1941.

Titanium: No specific limits are recommended for titanium, and it is not recommended for use in alternate steels because reduction facilities and priority preferences for special uses may make its general use impossible.

Zirconium: No specific limits are recommended for zirconium, and it is not recommended for use in alternate steels because reduction facilities and priority preferences for special uses may make its general use impossible.

Boron: The use of this element is in the development stage and it is not recommended for general use at this time.

Tungsten: This element is completely restricted under Priority Order M-3 and M-3-a dated March 26, 1941, and subsequent modifications.

Molybdenum: A maximum of 0.60 per cent is recommended except for steels which must have special creep characteristics.

Addition Agents: Special alloying compounds known as *addition agents*, or *reaction alloys*, which contain varying amounts of, or combinations of boron, silicon, titanium, vanadium and zirconium have been

used in some types of steel with rather remarkable results. However, their use is not recommended in the series of alternate steels presented herein because experience with them and knowledge as to their effects on all grades of steel is limited. Moreover, a recommendation for general use might complicate problems of availability.

These addition alloys are so numerous in type that their introduction into a work of this sort would tend to confuse the effort to minimize the number of grades of steel and complicate the problem of mill supplies and inventories.

End-Quench Hardenability Curves: Because an excessive amount of time would have been consumed in making standard tensile and other physical property tests of all the alternate compositions set forth herein, the committee was of the opinion that for general applications a comparison of standard end-quench hardenability data would suffice as a guide to application of the alternate steels.

All available end-quench hardenability data were accumulated from members of the committee and comparisons were made. Where no data was available several manufacturers generously produced a sufficient number of experimental heats to complete the program. The accumulated data was compared in detail to determine how the characteristics of the proposed alternates would compare with the characteristics of well-known steels. That information was then condensed and adjusted to conform with considerations set forth under individual element headings above, the availability of raw materials, and the desire to present the smallest possible number of alternate combinations which might satisfy the greatest number of needs.

The alternates presented embrace series of carbon-molybdenum, manganese-molybdenum, low chromium-molybdenum and low nickel-chromium-molybdenum steels. The latter series of steels can be used to effect savings of chromium or nickel or both in cases where such a combination is required because of the properties desired and to reduce the number and type of other possible alternates which might be suggested. The alternate steels have all been identified within the 8000 series as shown in the table on Page 70.

That committee consisted of the following men:

John Mitchell, chairman, Carnegie-Illinois Steel Corp.;

W. G. Bischoff, Timken Steel and Tubes Division, The Timken Roller Bearing Co.;

W. J. Buechling, Copperweld Steel Co.;

H. Bornstein, Deere & Co.;

L. C. Boyd, Carnegie-Illinois Steel Corp.;

Walter Crafts, Electrometallurgical Corp.;

E. F. Davis, Warner Gear Co.;

L. E. Ekholm, Alan Wood Steel Co.;

L. L. Ferrall, Rotary Electric Steel Co.;

H. J. French, International Nickel Co.;

W. H. Graves, Packard Motor Car Co.;

A. J. Herzig, Climax Molybdenum Corp.;

J. H. Jones, Republic Steel Corp.;

A. L. Kaye, Carnegie-Illinois Steel Corp.;

H. Knowlton, International Harvester Co.;

E. Larned, The Youngstown Sheet & Tube Co.;

E. O. Mann, Chevrolet Motor Division, General Motors Corp.;

M. J. R. Morris, Republic Steel Corp.;

S. M. Norwood, Union Carbide & Carbon Co.;

C. M. Parker, American Iron and Steel Institute;

Glenn Riegal, Caterpillar Tractor Co.;

R. W. Roush, Timken Detroit Axle Co.;

R. B. Schenck, Buick Motors Division, General Motors Corp.;

A. F. Sprankle, Carnegie-Illinois Steel Corp.;

E. F. Stillwell, Chrysler Corp.;

Jerome Strauss, Vanadium Corp. of America;

E. T. Walton, Crucible Steel Co. of America;

Henry Wysor, Bethlehem Steel Co.;

F. T. Young, Ford Motor Co.

Helpful Literature

1. Case Hardening

Nitralloy Corp.—30-page illustrated bulletin is entitled "Nitralloy and the Nitriding Process." Steels susceptible to nitriding, effect of nitriding on physical properties of various grades of steel, and procedure and equipment use in nitriding process are some of subjects treated in detail. Partial list of successful applications is included.

2. Blast Cleaning Cabinets

Ruemelin Mfg. Co.—8-page illustrated bulletin No. 32-A covers line of blast cleaning cabinets for metal cleaning operations in foundries, forging plants and other metal working industries. Section deals with features of construction and operation. Line drawings indicate principal dimensions and tables give motor sizes, dust filter sizes, compressed air capacities and other details.

3. Steam Turbines

Moore Steam Turbine division, Worthington Pump & Machinery Corp.—6-page illustrated bulletin No. 1951 covers types GA and GB steam turbines with combined reduction gears. Close-up views show features among which are mechanical type constant speed governor and independent emergency overspeed governor, self-contained forced feed lubrication system, centerline support, and stainless steel blading.

4. Plating Solutions

Hanson-Van Winkle-Munning Co.—48-page booklet is sixth edition of "Simple Methods of Analyzing Plating Solutions." Contents include descriptions of principles involved in analysis, use of apparatus, methods of sampling plating solution, and step-by-step methods for complete analysis of the various commonly-used plating solutions. Full lists are given of necessary equipment and chemicals required.

5. Truck Power Plant

Ready-Power Co.—4-page illustrated bulletin No. 94B describes model "F" electric power plant which uses standard model "B Ford" four-cylinder gasoline engine. Three models are available for delivering 4.32 kilowatts of either 36, 48 or 60 volt current.

6. Locknuts

Palnut Co.—12-page illustrated bulletin describes "Palnuts"—lock washers that provide secure fastening under vibration service. Covered with line drawings and sketches are principle, advantages, how to apply, how to specify, where nuts are used, dimensions, and available sizes, materials and finishes.

7. Welding Controls

Weltronic Corp. — 4-page illustrated bulletin No. S-41 presents condensed information on line of heat controls, synchronizers and synchronous timers, and complete machine controls for resistance welding operations. Principles, functions and methods of operation are briefly explained. Wiring diagrams show how equipment should be set up to obtain certain specific results.

8. Floor Steel

Open Steel Flooring Institute, Inc.—12-page bulletin is entitled "New Ideas in Functional Floor Design." It is intended as handbook for architects and engineers on uses and properties of open steel grating for floor, stair tread, walkway, ventilator, sidewalk grating and platform construction.

9. Recording Equipment

Leeds & Northrup Co.—16-page illustrated bulletin No. N-91-163 gives information about "Micromax" recording equipment for flue-gas carbon dioxide. This equipment uses alternating current throughout and is easily maintained. It is rapid in operation, indicating carbon dioxide changes in less than minute after they occur.

10. Tool Steels

Henry Disston & Sons, Inc.—72-page catalog No. 100-S deals with tool steels. In addition to describing growth of company and its facilities for production steels, numerous descriptions of tools steels and their recommended applications are enumerated. For each steel is given chemical range, properties, characteristics and instructions for hot working and heat treating. Illustrations show plant operations and company personnel.

11. Creosote

Koppers Co.—4-page illustrated bulletin TD-5 contains description, specifications, list of uses, and method of packaging of creosote. This is distillate of coal tar which is produced by high temperature carbonization of bituminous coal. One page shows typical structures pressure-treated with creosote for protection of timbers against molds, fungi, and termites.

12. Fluorescent Lighting

General Electric Co.—24-page No. Y-1251 book covers subject of rectified fluorescent lamps and luminaires. Matters of supplementary illumination, recommended mounting heights, increased production, and uniform light are covered. Case histories are cited to prove how seeing is made easier.

13. Stainless-Clad Steel

Jessop Steel Co.—16-page bulletin contains base prices for sheets and plates of "Silver-Ply" stainless-clad steel for twelve grades of cladding, in proportionate thicknesses of cladding from 5 to 50 percent. Section on standard classifications of extras for plates includes tables on machining, shearing and flatness tolerances, and estimated weights.

14. Radiant Energy Heating

Fostoria Pressed Steel Corp.—16-page illustrated bulletin No. PS-29 covers applications of near infra-red process in industrial, printing and motor-baking fields. It contains pictures of various applications and equipment to operate process, and describes in detail what radiant energy is and how it works.

15. Earthmoving Equipment

Osgood Co.—Two illustrated bulletins, No. 4132 and No. 4128 describe type 70 air controlled shovels, cranes, draglines and clamshells; and "Mobilcrane," respectively. Latter is mounted on pneumatic tired chassis, but differs from orthodox truck-crane in that it is powered with only one engine. Operator, from his position at levers in revolving upper body, controls all motions of crane, including traveling.

16. Material Handling

Barrett-Cravens Co.—100-page pocket-sized booklet comprises Junior Catalog No. 414. It lists salient features, applications, operation, construction and standard specifications for hand lift trucks, portable hydraulic elevators, skid platforms and other material handling equipment.

17. Condensate Return

Cochrane Corp. — 4-page illustrated bulletin No. 3025 announces new "Cochrane-Becker" high pressure condensate return system which can be used for draining jacketed kettles, drying rolls, coil cookers, dryers, unit heaters, laundry and platen presses, and similar equipment that depends on uniformly high steam temperatures for efficient operation. Detailed engineering specifications are given.

18. Bending Presses

Cleveland Crane & Engineering Co.—illustrated bulletin No. 2002-A sets forth features, advantages and construction information on line of "Steelweld" bending presses. Photographs show presses being constructed and close-up views of operating parts. Two pages of drawings depict typical bends made on presses.

STEEL *Readers' Service Dept.*

1213 West Third St., Cleveland, Ohio

TT
2-9-42

Please have literature circled below sent to me.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29
30 31 32 33 34 35 36 37 38

Name_____ Title_____

Company_____

Products Manufactured_____

Address_____

City_____ State_____

This card must be completely filled out. Please TYPE or PRINT

FIRST CLASS
PERMIT No. 36
(Sec. 510 P.L.&R.)
Cleveland, Ohio

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

4c POSTAGE WILL BE PAID BY—

STEEL

Penton Building

CLEVELAND, OHIO

Readers' Service Dept.

19. Safety Equipment

Kimball Safety Products Co.—Cardboard folder contains four bulletins which cover subjects of eye, body and hand protection, and welders supplies. Described are goggles of various types; sweat bands, sleevelets, aprons, trousers and coats of fire-resistant materials; helmets, gloves, welder curtains, electrode carriers, and face shields.

20. Metal Products

Lyon Metal Products, Inc.—16-page illustrated bulletin is entitled "Craftsman in National Defense." It contains descriptions and pictures of company's metal forming facilities, its personnel, and some of its representative products.

21. Bronze Awards

United States Bronze Sign Co.—16-page illustrated bulletin pictures and briefly describes representative plaques, trophies, testimonials, and honor rolls made by this company. Facilities of company for producing bronze awards are outlined and series of photographs show steps in formation of plaques. Instructions for ordering are included.

22. Hydraulic Equipment

Charles F. Elmes Engineering Works—Illustrated bulletin comprises series of photographs, with brief descriptions, showing accumulators; molding presses; drawing, forming and straightening presses; and special types of hydraulic presses.

23. Turbines

De Laval Steam Turbine Co.—2-page bulletin is reprint from trade paper on subject of "Steam-Flow Characteristics of Extraction Turbines." Relations between throttle flow and output for an extraction turbine, under various operating conditions, are shown and compared with that for typical straight condensing or non-condensing unit.

24. Air Valve

Hannifin Mfg. Co.—4-page illustrated bulletin No. 56 describes piston-type air pressure regulating valve for use on pneumatic presses, riveters, air chucks, spray painting equipment, pneumatic cylinders and similar equipment. It is designed for pressures ranging from 0 to 150 pounds and is adjustable over entire capacity range by simply turning handscrew. Cross-sectional views show details of construction.

25. Electric Motors

Wagner Electric Corp.—64-page, illustrated bulletin MU-183 contains detailed descriptions of construction of repulsion-start-induction motors, repulsion-induction motors, capacitor-start motors, split-phase motors, direct-current motors, small polyphase motors, fan motors, and explosion-proof motors. Numerous cut-away and schematic views of motors and motor parts amplify text.

26. Chain Drives

Link-Belt Co.—96-page catalog data book 125 deals with "Silverstreak Silent" chain drives. It contains numerous pages of installation pictures, engineering selection data, recommended drive selections for drives up to 2000 horsepower, list prices of chains and wheels, dimensions of wheel rims, hub sizes, bores and keys, information on drive accessories, and mechanical drawings.

27. Welding Electrodes

Welding Equipment & Supply Co.—16-page illustrated bulletin deals with line of "Eureka" tool steel welding wires for composite construction and repairing of tools and dies. Recommended usage, applications, heat treatment, and procedure for use are given for eight types of electrodes. Detailed data are given on characteristics and properties of welds produced in each case. Illustrations depict representative uses.

28. Electric Heating

Westinghouse Electric & Manufacturing Co.—38-page illustrated catalog No. 28-000 lists specifications, descriptions, ratings and prices on strip heaters, finned strip heaters, cartridge heaters, "Corox" water and oil immersion heaters, air and oven heaters, melting pots, glue pots, thermostats, switches and contactors. Seven pages contain application data and proper selection information.

29. Refractory Coating

A. P. Green Fire Brick Co. — 4-page illustrated bulletin describes "Greencote" refractory coating for reconditioning furnace linings. Product is mixed with water and applied by troweling or spraying. It is reported to adhere well to hot or cold, new or old refractory surfaces of furnaces operating at more than 2000 degrees Fahr. Photographs show typical uses.

30. Steamboat Ratchets

W. W. Patterson Co.—8-page illustrated catalog No. 42 deals with steamboat ratchets. These devices are so called because they were first used to connect together river boats and barges. Present day uses for tool include drawing together and securing steel plates in ship building and structural members in building construction. Barge connectors and river tow chains are also described.

31. Corrosion Resistant Metal

American Brass Co.—20-page illustrated bulletin is entitled "Everdur Metal Tanks and Equipment." General characteristics, forms, compositions and properties of metal which suit it for construction of pressure vessels are enumerated. In addition to text, data are summarized in several tables. Detailed welding procedures for formation of unfired pressure vessels are given.

32. Abrasive Products

Bay State Abrasive Products Co.—64-page illustrated bulletin contains facts about grinding wheels and other abrasive shapes. Given are definitions of grinding wheels, explanation of company's system of marking abrasive products, standard types of grinding wheels, standard shapes of grinding wheel faces, and prices for wheels, sticks, stones, bricks and rubs.

33. Bronzes

Ampco Metal, Inc.—16-page illustrated bulletin describes "Amcoloy" series of bronzes which comprise aluminum bronze, manganese bronze, beryllium-copper, high conductivity and high-lead alloys. Descriptions of alloys and comprehensive tables of physical properties, together with range of chemical compositions, are given. Photomicrographs show typical grain structures.

34. Alloy Steel

Allegheny Ludlum Steel Corp.—4-page bulletin, "Pluramelt Conserves Vital Alloys," points out how conservation of chromium and nickel can be effected through use of "Pluramelt" strip, sheets and strip. Product consists of facing of stainless steel and core of plain steel. Available sizes and metal combinations are listed.

35. Hydraulic Vise

Studebaker Machine Co.—6-page illustrated folder describes features of hydraulic "Visepress" vise which is operated from foot pedal. Details of construction and operation are given together with specifications and list of applications.

36. Graphite

Acheson Colloids Corp.—4-page bulletin No. 230.7 is one of series of technical papers pertaining to applications of colloidal graphite to industry. This bulletin comprises resume of forms in which colloidal graphite is available and few of specific uses to which these preparations are put in present-day practices.

37. Electric Products

BullDog Electric Products Co. — 88-page illustrated catalog No. 421 describes safety switches, lighting panels, circuit breakers and circuit breaker panels, power distribution ducts and fittings, fuse holders, and distribution panels and cabinets. Features, operation and construction details, and specifications are given.

38. Salt Baths

Park Chemical Co.—4-page bulletin, "New and Better," describes salt baths for heat treating of high speed steels. In question and answer style, it tells how these baths will give work free from surface defects, distortion, and breakage at minimum costs. Photograph shows typical work handled.

STEEL *Readers' Service Dept.*

1213 West Third St., Cleveland, Ohio

TT
2-9-42

Please have literature circled below sent to me.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29
30 31 32 33 34 35 36 37 38

Name_____ Title_____

Company_____

Products Manufactured_____

Address_____

City_____ State_____

This card must be completely filled out. Please TYPE or PRINT.

FIRST CLASS
PERMIT No. 36
(Sec. 510 P.L.&R.)
Cleveland, Ohio

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

4c POSTAGE WILL BE PAID BY—

STEEL

Penton Building

CLEVELAND, OHIO

Readers' Service Dept.

Steel Supply Meeting War Needs Closely

Enlarged consumption served by better distribution. Industry works closely with WPB. Pig iron output off slightly

MARKET IN TABLOID ★

Demand
Most carries high rating.

Prices
Minor ceiling changes.

Production
Down 1 point to 96 per cent.

■ DESPITE greatly increased consuming capacity for war purposes, supply of steel and iron is more nearly meeting requirements and delays are being reduced steadily.

Some tight spots remain, partly from insufficient supply of semifinished steel, partly from restrictions imposed by the scrap situation. Full co-operation by steelmakers with the War Production Board is eliminating difficulties formerly met and distribution is much smoother. War production is being broadened and subcontracting is on the increase.

A formal revision of the iron and steel products price schedule has been issued by OPA requiring mills to continue to absorb the same freight within their areas as over the past two years and tightening definitions of extras in the price schedule. Contracts entered into before April 16, 1941, when the schedule was issued, if not in conformity with the schedule, may be completed on contract terms only with respect to shipments made before March 15, 1942.

Various announcements by Office of Price Administration have made little essential change in the price situation, only details being involved for most part. In the scrap schedule a premium of $5 per ton is allowed for cast iron borings for chemical use in explosives manufacture over the price of plain borings. Other changes relate to computation of shipping point prices in New England, a schedule of allowances where vessel movement is involved, closer definition of some grades of scrap, better provision for unprepared scrap originating where preparation facilities are not available and allowances for truck delivery.

Steel movement to Central and South American countries is increasing as a result of the recent OPA order allowing export merchants and export agents to charge above the domestic ceiling. In the case of export merchants a 10 per cent increase is allowed and so-called export agents are allowed 5 per cent. Under the previous order export prices were at the domestic ceiling. The allowance is to apply only to the actual exporter and not to intermediaries.

A slightly easier situation is developing in steelmaking scrap, supply at several centers being increased last week by shipments from remote sources. In other areas some result is felt from the campaign to reclaim tonnage from automobile wrecking yards. Full effect of effort to release material from this source is not yet felt but large shipments are expected to develop in a short time. Meanwhile, open hearths in condition to operate remain idle from lack of scrap and numerous steelmakers are maintaining output on small margin.

Steelworks production last week declined 1 point to 96 per cent in spite of better scrap supply in several centers. Cincinnati gained 3 points to 87 per cent, New England 7 points to 92 and Youngstown 1 point to 88 per cent. Cleveland declined 10 points to 84½ per cent, Detroit 2 points to 85 and Wheeling 11 points to 84 per cent. Rates were unchanged at Chicago, 103; Buffalo, 79½; Pittsburgh, 95; Birmingham, 90; St. Louis, 78; Eastern Pennsylvania, 90.

Coke pig iron production in January, 4,958,785 net tons, was 56,210 tons less than 5,014,995 tons made in December, a decline of 1.12 per cent. The January figure was 6.03 per cent above January, 1941, and 23.21 per cent over January, 1940. At the end of January 219 stacks were active, one more than Dec. 31, the largest number in blast since September, 1941, when 219 were in service.

Use of bonderized black plate for can ends in place of tin plate bids fair to become general as tin plate makers install equipment for production of this material. Inland Steel Co. is adding equipment for this purpose and other producers are preparing to do so. Tin plate manufacturers have been ordered to reduce use of tin to 1.25 pounds of pig tin per base box of tin plate. Use of tin plate and terne plate is to be restricted by a quota system to be announced later by WPB. Long ternes are not to be used for roofing except on a priority of A-10 or higher.

Automobile production last week totaled 37,125 units, compared with 73,305 the preceding week. Passenger car assembly has ceased under government order and present output is trucks, mainly heavy types, light truck production ceasing Feb. 10.

Composite prices have not been affected by recent actions of the OPA and remain at former levels. Finished steel composite is $56.73; semifinished steel at $36.00; steelmaking pig iron at $23.05; steelmaking scrap at $19.17.

COMPOSITE MARKET AVERAGES

	Feb. 7	Jan. 31	Jan. 24	One Month Ago Jan., 1942	Three Months Ago Nov., 1941	One Year Ago Feb., 1941	Five Years Ago Feb., 1937
Finished Steel	$56.73	$56.73	$56.73	$56.73	$56.73	$56.73	$55.18
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	36.20
Steelmaking Pig Iron	23.05	23.05	23.05	23.05	23.05	22.95	19.98
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	20.05	19.40

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

COMPARISON OF PRICES

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

Finished Material

	Feb. 7, 1942	Jan. 1942	Nov. 1941	Feb. 1941
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.47	2.47	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.225
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv. Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to ⅜-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron

	Feb. 7, 1942	Jan. 1942	Nov. 1941	Feb. 1941
Bessemer, del. Pittsburgh	$25.34	$25.34	$25.34	$25.34
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern, del. Philadelphia	25.34	25.34	25.34	25.34
No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	24.69
No. 2 foundry, Chicago	24.00	24.00	24.00	24.00
Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	24.06	24.06	24.06	24.06
No. 2X, del. Phila. (differ. av.)	26.215	26.215	26.215	26.215
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	31.34	31.34	31.34	30.34
Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.17
Ferromanganese, del. Pittsburgh	125.33	125.33	125.33	125.33

Scrap

Heavy melting steel, Pitts.	$20.00	$20.00	$20.00	$20.75
Heavy melt, steel, No. 2, E. Pa.	18.75	18.75	17.75	18.50
Heavy melting steel, Chicago	18.75	18.75	18.75	19.25
Rails for rolling, Chicago	22.25	22.25	22.25	23.75
No. 1 cast, Chicago	20.00	21.12	21.50	19.875

Coke

Connellsville, furnace, ovens	$6.25	$6.25	$6.25	$5.50
Connellsville, foundry, ovens	7.25	7.25	7.25	6.00
Chicago, by-product fdry., del.	12.25	12.25	12.25	11.75

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. mill, carloads.

Sheets, Strip

Hot-Rolled Sheets

Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 2.10c
Granite City base 2.20c
Detroit, del. 2.20c
Pacific ports 2.65c

Cold-Rolled Sheets

Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, B'ham., base 3.05c
Granite City, base 3.15c
Detroit, del. 3.15c
Other Mich. pts., del. 2.25c
Pacific ports 3.70c

Galvanized Sheets, No. 24

Pittsburgh, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c
Granite City, base 3.60c
Pacific ports 4.05c

Corrugated Galv. Sheets

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, 29 gage, per square 3.31c
Granite City 3.38c
Pacific Ports 3.73c

Culvert Sheets

Pittsburgh, Gary, Birmingham, 16-gage, not corrugated, copper steel 3.60c, copper iron 3.90c, pure iron 3.95c.
Pittsburgh, 24-gage, zinc-coated, hot-dipped, heat-treated 4.25c.
Granite City, copper steel 3.70c, copper iron 4.00c, pure iron 4.05c.
Pacific ports, copper steel 4.25c, copper iron 4.55c, pure iron 4.60c.

Enameling Sheets

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage, base 2.75c
Granite City, base 2.85c
Pacific ports 3.40c
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c
Granite City, base 3.45c
Pacific ports 4.00c

Electrical Sheets, No. 24

	Pittsburgh Base	Pacific Ports	Granite City
Field gr.	3.20c	3.95c	3.30c
Armat.	3.55c	4.30c	3.65c
Elect.	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c
Transformer			
72	6.15c	6.90c	.....
65	7.15c	7.90c	.....
58	7.65c	8.40c	.....
52	8.45c	9.20c	.....

Hot-Rolled Strip

Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c
Detroit, del. 2.20c
Other Mich. pts. del. 2.25c
Pacific ports 2.75c

Cold-Rolled Strip

Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c
Chicago, base 2.90c
Worcester, base 3.00c
Detroit, del. 2.90c
Other Mich. pts. del. 2.95c

Commodity C.R. Strip

Pittsburgh, Cleveland, Youngstown, base 3 tons and over 2.95c
Worcester, base 3.35c
Detroit, del. 3.05c
Other Mich. pts. del. 3.10c

Cold-Finished Spring Steel

Pittsburgh, Cleveland, base; add 20 cents for Worcester.
.26-.50 Carbon 2.80c
.51-.75 Carbon 4.30c
.76-1.00 Carbon 6.15c
Over 1.00 Carbon 8.35c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

TYPE	BARS	PLATES	SHEETS	H. R. STRIP	C. R. STRIP
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
304-20% clad	...	*18.00	19.00	...	.....
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
311	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	...	.....
316	40.00	44.00	48.00	40.00	48.00
317	50.00	54.00	58.00	50.00	58.00
347	33.00	38.00	45.00	33.00	42.00
403	21.50	24.50	29.50	21.25	27.00
410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
430F	19.50	22.50	29.50	18.75	24.50
431	19.00	22.00	29.00	17.50	22.50
442	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00

*Includes annealing and pickling.

Tin, Terne Plate

Tin Plate

Pittsburgh, Chicago, Gary, 100-lb. base box $5.00
Granite City $5.10

Tin Mill Black Plate

Pittsburgh, Chicago, Gary, base 29 gage and lighter 3.05c
Granite City 3.15c
Pacific ports, boxed 4.05c

Long Ternes

Pittsburgh, Gary No. 24 unassorted 3.80c
Pacific Ports 4.55c

Special Coated Mfg. Ternes

Pittsburgh, Chicago, Gary, 100-base box $4.30
Granite City $4.40

Roofing Ternes

Pittsburgh base per package 112 sheets 20 x 28 in., coating I.C.

8-lb.	$12.00	25-lb.	$16.00
15-lb.	14.00	30-lb.	17.25
20-lb.	15.00	40-lb.	19.50

Steel Plate

Pittsburgh, Chicago, Gary, Cleveland, Birmingham,

Youngstown 2.10c
Coatesville, Sparrows Point, Claymont 2.10c
Gulf ports 2.45c
Pacific Coast ports 2.65c

Steel Floor Plates

Pittsburgh 3.35c
Chicago 3.35c
Gulf ports 3.70c
Pacific Coast ports 4.00c

Structural Shapes

Pittsburgh, Bethlehem, Chicago, Buffalo, Birmingham 2.10c
St. Louis, del. 2.34c
Pacific Coast ports 2.75c

Bars

Hot-Rolled Carbon Bars

Pittsburgh, Chicago, Gary, Cleve., Birm., base 20 tons one size 2.15c
Detroit, del. 2.25c
New York, del. 2.49c
Duluth, base 2.25c
Philadelphia, del. 2.47c
Gulf ports, dock 2.50c
All-rail, Houston from Birmingham 2.59c
Pac. ports, dock 2.80c
All-rail from Chicago.. 3.25c

Rail Steel Bars

Pitts., Chicago, Gary, Cleveland, Birm., base 5 tons 2.15c
Detroit, del. 2.25c
New York, del. 2.49c
Philadelphia, del..... 2.47c
Gulf ports, dock 2.50c
All-rail, Houston from Birmingham 2.59c
Pac. ports, dock 2.80c
All-rail from Chicago.. 3.25c

Hot-Rolled Alloy Bars

Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size 2.70c
Detroit 2.80c

Alloy S.A.E.	Diff.	S.A.E.	Alloy Diff.
2000.....	0.35	3100.....	0.70
2100.....	0.75	3200.....	1.35
2300.....	1.70	3300.....	3.80
2500.....	2.55	3400.....	3.20

4100 .15-25 Mo. 0.55
4600 0.20-0.30 Mo.; 1.50-2.00 Ni. 1.20
5100 80-1.10 Cr. 0.45
5100 Spr. flats 0.15
6100 Bars 1.20
6100 Spr. flats 0.85
Carb., Van. 0.85
9200 Spr. flats 0.15
9200 Spr. rounds, squares 0.40
T 1300, Mn, mean 1.51-2.00 0.10
Do., carbon under 0.20 max. 0.35

Cold-Finished Carbon Bars

Pitts., Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs. 2.65c
Detroit 2.70c

Cold-Finished Alloy Bars

Pitts., Chicago, Gary, Cleveland, Buffalo, base 3.35c
Detroit 3.45c
Galveston, add $0.25; Pacific Coast, $0.50.

Turned, Ground Shafting

Pitts., Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c
Detroit 2.70c

Reinforcing Bars (*New Billet*)

Pitts., Chicago, Gary, Cleveland, Birm., Sparrows Point, Buffalo, Youngstown, base 2.15c
Gulf ports, dock 2.50c
All-rail, Houston from Birmingham 2.59c
Pacific ports, dock 2.80c
Detroit, del. 2.25c

Reinforcing Bars (*Rail Steel*)

Pitts., Chicago, Gary, Cleveland, Birm., base. 2.15c
Gulf ports, dock 2.50c
All-rail, Houston from Birmingham 2.59c
Pacific ports, dock 2.80c
Detroit, del. 2.25c

Iron Bars

Philadelphia, com. del. 3.06-3.50c
Pittsburgh, muck bar.... 5.00c
Pittsburgh, staybolt 8.00c
Terre Haute com., f.o.b. mill 2.15c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard and cement coated wire nails $2.55

(Per Pound)

Polished fence staples... 2.55c
Annealed fence wire 3.05c
Galv. fence wire 3.40c
Woven wire fencing (base C. L. column) 67
Single loop bale ties, (base C. L. column) 59
Galv. barbed wire, 80-rod spools, base column... 70
Twisted barbless wire, column 70

To Manufacturing Trade

Base, Pitts.-Cleve.-Chicago Birmingham (except spring wire at Birmingham)

Bright bess., basic wire.. 2.60c
Galvanized wire 2.60c
Spring wire 3.20c
Worcester, Mass., 10c higher on bright basic and spring wire.

Cut Nails

Carload, Pittsburgh, keg. $3.85

Alloy Plates (Hot)

Pitts., Chicago, Coatesville, Pa. 3.50c

Rails, Fastenings

(*Gross Tons*)

Standard rails, mill $40.00
Relay rails, base, 35 lbs. and over 28.00-30.00
Light rails, billet qual., Pitts., Chicago, Bham. $40.00
Do., rerolling quality. 39.00

Cents per pound

Angle bars, billet, mills.. 2.70c
Do., axle steel 2.35c
Spikes, R. R. base 3.00c
Track bolts, base 4.75c
Do., heat treated 5.00c
Car axles forged, Pitts., Chicago, Birmingham.. 3.15c
Tie plates, base 2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller.....65½ off
Do., ⅜ and ⅝ x 6-in. and shorter .....63½ off
Do., ¾ to 1 x 6-in. and shorter .....61 off
1⅛ and larger, all lengths 59 off
All diameters, over 6-in. long .....59 off
Tire bolts .....50 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts .....56 off
Plow bolts .....65 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
½-inch and less.	62	64
⅝-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger..	56	..

Hexagon Cap Screws

Upset 1-in., smaller .....60 off

Square Head Set Screws

Upset, 1-in., smaller.....68 off
Headless, ¼-in., larger..55 off
No. 10, smaller .....60 off

Piling

Pitts., Chgo., Buffalo.... 2.40c

Rivets, Washers

F.o.b. Pitts., Cleve., Chgo., Bham.

Structural 3.75c
⅜-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-hardening .. 24.00
Carb. Ext. 18.00
Carb. Spec. 22.00 High car.-chr. 43.00

High Speed Tool Steels

Tung.	Chr.	Van.	Moly.	
18.00	4	1	....	67.00
18.00	4	2	1	77.00
18.00	4	3	1	87.00
1.50	4	1	8.50	54.00
...	4	2	8	54.00
5.50	4	1.50	4	57.50
5.50	4.50	4	4.50	70.00

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut-lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½"O.D.	13	$ 9.72	$23.71
1¾"O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2¼"O.D.	13	13.79	21.68
2¼"O.D.	12	15.16	....
2½"O.D.	12	16.58	26.57
2¾"O.D.	12	17.54	29.00
3" O.D.	12	18.35	31.36
3½"O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O.D.	13	$ 7.82	$ 9.01
1¼"O.D.	13	9.26	10.67
1½"O.D.	13	10.23	11.79
1¾"O.D.	13	11.64	13.42
2" O.D.	13	13.04	15.03
2¼"O.D.	13	14.54	16.76
2¼"O.D.	12	16.01	18.45
2½"O.D.	12	17.54	20.21
2¾"O.D.	12	18.59	21.42
3" O.D.	12	19.50	22.48
3½"O.D.	11	24.62	28.37
4" O.D.	10	30.54	35.20
4½"O.D.	10	37.35	43.04
5" O.D.	9	46.87	54.01
6" O.D.	7	71.96	82.93

Welded Iron, Steel, Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

In.	Steel Blk.	Steel Galv.
½	63½	51
¾	66½	55
1—3	68½	57½
	Iron	
¾	30	10
1—1¼	34	16
1½	38	18½
2	37½	18

Lap Weld

	Steel	
2	61	49½
2½—3	64	52½
3½—6	66	54½
7 and 8.....	65	52½
	Iron	
2	30½	12
2½—3½	31½	14½
4	33½	18
4½—8	32½	17
9—12	28½	12

Line Pipe, Plain Ends

	Steel
1 to 3, butt weld	68½
2, lap weld	63
2½ to 3, lap weld.....	66
3½ 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
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(*Gross Tons*)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Youngs., Birm., Sparrows Point..$34.00
Duluth (billets) 36.00
Detroit, delivered 36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young., Buffalo, Birm.. 40.00
Duluth 42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago. 34.00
Detroit, delivered 36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅜-inch incl. (per 100 lbs.) $2.00
Do., over ⅜ to 41/64-in. incl. 2.15
Worcester up $0.10, Galveston up $0.25 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
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

Kearny, N. J., ovens 12.15
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. 12.25
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.... 15.00c
Toluol, two degree 28.00c
Solvent naphtha 27.00c
Industrial xylol 27.00c

Per lb. f.o.b. works

Phenol (car lots, returnable drums) 12.50c
Do less than car lots.. 13.25c
Do tank cars 11.50c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers 8.00c

Per ton, bulk, f.o.b. port

Sulphate of ammonia $29.00

Pig Iron

No. 2 foundry is 1.75-2.25 sil.; 50c diff. for each 0.25 sil. above 2.25 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$25.00	$25.50	$24.50	$26.00
Birmingham, Ala.§	20.38	.....	19.38	25.00
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	.....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.00	25.50	24.50	26.00
Granite City, Ill.	24.00	24.00	23.50	24.50
Hamilton, O.	24.00	24.00	23.50	.....
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	.....	.....	.....
Sharpsville, Pa.	24.00–24.50	24.00–24.50	23.50–24.50	24.50–25.00
Sparrow's Point, Md.	25.00	.....	24.50	.....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	24.00–24.50	24.00–24.50	23.50–24.50	24.50–25.00

§Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	25.39	25.39	24.89	25.89
Baltimore from Birmingham†	25.61	.....	25.11	.....
Boston from Birmingham†	25.12	.....	.....	.....
Boston from Everett, Mass.	25.50	26.00	25.00	26.50
Boston from Buffalo	25.50	26.00	25.00	26.50
Brooklyn, N. Y., from Bethlehem	27.50	28.00	.....	.....
Canton, O. from Cleveland	25.39	25.39	24.89	25.89
Chicago from Birmingham	†24.22	.....	.....	.....
Cincinnati from Hamilton, O.	24.44	25.11	24.61	.....
Cincinnati from Birmingham†	24.06	.....	23.06	.....
Cleveland from Birmingham†	24.12	.....	23.12	.....
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	.....
Milwaukee from Chicago	25.10	25.10	24.60	25.60
Muskegon, Mich., from Chicago, Toledo or Detroit	27.19	27.19	.....	.....
Newark, N. J., from Birmingham†	26.15	.....	.....	.....
Newark, N. J., from Bethlehem	26.53	27.03	.....	.....
Philadelphia from Birmingham†	25.46	.....	24.96	.....
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	.....

Pittsburgh dist.: Add to Neville Island base, North and South Sides, 69c; McKees Rocks, 55c; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, 84c; Monessen, Monongahela City, $1.07; Oakmont, Verona, $1.11; Brackenridge, $1.24.

	No. 2 Fdry.	Malleable	Basic	Bessemer
Saginaw, Mich., from Detroit	26.31	26.31	25.81	26.81
St. Louis, northern	24.50	24.50	24.00	.....
St. Louis from Birmingham	†24.50	.....	23.62	.....
St. Paul from Duluth	26.63	26.63	.....	27.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$23.50	Lake Superior fur.	$28.00
Pitts. dist. fur.	23.50	do., del. Chicago	31.34
		Lyles, Tenn., high phos.	28.50

Silvery

Jackson county, O., base, 6.00 to 6.50 per cent $29.50. Add 50 cents for each additional 0.25 per cent of silicon. Buffalo base $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

Manganese differentials in silvery iron and ferrosilicon not to exceed 50 cents per 0.50 per cent manganese in excess of 1 per cent.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00

Second Quality

Pa., Ill., Ky., Md., Mo.	46.55
Georgia, Alabama	38.00
New Jersey	49.00

Ohio

First quality	43.00
Intermediate	36.10
Second quality	36.00

Malleable Bung Brick

All bases	$59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	58.90
Birmingham, Ala.	51.30

Ladle Brick
(Pa., O., W. Va., Mo.)

Dry press	$31.00
Wire cut	29.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Washed gravel, duty pd., tide, net ton	nominal
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$25.00
Do., barge	25.00
No. 2 lump	25.00

Ferroalloy Prices

Ferromanganese, 78-82%.

Carlots, duty pd., seab'd	$120.00
Carlots, del. Pittsburgh	125.33
Carlots, f.o.b. So. P'ces.	140.00

Add $10 for ton, $13.50 for less ton, $18 for less than 200-lb. lots.

Spiegeleisen, 19-21%, gross ton, Palmerton $36.00

Manganese Briquets, Contract carloads, bulk freight allowed, per lb.

Packed	5.75c
Ton lots	6.00c
Less-ton lots	6.25c
Less 200-lb. lots	6.50c

Spot ¼c higher.

Manganese Electro, 99.9+%, less car lots 42.00c

Chromium Metal, per lb. contained chromium

	Contract	Spot
98% Cr. ton lots	80.00c	85.00c
88% Cr. ton lots	79.00c	84.00c

Ferrocolumbium, 50-60% f.o.b. Niagara Falls, per lb. contained Cb on contract $2.25

Less-ton lots	2.30

(Spot 10c higher)

Chromium Briquets, per lb., freight allowed

	Contract	Spot
Carlots	8.25c	8.50c
Packed	8.50c	8.75c
Ton lots	8.75c	9.00c
Less-ton lots	9.00c	9.25c
Less 200 lbs.	9.25c	9.50c

Ferrochrome, 66-70%, freight allowed, 4-6% carbon, per pound contained (chrome)

Carloads	13.00c
Ton lots	13.75c
Less-ton lots	14.00c
Less than 200-lb. lots	14.25c

67-72%, low carbon, cts. per pound:

	Car loads	Ton lots	Less ton	Less 200 lbs.
2% C.	19.50	20.25	20.75	21.00
1% C.	20.50	21.25	21.75	22.00
0.20% C.	21.50	22.25	22.75	23.00
0.10% C.	22.50	23.25	23.75	24.00

Spot is ¼c higher,

Ferromolybdenum, 55-75%, per lb. contained molybdenum, f.o.b. furnace 95.00c

Calcium Molybdate (Molyte), 40-45% Mo., per lb. contracts, f.o.b. producers plant 80.00c

Molybdic Oxide Briquets, 48-52% Mo. per lb. contained, f.o.b. producers plant 90.00c

Molybdenum Oxide, (In 5 and 20 lb. mo. contained cans) 53-63 mo. per lb. contained f.o.b. producers' plants 80.00c

Molybdenum Powder, 99%, f.o.b. York, Pa., per lb. in 200-lb. kegs $2.60

Do., 100-200 lb. lots	2.75
Do., under 100-lb. lots	3.00

Ferrophosphorus, 17-19%, gross ton carloads, f.o.b. sellers' works, $3 unitage, freight equalized with Rockdale, Tenn. for 18% phos.

Contract	$58.50
Spot	62.25

23-26%, $3 unitage, freight equalized with Mt. Pleasant, Tenn., for 24% phos.

Contract	75.00
Spot	80.00

Ferrosilicon, Gross tons, freight allowed, bulk

	Carloads	Ton lots
50%	$ 74.50	$87.00
Unitage	1.50	1.75
75%	135.00	151.00
Unitage	1.80	2.00
85%	170.00	188.00
Unitage	2.00	2.20
90-95%	10.25c	11.25c

(Above for contracts; spot ¼c higher)

Silicon Metal, Spot ¼-cent higher (Per Lb., Contracts): 1% Iron 2% Iron

Carlots	14.50c	13.00c
Ton lots	15.00c	13.50c
Less-ton lots	15.25c	13.75c
Less 200 lbs.	15.50c	14.00c

Silicon Briquets, Contract carloads, bulk freight allowed, per ton $74.50

Packed	80.50
Ton lots	84.50
Less-ton lots, per lb.	4.00c
Less 200-lb. lots	4.25c

Spot ¼c higher on less ton lots; $5 higher on ton lots and over.

Silicomanganese,

Carbon	1½%	2½%
Carloads (contract)	$128.00	$118.00
Ton Lots (contract)	140.50	130.50

Freight allowed spot $5 above contract

Ferrotungsten, (All prices nominal) Carlots, per lb. contained tungsten $1.90

Tungsten Metal Powder, (Prices Nominal) 98-99 per cent, per pound, depending upon quantity $2.60-$2.65

Ferrotitanium, 40-45%, f.o.b. Niagara Falls, per lb. contained in ton lots $1.23

Less ton lots	1.25

20-25%, C. 0.10 max., in ton lots per lb. contained Ti 1.35

Less-ton lots	1.40

(Spot 5c higher)

Ferro-Carbon-Titanium, 15-20% Titanium,

	6-8% C	3-5% C
Carlots, contract, f.o.b. Niagara Falls, freight allowed to destinations east of Mississippi and north of Baltimore and St. Louis	$142.50	$157.50

Ferrovanadium, 35-40%, contract per pound contained vanadium $2.70-$2.80-$2.90

(Spot 10c higher)

Vanadium Pentoxide, Per lb. contained, contracts 1.10

Do., spot	1.15

Zirconium Alloy, 12-15%, carloads, contract, bulk $102.50

Packed	107.50
Ton lots	108.00
Less ton lots	112.50

Spot $5 a ton higher

35-40%, contract, carloads, bulk or package, per lb. alloy 14.00c

Do., ton lots	15.00c
Do., less-ton lots	16.00c

Spot is ¼-cent higher

Alsifer, Per lb., f.o.b. Niagara Falls.

	Contract	Spot
Carlots	7.50c	8.00c
Ton lots	8.00c	8.50c

Simanal, Per lb. of alloy, contracts, freight allowed (approx. 20% Si, 20% Mn, 20% Al)

Carlots	Ton Lots	Less Ton Lots
10.50c	11.00c	11.50c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials. As of April 16, 1941

As Kansas City, Mo., Chattanooga, Tenn., Tulsa, Okla., and Portland, Oreg., were not named in the order fixing ceiling prices they have been omitted below.

	Soft Bars	Hot-rolled Strip Bands	Hot-rolled Strip Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets Hot Rolled	Sheets Cold Rolled	Sheets Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars Carbon	Cold Drawn Bars S.A.E. 2300	Cold Drawn Bars S.A.E. 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.48	5.11	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.95	4.45	3.55	3.55	5.25	3.55	4.05	4.65	3.31	4.06	8.56	7.16
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	....	5.05	....	4.05	....	....
Norfolk, Va.	4.00	4.10	....	4.05	4.05	5.45	3.85	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.25	4.30	4.75	3.52	3.75	8.40	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.65	....	3.65	8.40	6.75
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.62	3.20	3.75	8.40	6.75
Detroit	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.30	4.84	3.40	3.80	8.70	7.05
Omaha	4.10	4.20	4.20	4.15	4.15	5.75	3.85	5.32	5.50	....	4.42	....	....
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.00	4.92	3.47	4.00	8.75	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.25	4.10	4.85	3.50	3.75	8.40	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.50	4.35	5.00	3.83	4.34	9.09	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.38	4.23	4.98	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
Indianapolis	3.60	3.75	3.75	3.70	3.70	5.30	3.45	....	5.01	....	3.97	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	....
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	....	5.25	5.00	4.60	....	....
Houston, Tex.	3.75	4.30	4.30	4.05	4.05	5.50	4.00	....	5.25	....	6.90	....	....
Seattle	4.35	4.35	....	4.35	4.35	6.10	4.35	6.35	5.60	....	5.75	....	....
Los Angeles	4.50	5.00	6.80	4.50	4.50	6.75	4.65	6.50	5.85	....	6.60	10.55	9.55
San Francisco	4.10	4.60	6.35	4.25	4.25	5.95	4.25	6.40	6.00	....	6.80	10.80	9.80

	S.A.E. Hot-rolled Bars (Unannealed) 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	....
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	6.02	5.77	7.87
Seattle	6.25	....	8.75	9.85	8.65
Los Angeles	4.80	9.55	8.55	8.40	9.05
San Francisco	5.60	9.80	8.80	8.65	9.05

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland; 300-9999 Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in B'ham., Memphis.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, 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, New Orleans; 300-1999 Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-4999 in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 3500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; 25 to 49 bundles in Philadelphia; 750-4999 in San Francisco.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

EUROPEAN IRON, STEEL PRICES

Dollars at $4.02½ per Pound Sterling

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	BRITISH Gross Tons f.o.b. U.K. Ports	£	s	d
Merchant bars, 3-inch and over	$66.50	16	10	0
Merchant bars, small, under 3-inch, re-rolled	3.60c	20	0	0
Structural shapes	2.95c	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
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	$25.79	6	8	0(a)
Basic pig iron	24.28	6	0	6(a)
Furnace coke, f.o.t. ovens	7.40	1	16	9
Billets, basic soft, 100-ton lots and over	49.37	12	5	0
Standard rails, 60 lbs. per yard, 500-ton lots & over	2.61c	14	10	6
Merchant bars, rounds and squares, under 3-inch	3.17c	17	12	0††
Shapes	2.77c	15	8	0††
Ship plates	2.91c	16	3	0††
Boiler plates	3.06c	17	0	6††
Sheets, black, 24 gage, 4-ton lots and over	4.10c	22	15	0
Sheets, galvanized 24 gage, corrugated, 4-ton lots & over	4.70c	26	2	6
Plain wire, mild drawn, catch weight coils, 2-ton lots and over	4.28c	23	15	0
Bands and strips, hot-rolled	3.50c	18	7	0

(a) del. Middlesbrough 5s rebate to approved customers. ††Rebate 15s on certain conditions.

Ores

Lake Superior Iron Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents. unit; del. E. Pa.

Foundry and basic 56-63%, contract	12.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Chinese wolframite, net ton, duty pd.	$24.00
Brazil iron ore, 68-69% ord.	7.50c
Low phos. (.02 max.) F.O.B. Rio Janeiro.	8.00c
Scheelite, imp.	23.50-24.00

Chrome Ore

Gross ton c.i.f. Baltimore; dry basis; subject to penalties for guarantees

Indian and African, 2.8:1 lump, 48%	$39.00
South African (excluding war risk) No ratio lump, 44%	28.00
Do. 45%	29.00
Do. 48%	34.00
Do. concentrates, 48%	33.00
Do. 50%	34.00
Brazilian 2.5:1 lump, 44%	31.00
2.8:1 lump, 44%	32.50
3:1 lump, 48%	41.00
No ratio lump, 48%	35.00-35.50
Do. concentrate, 48%	33.00-33.50
Philippine No ratio lump, 45%	32.00
2.8:1 lump, 48%	40.00
Do., concentrate, 48%	39.00
2.5:1 concentrate, 48%	36.50
No ratio concentrate, 48%	34.00
No ratio lump, 48%	35.00
Rhodesian	nominal

Manganese Ore

Including war risk but not duty, cents per unit cargo lots

Caucasian, 50-52%	
S. African, 50%	65.00
Indian, 50%	68.00-70.00
Brazilian, 46%	65.00
Chilean, 47%	68.00-70.00
Cuban, 50-51%, duty free	81.00-83.00

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.

PRICES FOR OTHER THAN RAILROAD SCRAP

				ELECTRIC FURNACE AND FOUNDRY GRADES										
				Low Phos. Grades					Cut Auto Scrap					
	OPEN HEARTH GRADES*	Machine Shop Turnings	BLAST FURNACE GRADES*	Billet, Bloom Forge Crops	Bar Crops and smaller; Punchings, Plate	Heavy Structural, Plate 3 ft. and less	Heavy Structural, Plate 2 ft. and less	Heavy Structural, Plate 1 ft. and less	3 ft. and less	2 ft. and less	1 ft. and less	Alloy-Free Low Phos. & Sulphur Turnings	First Cut Heavy Axle & Forge Turnings	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren	$20.00	$16.00	$16.00	$25.00	$22.50	$21.00	$21.50	$22.00	$20.00	$20.50	$21.00	$18.00	$19.50	$21.00
Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville	18.75	14.75	14.75	23.75	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Bethlehem	18.25	14.25	14.25	23.25	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Buffalo	19.25	15.25	15.25	24.25	21.75	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	19.50	15.50	15.50	24.50	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Detroit	17.85	13.85	13.85	22.85	20.35	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85
Toledo	.....	13.85	13.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chicago	18.75	14.75	14.75	23.75	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Kokomo	18.25	14.25	14.25	23.25	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Duluth	18.00	14.00	14.00	23.00	20.50	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00
St. Louis	17.50	13.50	13.50	22.50	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif.	17.00	13.00	13.00	22.00	19.50	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	12.50	12.50	21.50	19.00	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50
Seattle	14.50	10.50	10.50	19.50	17.00	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50
Portland, Oreg.	.....	.....	.....	.....	15.50	14.00	14.50	15.00	13.00	13.50	14.00	11.00	12.50	14.00

RAILROAD SCRAP

	Heavy Melting Steel	Scrap Rails	Rails for Rolling	Scrap Rails 3 ft. and under	Scrap Rails 2 ft. and under	Scrap Rails 18 in. and under
Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton	21.00	22.00	23.50	24.00	24.25	24.50
Philadelphia, Wilmington, Sparrows Point	19.75	20.75	22.25	22.75	23.00	23.25
Cleveland, Cincinnati, Middletown, Ashland, Portsmouth	20.50	21.50	23.00	23.50	23.75	24.00
Chicago	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Kokomo	19.25	20.25	21.75	22.25	22.50	22.75
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00
Birmingham	18.00	19.00	20.50	21.00	21.25	21.50
Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Seattle	15.50	16.50	18.00	18.50	18.75	19.00

CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

	Group A	Group B	Group C
No. 1 Cupola Cast	$18.00	$19.00	$20.00
No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under	18.00	19.00	20.00
Clean Auto Cast	18.00	19.00	20.00
Stove Plate	14.00	15.00	16.00
Heavy Breakable Cast	16.50	17.50	18.50
Charging Box Size Cast	17.25	18.25	19.25

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes all states not named in groups A and B.

*Open Hearth Grades refer to No. 1 heavy melting steel, No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 busheling. Blast Furnace Grades refer to mixed borings and turnings, shoveling turnings, No. 2 busheling and cast iron borings. Add $3 for chemical borings, $5 when chemical borings used in manufacture of explosives.

A basing point includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Pa. Cincinnati basing point includes the switching district of Newport, Ky. St. Louis basing point includes the switching districts of Granite City, East St. Louis and Madison, Ill. San Francisco basing point includes the switching districts of South San Francisco, Niles and Oakland, Calif.

Inferior Grades: Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

Commissions: No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. No commission is payable to a person for scrap which he prepares. No person who has not acted as a broker prior to April 3, 1941, is allowed a brokerage commission.

Maximum Shipping Point Price: Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.27 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.50 per ton.

Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 the prices listed in the table for the nearest basing point. Certain exceptions specified in OPA Price Schedule No. 4 (Amendment 11) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan.

Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are $2.50 less than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap."

Remote Scrap: Consists of all grades, except railroad scrap, located in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon and Utah. Delivered price may exceed by not more than $5 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $5 the nearest basing point price.

Sheets, Strip

Sheet & Strip Prices, Page 104

Demand is well in excess of supply of all finishes of sheets and while some mills were in better position for a time after curtailment in automobile and household equipment production the lag has been absorbed and supply is as tight as before.

One effect of the shift from normal to war conditions is the increasing proportion of heavier gages, mainly for armament work. Most sheets used for automobile and household accessories were of light gages.

Inquiries for hot-rolled black pickled sheets for 1943 automobile license plates for the New England states, usually about 2000 tons, will not be issued this year, most of the states to use a small insert to be applied to 1942 plates. Government shops in New England are in the market frequently for tonnages carrying high ratings. Several shops have quoted on 40,000 ammunition boxes for the Navy.

In narrow cold-rolled strip bookings are slightly under shipments in the experience of some producers, decline of nonrated civilian tonnage offsetting new defense orders. The latter makes up most of new business and is increasing steadily. Most cancellations because of curtailed nondefense volume involve low carbon steel and this is diverted readily to other channels. Restrictions on alloys and specialties, except in the higher ratings, adds to confusion, however. Stainless, straight chromium and special analysis types are backing up with some producers. Electroplaters are confronted with sharp restrictions in coating regulations. Hot-strip replacements are confined mainly to high ratings. Allocations have been made to several mills of 13,000 tons of high-carbon spring steel for machine gun clips under lend-lease for shipment by April 1.

The whole trend of sheet bookings is sharply toward the higher priority brackets. Most producers now have little capacity available this month for anything under A-3 and some have little for A-3. Producers are endeavoring to build up as much of this high priority business as possible, not only because of its importance in the war effort, but so as to assure themselves of sufficient raw material and semifinished steel to keep their finishing department operating at as high a rate as possible.

Where their finished steel tonnage does not run high, their chances for obtaining an adequate supply of pig iron and scrap are lessened. Further, they may be called upon to supply a larger portion of their semifinished to outside mills than otherwise would be the case. Specially heavy demand continues for drum stock.

Tin Plate

Tin Plate Prices, Page 104

Tin mills continue to operate at about 92 per cent of capacity with

sufficient orders on books to maintain this rate indefinitely. The industry has been ordered by WPB to reduce tin coatings to 1¼ pounds of tin per base box of tin plate. Producers already had reduced from 1¼ pounds to 1.35 pounds per box. The new order also provides that no tin plate, terne plate or long ternes shall be used in manufacture of any product, including tin cans, except as permitted by WPB under a schedule of quotas to be announced later. It also provides that long ternes shall not be used for roofing except on orders with preference rating of A-10 or better.

Bonderized black plate for can ends to replace tin plate soon will become a standard product, listed in tin plate extra books as such. Most tin plate producers are expected to adopt this plan. Can bodies probably will continue to be of tin, at least until means of soldering untinned sheets has been solved. A bonderizing unit can produce 300,000 to 500,000 base boxes per year, tests show. Inland Steel Co. has made the only announcement of such an installation. Steel Corp. subsidiaries are preparing to add bonderizing lines and electrolytic tin plate units. Pending study of costs extras on bonderized plate have not been published.

Plates

Plate Prices, Page 104

Little plate tonnage is going to fabricators with ratings below A-1-c and the tightest situation is met in attempts to cover on small lots to fill in, even with top priorities.

Automatic welding and earlier launchings, enabling shipyards to increase volume of fabrication and speed of fitting out after launching, are streamlining shipbuilding construction, reflected in heavier plate allocations. Standardization of design also allows better concentration of orders as to size and widths. Shipyard schedules are also dependent on machinery and equipment deliveries. Shops supplying these, also large consumers of plate, are maintaining deliveries on boilers, propulsion gears, shafting and other fabricated parts at a satisfactory rate.

Former complaints that shipyard plate deliveries were in excess of immediate needs and that inventories were being built have disappeared and actual daily fabrication under improved methods is consuming plates close to deliveries. In addition to hull steel, inquiry is heavy for marine boiler plates.

Plate mills find schedules must be revised from week to week to accommodate more urgent orders, at the same time seeking to avoid loss of tonnage from frequent changes. Continuous sheet mills are increasingly supplying light plates, this relieving plate mills for heavier products. Mills are filling in a WPB questionnaire to afford an accurate appraisal of what thicknesses and widths various mills can supply, to facilitate allocation of tonnage.

Some plate producers are unable to supply sufficient tonnage of slabs to meet plate requirements and semifinished is being allocated for their use. An eastern mill is receiving slabs from six other companies to support its plate program.

Bars

Bar Prices, Page 105

Expanding demand for bars for the enlarged shell program is absorbing a large part of production of large rounds. Seamless tube mills are expected to be especially hard hit as a result, notwithstanding scheduled curtailment in demand for oil country goods this year. With some bar producers, however, flats are scarcer than rounds. Warehouses find increasing difficulty in obtaining bars. Specifications for alloy bars are high and entirely for war purposes. Forging shops are operating at capacity, with heavy backlogs.

An important bar purchase involves 3756 tons of grade V nickel steel bars for forged chain fabrication at a navy yard.

New England forge shops have fair inventories, except for certain bar sizes, and are specifying liberally against forward contracts. Small arms plants are maintaining substantial orders with mills and taking monthly deliveries in large volume. Subcontracting tends to broaden demand for bars, both carbon and alloy, and producers of bolt and nut specialties are buying heavily. Sellers quoting on government inquiries frequently are subjected to terms involving larger tonnage than the original inquiry.

Railroad equipment builders are pressing sellers of bars and shapes for deliveries and, to some degree, sellers of sheets. They claim the plate situation, which has been the principal bottleneck, is now improving, owing to a greater amount of strip mill plate, and to such an extent that supplies of these other products have been thrown out of balance.

Cold-drawn bar producers, who are now receiving tonnage from hot mills on an allocation basis, report sharply increasing demand from two sources in particular, airplane motor manufacturers and manufacturers of armor plate piercing ammunition, requiring mostly 1 9/16-inch hot rounds.

Pipe

Pipe Prices, Page 105

Under heavy demand pipe stocks are somewhat depleted, with inventories showing more broken sizes. Distributors are filling requirements promptly for industrial installations in most instances. Plumbing supply buying is somewhat less active, except for war purposes.

Tubing requirements are heavy and most are covered by high ratings, alloy tubing being available only at top priority. Considerable defense subcontracting is offered, for which tubing is required, tapered, perforated and complex specifications relatively few shops are able to take on.

Distribution of alloy chromium steel tubing for the aircraft industry is now under supervision of air corps procurement, Wright Field, Dayton, O., under regulations which in effect amount to allocation. Prospective purchasers make out requisitions for each size in triplicate, forward them to Dayton, and if approved, the consumer is advised where the material may be procured, this applying to both warehouse and mill orders.

Municipal demand for cast iron pipe is below normal for this period and while annual contracts are being placed, specifications against them are expected to be confined to maintenance, unless connected with defense.

Four eastern foundries share in a 10,000-ton contract for cement-lined cast pipe, 24-inch and under, for New York city, 3000 tons of fittings being distributed among additional foundries and jobbers. This pipe is for immediate installation and will not go into stock. Washington, through a contractor, is taking bids on 2330 tons of 36-inch, with alternates on steel and concrete pipe.

CAST PIPE PLACED

10,000 tons, 24-inch and under, cement-lined, New York city, for immediate installation, divided between four foundries; also 3000 tons of fittings.

400 tons, 12-inch, Connecticut, to Warren Pipe Co., Everett, Mass.

250 tons, mostly 8-inch, Boston district, to Warren Pipe Co., Everett, Mass.

175 tons, 2 to 8-inch, for Bremerton, Wash., to United States Pipe & Foundry Co., Burlington, N. J., and Pacific States Cast Iron Pipe Co., Provo, Utah.

125 tons, 6 and 8-inch, Springfield, Mass., to Warren Pipe Co., Everett, Mass.

120 tons, 8-inch Newport, R. I., to Warren Pipe Co., Everett, Mass.

CAST PIPE PENDING

2330 tons, 36-inch, Washington, through contractor, with alternates on steel and concrete.

1000 tons or more, alternates asked, for cantonment; bids to U. S. Engineer, Portland, Oreg., Feb. 9.

275 tons, two Seattle improvements; bids Feb. 5.

115 tons, 8-inch, cement-lined, Panama schedule 5958; bids Feb. 13.

100 tons, West Seattle housing project; J. C. Bosepflug Construction Co., Seattle, low.

Unstated tonnage, 11,350 feet cast iron pipe and fittings, bids for alternates, Port Townsend, Wash.; bids to N. M. Hawkins, city clerk, Feb. 11.

Wire

Wire Prices, Page 105

Wire mill production schedules are confused by growing restrictions on alloys entering into specialties and finishing departments are subject to delays from lack of rods. Lend-lease tonnage is also

affecting production by reducing supply of semifinished.

Wire products fabricators without rated orders are unable to obtain further supply and much offered tonnage is being refused, bookings entered for early production being in the A classifications, with B ratings increasingly eliminated.

Wire rope mills are heavy consumers and generally their requirements are being well covered. Tapering of demand for spring wire has eased pressure from the upholstery trade but highly specialized wires for springs used in scores of military products have caused choke points in processing departments.

Rails, Cars

Track Material Prices, Page 105

Due to substantial last-minute buying, domestic freight car business in January amounted to 4253 cars. All but 213 cars were placed during the final week. The total, however, was less than half of the preceding month, when 8406 cars were awarded and down sharply from the 15,169 in the corresponding period of 1941. Further comparisons follow:

	1942	1941	1940	1939
Jan.	4,253	15,169	360	3
Feb.	.....	5,508	1,147	2,259
March	.....	8,074	3,104	800
April	.....	14,645	2,077	3,095
May	.....	18,630	2,010	2,051
June	.....	32,749	7,475	1,324
July	.....	6,459	5,846	110
Aug.	.....	2,668	7,525	2,814
Sept.	.....	4,470	9,735	23,000
Oct.	.....	2,499	12,195	19,634
Nov.	.....	2,222	8,234	2,650
Dec.	.....	8,406	7,181	35
Total	.....	121,499	66,889	57,775

February started off briskly with the placing of 1000 fifty-ton box cars by the Norfolk & Western with the Ralston Steel Car Co., Columbus, O., and with two sizable inquiries being figured, 3500 for the Southern and 2000 for the Baltimore & Ohio.

Pending inquiries include 250 seventy-ton flat cars for the Pere Marquette and 25 30-ton steel caboose cars for the New York, Chicago & St. Louis.

The Southern has closed on two 5400-horsepower diesel-electric freight locomotives to Electro-Motive Corp., La Grange, Ill.; Wabash, one 1000-horsepower diesel-electric switch engine to Baldwin Locomotive Works, Eddystone, Pa.; Remington Arms Co., one 45-ton diesel-electric switch engine, to General Electric Co., Schenectady, N. Y.; and one diesel-electric switch engine, to H. K. Porter Co., Pittsburgh.

Central of New Jersey has placed 5000 tons of 130-pound rail with Bethlehem Steel Co., Bethlehem, Pa.

CAR ORDERS PLACED

Chicago & North Western, 250 fifty-ton flat cars, to Pullman-Standard Car Mfg. Co., Chicago; in addition to 1500 cars recently distributed among three builders.

Navy, 290 freight cars, 91 box cars going to Greenville Steel Co., Greenville, Pa., 101 steel-sheathed box cars and 61 flat cars to Haffner-Thrall Car Co., Chicago; 15 flat cars to American Car & Foundry Co., New York, and 10 steel-sheathed box cars to General American Transportation Co., Chicago.

New York, Chicago & St. Louis, 25 thirty-ton steel caboose cars, to Magor Car Corp., Passaic, N. J.

Norfolk & Western, 1000 forty-foot box cars, to Ralston Steel Car Co., Columbus, O.

St. Louis San Francisco, steel underframes and assembled car sides for 70 fifty-ton box cars and 30 underframes and sides for other types, to American Car & Foundry Co., New York.

War Department, 270 flat cars to American Car & Foundry Co., New York, and 80 flat cars to Gregg Co. Ltd., New York.

CAR ORDERS PENDING

Pere Marquette, 250 seventy-ton flat cars, pending.

LOCOMOTIVES PLACED

Navy, one diesel-electric switch engine, to H. K. Porter Co., Pittsburgh, and two diesel-electric switch engines, to General Electric Co., Schenectady, N. Y.

Remington Arms Co., one 45-ton diesel-electric switch engine, to General Electric Co., Schenectady, N. Y.

Southern, two 5400-horsepower diesel-electric freight locomotives, to Electro-Motive Corp., La Grange, Ill.

Wabash, one 1000-horsepower diesel-electric switch engine, to Baldwin Locomotive Works, Eddystone, Pa.

LOCOMOTIVES PENDING

Navy, bureau of supplies and accounts,

four 1000-horsepower, 115-ton diesel electric, schedule 900-7577, deliveries Hingham, Mass.; White Plains, Md.; Burns City, Ind., and Thorne, Nev.; bids Feb. 6.

Navy, bureau of supplies and accounts, twelve 45-ton diesel electric, schedule 900-7578, delivery east and west yards; bids Feb. 6.

St. Louis San Francisco, two 660-horsepower and eight 1000-horsepower diesel-electric switchers; bids asked.

St. Louis Southwestern, five 4-8-4 steam locomotives; bids asked.

RAIL ORDERS PLACED

Central Railroad of New Jersey, 5000 tons, 130-pound rail, to Bethlehem Steel Co., Bethlehem, Pa.

BUSES BOOKED

A.c.f. Motors Co., New York, has booked 26 coaches: 10 for United Electric Railways Co., Providence, R. I.; 10 for Conestoga Transportation Co., Lancaster, Pa.; three for Fort Worth Transit Co., Fort Worth, Tex.; one for A. B. & W. Transit Co., Alexandria, Va.; and two air-conditioned motor coaches for the Santa Fe Trail Transportation Co., Chicago.

Structural Shapes

Structural Shape Prices, Page 105

While the expected increase in demand for structural steel for war plants has not developed to the extent looked for, it is gaining, and numerous tonnages have been awarded for additions to existing plants and some new projects are emerging. Mills also are being called on for considerable tonnage in small sections, for freight car builders, whose needs now are receiving special attention.

SHAPE CONTRACTS PLACED

26,000 tons, bomber plant, to Bethlehem Steel Co., Bethlehem, Pa.

3300 tons, shipfitters' bay, navy yard, to Columbia Steel Co., Seattle; Bailey Construction Co., Seattle, contractor.

6000 tons, additional shipbuilding facilities, to American Bridge Co., Pittsburgh; Walter Kidde Constructors Inc., New York, contractor.

3000 tons, munitions plant, to Bethlehem Steel Co., Bethlehem, Pa.; Frazier-Brace Engineering Co., Wilmington, Del., contractor.

1700 tons, war department arsenal, to Gage Structural Steel Co., Chicago; Sanderson & Porter Co., contractor.

615 tons, coaster gates, specification 1010, Odair, Wash., for Department of Interior, to American Bridge Co., Pittsburgh.

425 tons, shop building, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., to Bethlehem Steel Co., Bethlehem, Pa.; Turner Construction Co., New York, contractor.

400 tons, buildings, Basic Magnesium Corp., Las Vegas, Nev., to unstated fabricator; bids Dec. 18.

265 tons, reconstruction, Willis avenue bridge, Bronx, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; Millwood Construction Co., New York.

200 tons, bus structures, Coulee power project, to Charles E. Schuler Engineering Co., Newark, O., low at $24,495, by Bureau of Reclamation.

SHAPE CONTRACTS PENDING

3500 tons, aircraft plant building.

3496 tons, two warehouses and a shed for army; James J. Barnes, Santa Monica, Calif., contractor on warehouses with 2666 tons; James Leck & Al Johnson Construction Co., Minneapolis, contractor on shed with 830 tons; bids Jan. 23.

500 tons, bridge and runway, Dahlgren, Va.

172 tons, galvanized bus structure, specification 1603D, Odair, Wash.; Charles E. Schuler Engineering Co., contractor.

100 tons, Panama, schedule 5855; Central Steel Construction Co., Buffalo, low.

Unstated tonnage, several roof trusses, Tacoma, Wash., lighting department; bids Feb. 4.

Unstated, two hangars, 210 x 320 feet, shop unit, 300 x 342 feet and other structures, army air depot; bids to U. S. Engineer, Seattle, Feb. 23.

SHAPE AWARDS COMPARED

	Tons
Week ended Feb. 7	41,905
Week ended Jan. 31	13,055
Week ended Jan. 24	19,808
This week, 1941	31,960
Weekly average, 1942	25,809
Weekly average, 1941	27,373
Weekly average, Jan., 1942	21,786
Total, 1941	232,651
Total, 1942	129,048

Includes awards of 100 tons or more.

Reinforcing Bars

Reinforcing Bar Prices, Page 105

For reasonably prompt delivery reinforcing steel must carry ratings of A-1 or A-2, tonnages placed below these classifications being subject to delay. Mill output is limited by supply of semifinished steel. Warehouse stocks for prompt delivery are small and assortments are broken. Smaller diameters, notably ⅜ and ½-inch, are especially tight.

Demand continues heavy, practically all being for defense plants. Numerous additional plants are under consideration which promise to require important tonnages. Civilian projects have little chance of consideration in view of pressure for high-rated orders.

REINFORCING STEEL AWARDS

500 tons, test building, Lincoln Motor Co., Detroit, to Republic Steel Corp., Cleveland, through Truscon Steel Co., Youngstown, O.

300 tons, steel mill extension, Ford Motor Co., River Rouge, Mich., to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, shipfitters' bay, navy yard, to Seattle Steel Co., Seattle; Bailey Construction Co., Seattle, contractor.

150 tons, factory, Keokuk Electro Metals Co., Keokuk, Iowa, to Carnegie-Illinois Steel Corp., Chicago; Cameron & Joyce Co., Keokuk, Iowa, contractor; bids Jan. 9.

150 tons, contract 8, Long Island railroad improvement, New York, to Jones & Laughlin Steel Corp., Pittsburgh; Tully & DeNapoli Co., New York, contractor.

100 tons, buildings for torpedo station, to Bethlehem Steel Co., Bethlehem, Pa.; Wick & Dahlgren, Seattle, contractors.

100 tons, addition, storage and distributing plant, A. & P. Food Stores Inc., Syracuse, N. Y., to Truscon Steel Co., Youngstown, O.; Dawson Bros. Construction Co. Inc., Syracuse, contractor.

REINFORCING STEEL PENDING

1255 tons, invitation B33075A, Coram, Calif., Bureau of Reclamation; bids to Denver Feb. 6.

625 tons, State street subway, Contract S-8B, Chicago, for city; Thomas McQueen Co., Chicago, low on general contract; bids Jan. 29.

385 tons, bridges 7 and 8, War Department building-road network, Arlington county, Va.; bids in to Public Roads Administration, Washington; also 125 tons for bridge No. 9, bids Feb. 11.

134 tons, high school, Sterling, Ill.; Paul Kornman, Sterling, Ill., low on general contract; bids Jan. 28.

115 tons, paving Fifteenth and Fourteenth streets, S. W., Washington; bids in.

Unstated tonnage, second Nisqually power project; bids to Tacoma, Wash., utility commission, soon.

CONCRETE BARS COMPARED

	Tons
Week ended Feb. 7	1,500
Week ended Jan. 31	13,891
Week ended Jan. 24	9,727
This week, 1941	13,771
Weekly average, 1942	9,415
Weekly average, 1941	13,609
Weekly average, Jan., 1942	11,394
Total, 1941	59,724
Total, 1942	47,075

Includes awards of 100 tons or more.

Pig Iron

Pig Iron Prices, Page 106

Pig iron output in some districts was lower in January than in December, several stacks being down for repairs. Merchant iron distribution in some areas lagged behind schedule, which resulted in reduction of some consumer inventories as of Jan. 31. This condition is expected to prevail until the number of stacks in blast is increased. The short supply has not resulted in distress in the case of most melters.

Except for a few larger consumers pig iron inventories are generally reduced to a 30-day basis. Allocations are based on inventories, some foundries this month getting iron against B ratings while others with larger reserves, but with higher ratings, were given little or none. Next month more melters who have been receiving a minimum of iron will be in the market for substantial tonnage, having depleted stocks. Shipments con-

tinue to be made to schedule, a vital consideration under low inventories.

Occasional threatened shortage develops but usually this is relieved by allocation from furnace reserves. Such shortages result from a squeeze in scrap, borrowing against the next month's allotment or inability of a producer to meet the tonnage scheduled.

As a rule sufficient iron is being shipped to supply all users with ratings but those without priority work receive less each month, until they obtain work that carries precedence. Stove foundries are operating irregularly, in proportion to business they are able to obtain for cooking and heating equipment for the armed forces.

Great Britain, which suspended shipments last fall on pig iron from this country, again is sounding out Washington as to available supplies with a view to resuming the movement. Low phosphorus is especially desired. Any arrangement, it is believed, will be on a short term basis.

Scrap

Scrap Prices, Page 108

Iron and steel scrap price schedule has been amended by OPA, effective Feb. 2. A new maximum price of $5 per ton higher than the maximum for cast iron borings is provided for borings for chemical use in explosives manufacture. Maximum shipping point price in New England is to be computed from prices at the most favorable basing point and the maximum transportation charge a consumer may pay for scrap from any New England shipping is $6.27 per gross ton.

In place of dock charges where vessel movement is involved in computing shipping charges the following prices are allowed: Fifty cents per gross ton at Memphis, Tenn.; $1 at Great Lakes ports; $1.25 at New England ports; 75 cents at all other ports, dock charges being eliminated.

Special provisions are allowed for consumer purchases of unprepared scrap originating at remote points lacking facilities for preparation. Truck delivery allowances are modified so that only public carriers may use established truck rates; where delivery is by a vehicle of the scrap seller the maximum transportation charges allowed are those based on the highest carload rate for rail shipment; less carload rates are not allowed, except that such transportation charges need not be less than $1.50 per gross ton.

Railroad scrap shipped from a dealer's yard is considered to lose its railroad origin and to be priced according to the other classifications, with special provision for long and short scrap rails and re-rolling rails. A warning is issued to railroads to file average price information on scrap originating from their lines within two weeks, under penalty of computing their prices under the other classifications. Some tightening has been done in definitions of grades. Mixed grade shipments are to be classed as unprepared scrap and priced accordingly, OPA warned, unless the consumer in his order has authorized shipment of mixed grades.

While supply of scrap continues far below requirements and numerous open hearths in condition to use are kept idle, some signs indicate a better movement. Both at St. Louis and Cincinnati the past fortnight has brought larger

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

supply. Some scrap is reaching these points from as far away as Texas and weather conditions are expected to favor movement from such distant areas. The St. Louis market is also getting larger shipments from Iowa, after interruption because of adverse differentials. The Cincinnati increase is largely from intensified drives in southwestern Ohio rural regions.

In connection with the new provision for $5 higher price on cast iron borings for chemical use in the manufacture of explosives clarification indicates this applies to borings with oil content of not more than ½ per cent. Relatively small production of commercial borings can meet that specification and dealers point out that inclusion of borings with higher oil content will be, in effect, upgrading.

Revision of the scrap schedule in effect increases steelworks grades and electric furnace scrap 70 cents per ton in New England, based on water shipments to Sparrows Point. Allowing for barge rates and handling charge the price will be $14.75, against $14.06 based on Johnstown, Pa., as heretofore. In Connecticut dealers may also benefit from the most favorable shipping point clause, applying rates to Conshohocken, Bethlehem or Phoenixville, Pa., by rail. However, New England consumers of heavy melting steel or others in Pennsylvania may equalize the rates at any water shipping point, precluding any price advantage to shippers by barge.

Relaying Rail Schedule Is Revised by OPA

Warehouse ceiling on relaying rails has been lowered from $32 per net ton to $32 per gross ton under a modification by OPA of price schedule 46, covering relaying rails, effective Feb. 7. A provision allows a charge for reconditioning extras asked by consumers, at a scale established by the schedule. Time for filing purchase and sales reports has been extended to 15 days after the transaction, instead of ten days. The term "relaying rail" is defined specifically.

Denver has been added to basing points, with a ceiling on relaying rail purchased on that base point revised so as not to be less than $24 per gross ton in any case. A purchaser's agent commission is allowed up to $1 per gross ton, but only when the agent is employed by the purchaser and the agent has no beneficial interest in the seller as employe or otherwise.

Pacific Coast

Seattle—The all-out war program is developing important projects, some veiled in military secrecy. One of the largest immediately pending is a cantonment, bids for which will be opened by United States engineer, Portland, Oreg., Feb. 9. While frame construction is specified, many steel items will be required, including more than 1000 tons of cast iron pipe or alternates. United States engineer, Portland, has called bids Feb. 23 for air depot buildings, including two steel hangars, each 320 x 210 feet, a shop unit 342 x 300 feet and other structures, tonnages unstated. Hangars will be 90 feet high with 275-foot span. Reports from Washington state that the proposed aluminum rolling mill will be greatly enlarged from original plans of 5000 tons a month to more than 10,000-ton capacity. Equipment has been ordered, it is reported, and plant construction bids will be asked soon. Sheets, castings, etc. will be produced for airplanes. Government is also reported to be planning a magnesium plant in Eastern Washington, using either the dolomite or Doerner process.

Bids will be invited soon for Tacoma's second Nisqually river power project, an $11,000,000 job. Items involved include bars, shapes, surge tanks, penstocks, gates, valves, hoists, etc.

Alaska gold mining interests claim they are facing a crisis as materials and replacements are not available under present priorities. This industry consists largely of

hydraulic mining, large dredges being involved.

Paul J. Raver, administrator, Bonneville Project, reports that Bonneville has committed itself to furnish 190,000 kw. for six new war industries.

At Marshfield, Oreg., a $500,000 chromite concentration plant is planned by Krome Corp., C. F. Corzelius, El Paso, Tex., and associates, with W. G. Hellier as resident manager. Ore properties on the Oregon beaches have been acquired and sales arrangements concluded with the government, it is reported.

Shipbuilding operations in the Portland area will soon employ 54,000 men, exceeding the 50,000 in logging and lumbering, heretofore the principal industry. Oregon Shipbuilding Corp. will increase force from 18,000 to 25,000, Willamette Iron & Steel Co. will add 3000, other local plants 2000 while the Kaiser Shipyards will have 20,000 on the payroll.

The Bonneville Project station at Longview, Wash., now under construction, will be enlarged from a $1,500,000 to a $4,261,000 project, in addition to $298,140 allocated for double circuit power line.

Bremerton, Wash., plans a major water system project and has awarded 175 tons 2 to 8-inch cast iron pipe to U. S. Pipe & Foundry Co. and Pacific States Cast Iron Pipe Co. Bids are in at Seattle for two system improvements involving 275 tons and award is pending for the West Seattle housing project, requiring 100 tons cast iron pipe.

Warehouse

Warehouse Prices, Page 107

On numerous steel products the blanket A-9 rating is of little benefit to warehouses in obtaining replenishments of material moved arbitrarily under higher priorities. Under heavy demand, with stocks broken and unbalanced, warehouses are able to fill only part of the inquiry. Consumers seeking material from distant points on high rating force sellers to absorb freight charges if the order is accepted.

New regulations are under consideration, including the possibility that certain warehouses may be designated as distributors of specified products for definite districts. Further control is expected on stainless steel and alloys, prohibiting jobber sales nickel alloys below A-1-h and A-1-j on chromium types, replacements to be confined to the same ratings.

Canada

Toronto, Ont.—In addition to heavy orders for all classes of steel on war account the Canadian government is steadily extending purchases in the United States. On most lines of production Canadian steel mills now are fully booked to the end of June and further commitments are being accepted only for the most urgent war needs with top priority rating. The government also has placed new restrictions on importers of certain types of steel plates, and before placing orders in the United States permission now must be obtained from F. B. Kilbourn, steel controller. For nonessential industry practically no steel is available and within the next few months it is expected most lines of civilian manufacture, where steel is chiefly used, will be discontinued for the duration. Shortage of steel continues to affect some of the more essential lines of production. In this respect Victor M. Drury, president of Canadian Car & Foundry Co., stated his company has been greatly delayed in production of railway cars, due to lack of steel. Similar experience is reported by other Canadian rolling stock builders. At the same time it is announced that both the Canadian National and Canadian Pacific railways are in the market for large quantities of new rolling stock urgently needed to handle expanding freight on war account. While there has been some improvement in shipbuilding activities, due to imports of steel from the United States, there is still a shortage in some plants and full time production is not possible.

Orders for plates continue heavy and Canadian mills are exceeding

their former rated capacity to provide supplies for shipbuilding.

Sheets are in steadily expanding demand and while mills are accepting new business practically all orders are directly associated with the war effort. Demands by the shipbuilding and automotive industry are more than sufficient to take all Canadian output, but supplies have to be found for other essential war needs and these are being obtained from across the line.

Merchant bar sales are heavy and from numerous sources. Mills are accepting some business, sending orders to the steel controller for approval before making shipment. War manufacturers with top priority ratings are given first consideration on shipments and others are receiving supplies whenever possible.

A new program of war plant construction appears to be getting under way here and is expected to be reflected in sharp gain in structural steel lettings soon. The proposed plant additions for Algoma Steel Corp., Sault Ste. Marie, Ont., will require upwards of 10,000 tons of steel and war plant enlargements at Windsor, Toronto and in the Montreal section of Quebec will add about 20,000 tons additional to orders pending. Awards for the past week rose to about 6000 tons.

Pig iron sales gained sharply in the past week or ten days, totaling close to 10,000 tons, against a former average of about 6000 tons per week. Basic iron sales have moved up to better than 1500 tons, malleable iron sales about 5000 tons and foundry iron close to 4000 tons for the week. Merchant pig iron orders still are under strict supervision of the steel controller.

Snow and severe cold weather slowed movement of iron and steel scrap from outside points and dealers had to depend on local sources to fill urgent orders. Mills and electric furnace operators are taking all steel grades offered, but find it necessary to draw heavily on stocks. Iron scrap, particularly cast grades, is decidedly scarce and dealers state it is almost impossible to meet demands of all consumers.

Metallurgical Coke

Coke Prices, Page 105

Revisions to price schedule 29 on byproduct foundry coke have been announced by OPA, recognizing existing regional prices and permitting all producers to compete at these prices. Prices in general are the same as in effect Oct. 1. The revisions follow extensive industry consultations and were anticipated at the time schedule 29 was issued. The revision primarily defines the areas governed by specific oven prices to conform to established industry practices. Changes are effective Feb. 7. The so-called New England delivered price was amended to eliminate certain Maine and Vermont points where freight is over the prevailing $3.10 per ton. Swedeland, Pa., area is restored at the limit in use prior to Sept. 15. in the case of St. Louis, Mo., and East St. Louis, Ill., producers other than Missouri, Alabama and Tennessee may charge a maximum delivered price of $12.75. Coke shipped from Alabama may be sold at the following maximum prices in these districts: Chicago, $12.85; Detroit, $12.45; Indianapolis, $12.45; Cleveland, $12.40; Chattanooga, Tenn., $9.92; Bayonne, N. J., $16.96; Williamsburg, O., $11.95.

All beehive coke is moving at $6 per ton or less, in compliance with the ceiling price order. Most producers have indicated willingness to accept this price but there are some exceptions where costs are out of line and where more than $6 is necessary to maintain profitable operation.

Representatives of the latter are filing exceptions to ceiling price but meanwhile this coke is moving at $6, subject to adjustment if the exceptions are granted. If not granted some of these operations may cease production.

Refractories

Refractories Prices, Page 106

Manufacturers of basic refractory brick have agreed through OPA to maintain present prices on all grades of such brick for three

months, on the basis of prices in effect since Oct. 25. This follows action a fortnight ago by OPA fixing a ceiling price on basic refractory material. At that time it was announced prices would be fixed on basic brick, whether containing magnesium or not.

Ferroalloys

Ferroalloy Prices, Page 106

Power difficulties continue to restrict ferroalloy production. During the summer there was the drought in the South and certain sections of the North and this continued in a somewhat lessening degree throughout fall. Now in the North frozen rivers and slush and ice at Niagara Falls have tended to retard power production.

Such conditions, it is pointed out, may be more or less normal. In the South there is usually a period of dry weather during the summer, although not as pronounced as last year nor as prolonged; and in the North freezing weather is not unusual. It is just, some believe, that it is all so much more noticeable under current conditions.

Curtailment, due to power trouble, is not great at present, but still is felt when there is pressure for delivery. It is still too early for a general comparison of January shipments against those of December, although it is believed there was little variation, with possibly a shade more capacity offsetting power curtailment.

Ferromanganese output continues adequate, with consumers reporting no shortages. In chromium, vanadium and tungsten alloys, all of which are under allocation by Washington, the situation is tighter. Prices are unchanged.

New Kennametal Tool Price List Is Issued

■ McKenna Metals Co., 200 Lloyd avenue, Latrobe, Pa., has issued price list No. 7, listing prices for standard Kennametal steel-cutting carbide tools and blanks, effective Jan. 5. It also contains list prices for blank weights from 1 to 1000 grams for use in calculating prices of special blanks. The list covers blanks and complete tools listed in catalog No. 42. Copies of the new price list No. 7 are available free on request.

Steel in Europe

Foreign Steel Prices, Page 107

London—(*By Cable*)—Steel and iron activities in Great Britain are increasing and output is geared to higher pitch. The raw materials situation is satisfactory and resumption of semifinished imports from the United States is reported probable. Wire mills are operating at capacity. Black and galvanized sheet demand is increasing and higher sheet bar allocations allow larger output. The tin plate market is firm.

Coke Oven By-Products

Coke By-Product Prices, Page 105

At least 70 per cent of the total production of toluol, now being distributed under complete allocation, must be of nitration grades meeting army specifications. So great is demand for munitions, civilian ratings from B-1 to B-6, will not be filled in many cases. Demand for phenol, notably for the plastic industry, is heavy and this is also being allocated largely. Distillates are also active, demand moving ahead of high production, xylol especially. Commercial demand for naphthalene is less than that for industrial needs, which are strong.

Iron Ore

Iron Ore Prices, Page 107

Reduction in ocean freights from Brazil and South Africa has resulted in lower prices on manganese ore from these sources, with a resultant slight easing of prices from other parts of the world. The present reduction in ocean rates is at the request of the Maritime Commission and is for a trial period extending into early March, at which time the whole question will be reviewed in the light of possible changes in war

risk insurance rates, crew bonuses and wages, repair charges, etc.

A reduction in rates from India, China and Chile is said to be under consideration.

Unions Extend Pressure For New Wage Increases

(*Concluded from page 22*)

Meany, AFL secretary-treasurer; Daniel J. Tobin, president, International Teamsters Union; Philip Murray, CIO president; R. J. Thomas, UAW president; and Julius Emspak, secretary-treasurer of the United Electrical, Radio and Machine Workers of America.

Sidney Hillman, WPB labor member, will sit in at conferences between the President and the board.

Name Administrative Associate Member to War Labor Board

National War Labor Board has appointed Ralph T. Seward as administrative associate member, George Kirstein as executive secretary and Lewis M. Gill as assistant executive secretary.

Mr. Seward will be in charge of the mediation work of the board. He was executive secrtary of the National Defense Mediation Board. Before joining the mediation board he was chairman of the Board of Immigration Appeals of the Department of Justice.

Mr. Kirstein became a principal mediation officer of the mediation board in May, 1941, and acted as its executive secretary during the last three months of its existence.

Puget Sound Welders' Strike Reported "All Washed Up"

Jurisdictional strike by independent welders in the Puget Sound shipyards in Washington last week was regarded as "all washed up" by a spokesman for the yards. He said only a few of the 1654 strikers were still out and that the workers were "straggling" back to their jobs.

Early last week chief war production officials in the national capital called on the strikers to return to their jobs and "repudiate the leadership which has encouraged a reckless disregard of the need of the country."

Sign Agreement With Independent Mine Workers

Officials of Pickands, Mather & Co.'s Penn Iron Mining Co., operating several Monominee range iron ore properties in Norway and Vulcan, have signed a contract with the Independent Mine Workers' union of Norway and Vulcan, recognizing it as the sole bargaining agency of the miners for one year.

Wage contract negotiations between four CIO affiliated unions and the Aluminum Co. of America, which were recessed Jan. 21, were resumed last week. The negotiations will cover virtually all employes at plants in nine states.

December Employment Establishes New Record

Civil nonagricultural employment in December was at a new high, according to the Department of Labor. The total, 40,940,000, was 5,000,000 above the 1929 figure. Unemployment, however, still is 1,500,000 greater than it was 13 years ago.

Employment index for all manufacturing industries (based on 1923-25 as 100) was 134 in December. Payroll index for the month was 169.8.

■ Stockholders of Reliance Electric & Engineering Co., Cleveland, approved the plan of recapitalization whereby the company is authorized to issue 7500 shares of convertible preferred stock, to bear cumulative annual dividends of $5 per share.

DIED:

■ **William Brown Dickson,** 76, former first vice president and one of the founders, United States Steel Corp., in Littleton, N. H., Jan. 27. He was one of the "young partners" of Andrew Carnegie when Carnegie Steel Co. was organized, and became assistant to Charles M. Schwab, president of the company. When the Steel corporation was organized in 1901 Mr. Schwab became president and Mr. Dickson, second vice president. He was made first vice president in 1909, resigning two years later. After a few years of retirement Mr. Dickson returned to work when the United States entered the first World war, becoming secretary-treasurer, Midvale Steel & Ordnance Co., Philadelphia.

♦

Louis W. Greve, 59, president, Cleveland Pneumatic Tool Co., Cleveland, Feb. 2, in Fort Lauderdale, Fla. He was also president, Cleveland Rock Drill Co.; chairman, Champion Machine & Forging Co., and vice president, Carey Machine Co. In the first World war Mr. Greve served as chairman of the pneumatic tool committee, War Industries Board. He was a former president, American Drop Forging Institute, and a former vice president, Compressed Air Society.

Mr. Greve has been president of the National Air Races since the organization's inception in 1929.

♦

William J. Corbett, 48, vice president and works manager, Atlas Steel Casting Co., Buffalo, Feb. 3, in that city. For many years Mr. Corbett had been active in various group activities of the foundry industry, including American Foundrymen's Association, of which he was a director, and Steel Founders' Society of America. From 1922 to 1925 he served as an industrial engineer, Electric Steel Founders' Research Group, Chicago. Prior to joining the Atlas company in 1933, Mr. Corbett was associated with the Fort Pitt Steel Casting Co., McKeesport, Pa., as assistant to the president and works manager.

♦

Hays H. Clemens, 58, president, Erie City Iron Works, Erie, Pa., and treasurer, Hayes Mfg. Co., Jan. 27, in Dallas, Tex., where he had been visiting. Mr. Clemens was a member of the board, American Cyanamid Co., and was president, American Engine and Boiler Manufacturers Association.

♦

George H. Dormer, 68, since 1932 superintendent of the Marquette, Mich., district of Oliver Iron Mining Co., Jan. 25, in Rochester, Minn.

♦

Albert C. Blair, 72, secretary and a director, Cleveland Worm & Gear Co., Cleveland, Jan. 28, in that city.

Nonferrous Metals

New York—WPB and OPA officials issued additional orders and amendments to others last week in an effort to direct a larger flow of material to war industries.

Copper—Donald Nelson, chairman of WPB, asked all persons to carry out proposed production programs even though formal contracts for the payment of premium prices for increased output have not been signed. Maximum copper wire and cable prices were fixed at the Oct. 15, 1941, levels with the exception of weatherproof which was allowed to advance to the less than carlot basis of 17.50c. Copper scrap price schedule was amended so that Metals Refining Co., Hammond, Ind., Sherwin-Williams Co., Bound Brook, N. J., and Superior Copper Products Co., Chicago, could purchase specified monthly tonnages of specially prepared copper wire scrap at a price not to exceed 11.25c a pound, f.o.b. point of shipment.

Lead—Production is expected to increase soon due to MRC's agreement to pay 9.25c for output over established quotas.

Zinc—Requirements for February

Nonferrous Metal Prices

Feb.	Copper Electro. del. Conn.	Copper Lake, del. Midwest	Copper Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
1-6.	12.00	12.12½	11.75	52.00	52.00	6.50	6.35	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	13.15

Tubes

High yellow brass	22.23
Seamless copper	21.37

Rods

High yellow brass	15.01
Copper, hot rolled	17.37

Anodes

Copper, untrimmed	18.12

Wire

Yellow brass (high)	19.73

OLD METALS

Dealers' Buying Prices

No. 1 Composition Red Brass

New York	10.12½-10.25
Cleveland	10.25-10.50
Chicago	9.50-10.00
St. Louis	10.25

Heavy Copper and Wire

New York, No. 1	10.00
Cleveland, No. 1	10.00
Chicago, No. 1	10.00
St. Louis	10.00

Composition Brass Turnings

New York	9.37½-9.75

Light Copper

New York	8.00
Cleveland	8.00
Chicago	8.00
St. Louis	8.00

Light Brass

Cleveland	6.25
Chicago	6.50-7.00
St. Louis	6.50

Lead

New York	5.25-5.60
Cleveland	5.40-5.50
Chicago	5.25-5.60
St. Louis	5.25-5.35

Old Zinc

New York	5.00-5.25
Cleveland	5.25-5.50
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

pool were fixed at 40 per cent of November, 1941, production of metallic zinc, and 20 per cent of zinc oxide output. Anaconda Copper Mining Co. has started expansion of its electrolytic zinc refining capacity which, when completed next fall, will add about 45,000 tons to its capacity.

Under an amendment to the copper price schedule OPA has added maximums for 24 grades of copper scrap, effective Feb. 27, intended to help electrolytic copper refineries to increase purchases of brass scrap.

Mirrors of Motordom

(*Concluded From Page 40*)

war production is to be attained. The aircraft industry already has thousands of women at work. More will have to drop the dishpan for the drilling machine.

Final quotas of passenger cars were dribbling out of a few motor plants last week, where permission for assemblies after the Feb. 1 deadline had been obtained. Feb. 10 is the final limit on car production, but even so it appears likely parts and materials inventories in the motor plants will bulk large. Some of this material may possibly be adapted to war needs, but most of it will stay on the shelf or, in the case of parts, be consigned to service needs.

Army Air Corps became the third

branch of the American armed forces to utilize the facilities of the Ford industrial school system when 70 enlisted recruits enrolled in special classes at the aircraft training school at the Rouge plant, Feb. 2. The men will spend half their time in school, half in shop work, receiving an intensive training in engine maintenance work over a three-month period. Facilities are being expanded to handle 200 at a time.

Equipment

Boston—Orders for machine tools are heavy. Based on preference lists, deliveries are frequently diverted from the first purchaser to shops considered more in need of equipment, and with distribution practically in full control of WPB, a large backlog is accumulating on which deliveries are uncertain. New production facilities and larger output, the result of longer working week, do not make up for the continued heavy volume of new orders. Shipyards are asking for additional tools, as are bearing manufacturers, while full lists are being awarded for industrial plant expansions based on defense needs, some being placed before construction starts. Much volume is being placed through Wright Field, Dayton, O., several hundred bench and precision lathes being placed with Dayton, Cincinnati and Toledo firms; also hundreds of drill presses, deliveries being for various sections.

Construction and Enterprise

Ohio

AKRON, O.—Star Drilling Machine Co., 474 Washington street, is adding 5800 square feet for forge shop and heat treating department. Crane runway will be extended and boiler plant remodeled. (Noted Jan. 12).

AKRON, O.—Enterprise Mfg. Co., 217 Ash street, G. T. Pflueger, general manager, will take bids soon on general contract for altering plant. J. F. Mumper, 72 Marshall avenue, engineer.

AKRON, O. — Schreiber-Schroth Co. will add a 3450-square foot machine shop at rear of present plant at 61 West Market street.

BARBERTON, O.—Electro Metal Casting Co. has awarded contract for one-story factory addition to Clemmer Construction Co., Cordelia avenue, Akron, O. Cost about $30,000.

CANTON, O.—Spun Steel Products Co. has been formed as wholly-owned subsidiary of Spun Steel Co., 2037 Dueber avenue, to manufacture spun steel products. Attorney is Wendell Herbruck, Ronkert building.

CLEVELAND—Marquette Metal Products Co. is planning to erect factory building adjacent to plant at 1145 Galewood road. Herbert Gleitz is president.

CLEVELAND—American Metal Treating Co., Jesse L. Teegarden, will add 2880 square feet to warehouse at heat treating plant, 1035 East Sixty-second street, if approval is given by board of zoning appeals.

CLEVELAND — Breckenridge Machine Co., 23000 St. Clair avenue, is adding a $20,000 extension to its factory.

CLEVELAND—National Bronze & Aluminum Foundry Co., John H. Schmeller, president and treasurer, will improve foundry at 8800 Laisy avenue, with dust room 40 x 50 feet.

CLEVELAND—Bacon Electric Timer Corp., 4513 Brooklyn avenue, organized last fall to make clock mechanisms to control lighting for poultry houses and for industrial uses, plans to increase production and purchase special foot presses and a hobbing machine. E. D. Bacon is general manager.

CLEVELAND—Harshaw Chemical Co., H. E. Cowser, engineer, 1945 East Ninety-seventh street, will install new tanks, scale and gage house at plant at 1000 Harvard avenue.

CLEVELAND—American Shipbuilding Co., foot of West Fifty-eighth street, will add 3200 square foot tin shop at yard and dock.

LIMA, O.—Ohio Steel Foundry Co. plans to construct a $2,000,000 foundry unit, including a foundry building, electric melting furnaces, heat treatment furnaces, and machine tool equipment.

NEWTON FALLS, O. — Village, Elmo Bailey, mayor, plans water system expansion, including elevated steel tank, feeder mains and pumping station. Total estimated cost $90,000. R. F. MacDowell, Chester-Twelfth building, Cleveland, consulting engineer. C. R. Bricker, 210 North High street, Warren, O., village engineer.

Connecticut

BRIDGEPORT, CONN.—Producto Machine Co., 990 Housatonic avenue, has plans by A. H. Pokras, 436 Salem street, for steel milling machine manufacturing plant. Cost over $40,000.

GLENBROOK, CONN.—Electric Indicator Corp., 23 Parker avenue, has asked bids for erecting an addition and alter-

ing garage into factory. Estimated cost $40,000. F. S. Massari, 200 Atlantic street, Stamford, Conn., architect.

NEW HAVEN, CONN.—Snow & Petrelli Mfg. Co., 25 Fox street, plans two-story 39 x 188-foot steel factory. Cost estimated at $75,000. H. Labov, 164 Linden street, engineer.

STAMFORD, CONN.—Baer Bros., 700 Canal street, will erect two-story steel factory unit, at cost of about $50,000.

STAMFORD, CONN.—Stamford Engineering Works, J. Bamber, 248 Canal street, has plans by C. C. Braun, 2 West Forty-fifth street, New York, for one-story, 50 x 100-foot steel factory addition, costing about $40,000. (Noted Jan. 26).

Vermont

BRATTLEBORO, VT.—American Optical Co., Southbridge, Mass., has asked bids for superstructure for one-story 160 x 420-foot steel grinding plant, power and garage building. Hayden, Harding & Buchanan, Park Square building, Boston, engineers.

New York

BROOKLYN, N. Y.—Robins Dry Dock & Repair Co., Erie Basin, has plans by Kelly, Syska & Hennessy, 144 East Thirty-ninth street, New York, for two-story 57 x 142-foot compressor room, electric transformer substation, motor generator station, tool room, etc. Cost $50,000.

HAVERSTRAW, N. Y.—Garnerville Machine & Tool Corp. has been organized to deal in tools, machinery, boilers, engines, motors, etc., by Samuel Miller, 14 Main street, Haverstraw.

KEW GARDENS, N. Y.—George Mfg. Co., 103-37 Ninety-eighth street, Ozone park, has plans by G. I. Prowler, care of owner, for one-story factory at 89-46 127th street. Cost $60,000.

SYRACUSE, N. Y.—Lennox Furnace Co. recently sustained severe damage to three buildings by fire.

New Jersey

PASSAIC, N. J.—Allen B. Dumont Laboratories Inc., 2 Main avenue, will soon let contract for two-story manufacturing plant addition to cost $200,000. Ballinger Co., 105 South Twelfth street, Philadelphia, architect and engineer.

Pennsylvania

BIRDSBORO, PA.—Birdsboro Steel Foundry & Machine Co. is considering plant and office addition to cost approximately $40,000.

HARRISBURG, PA.—Central Iron & Steel Co., South Front street, plans 216 x 256-foot flanging shop addition, to cost approximately $67,000.

SHARON, PA.—Petroleum Iron Works has let contract to P. Glenn, Sharon, for 40 x 200-foot steel drum manufacturing plant addition. Cost $40,000.

Michigan

DETROIT—Esslinger-Misch Co., Detroit, has been awarded contract for construction of an engine test building at the Lincoln Motor Division of Ford Motor Co., Detroit. Giffels & Vallet Inc., Detroit, architects.

DETROIT—Victory Forging Die & Machine Corp., 575 Lycaste avenue, has been organized to do machine shop work. Louis J. Steiner, 5157 Burns avenue, correspondent.

GRAND RAPIDS, MICH.—R. C. Allen Products Inc., 678 Front avenue Northwest, has been incorporated with $50,000 capital to manufacture machinery. Robert E. Mumford, 40 Wall street, New York, correspondent.

HILLSDALE, MICH.—City, Richard J. Schmidt, mayor, plans power plant improvements costing $208,000. C. F. Cook Jr., vice president, board of public works.

LANSING, MICH.—Granger Bros., Lansing, have been awarded general contract for construction of a covered loading dock, garage and other improvements to factory of Nash-Kelvinator Corp. in Lansing.

Indiana

BEDFORD, IND.—Public Service Corp. of Indiana plans erection of high power substation near here. Cost $100,000 or more with equipment.

FORT WAYNE, IND.—National Can Co., 110 East Forty-second street, New York, plans erection of plant here to cost $50,000 or more with equipment.

Maryland

SPARROWS POINT, MD. — Rheem Mfg. Co., 30 Rockefeller Plaza, New York, has awarded contract for one-story 100 x 250-foot factory to Brown & Matthews Co., 122 East Forty-second street, New York. Cost $100,000.

Tennessee

NASHVILLE, TENN. — City smoke commission, Joe S. Reeves, chairman, has had estimates prepared by Coal Carbonizing Co., 418 Olive street, St. Louis, for proposed erection of coal processing plant to cost approximately $70,000.

Louisiana

MINDEN, LA.—Barnard, Godat & Heft, 1125 Canal street, New Orleans, have been appointed designing and consulting engineers for $202,000 sewage disposal plant here.

Virginia

OCCOQUAN RUN, VA.—Occoquan Co. has applied to federal power commission for license to build and operate a $4,987,000 power plant here. Application filed by George H. Knutson, 61 Broadway, New York, power engineer.

PORTSMOUTH, VA.—President Roosevelt has approved construction of sanitary sewage facilities, estimated to cost $556,500.

Missouri

FREDERICKTOWN, MO.—St. Louis Smelting & Refining Co., Jean McCallum, manager, 722 Chestnut street, may reopen and develop old Buckeye cobalt mine near here.

Arkansas

MORRILTON, ARK.—Petit Jean Electric Co-operative Corp., M. Hawkins, president, plans construction of 343 miles of rural electric lines, for which REA has allotted $432,000.

Oklahoma

PRYOR CREEK, OKLA.—Construction of extension to water purification plant, water distribution system and purchase of fire fighting equipment, costing $108,000, has been approved by President Roosevelt.

Texas

HOUSTON, TEX.—Reed Roller Bit Co., S. P. Farish, president, Mack street, will receive $8,543,000 for renovation and expansion of buildings and installation of tools and facilities.

HOUSTON, TEX.—Neal Pickett, mayor, has approval of federal grant of $434,100 for expansion and improvement to sanitary sewer system. Estimated total cost $2,530,000.

OMAHA, TEX.—City has voted $40,-

000 bonds for constructing waterworks system.

PARIS, TEX.—City, J. M. Crook, mayor, plans waterworks improvements, costing $367,000. Rollins & Forrest, consulting engineers, 817 Praetorian building, Dallas, Tex.

PORT ARTHUR, TEX.—Texas Co., 720 San Jacinto street, Houston, Tex., has revised plans for lubricating oil manufacturing plant to cost $2,500,000. The company also plans to spend approximately $7,500,000 for alkylation plant for 100-octane gasoline manufacture.

California

LOS ANGELES—Los Angeles Bureau of Power & Light, 207 South Broadway, is building unit No. 1 of its harbor steam plant at 100 South Lagoon avenue, Wilmington, Calif., at cost of $300,000. A reinforced concrete control house, costing $150,000, will also be erected.

Washington

BREMERTON, WASH.—City has allotment of $217,000 and voters will soon pass on proposed $250,000 bond issue for $400,000 water system expansion program.

OMAK, WASH.—City has sold $52,000 bond issue to finance water system, including new wells, three pumps, supply line and other facilities.

SEATTLE—North Coast Chain Co., 22 Etruria street, plans plant expansion and alterations.

SPOKANE, WASH.—Columbia Electric & Mfg. Co. plans plant and equipment expansion.

Canada

CHIPPEWA, ONT.—Norton Co., H. J. Daly, general manager, will start work early in March on plant addition, 80 x 120 feet, for production of crude abrasives, to cost $78,000. Smith Bros. Construction Co., 1740 Ellen avenue, Niagara Falls, Ont., has general contract.

HAMILTON, ONT. — Steel Co. of Canada Ltd., Wilcox street, has given general contract to Hamilton Bridge Co. Ltd., Bay street North, and work will be started immediately on addition to bloom yard and boiler house, one story, 125 x 275 feet, to cost $110,000.

LONDON, ONT.—Department of Munitions and Supply, Ottawa, H. H. Turnbull, secretary, has had survey made in connection with establishing a large war industry here, estimated to cost about $1,000,000.

LONDON, ONT.—Empire Brass Mfg. Co. Ltd., Dundas street East, is considering plans for erection of plant addition, estimated to cost with equipment about $50,000.

ORILLIA, ONT.—Orillia Water, Light and Power Commission, M. Sarjeant, chairman, is considering plans for construction of power plant to cost about $50,000 with equipment.

TORONTO, ONT.—Precision Die & Castings Ltd., 282 St. Helens avenue, has given contract to Frankel Bros., and work is proceeding to clear site for plant addition to cost about $35,000, with equipment. Plans prepared by T. Pringle & Son, 36 Toronto street.

WELLAND, ONT.—Atlas Steels Ltd., Main street East, has given general contract to Pigott Construction Co. Ltd., 811 Pigott building, Hamilton, Ont., for construction of metallurgical research building to cost $50,000.

SYDNEY, N. S.—Canadian Liquid Air Co., 1111 Beaver Hall Hill, Montreal, is considering plans for erection of plant here to cost about $25,000 with equipment.

SHERBROOKE, QUE.—Canadian Ingersoll-Rand Co. Ltd., Commissioner street, is having plans prepared by H. G. James, 36 Portland avenue, for further addition to foundry and shop No. 2 on Des Moines street here, to cost, with equipment, about $75,000. This is in addition to foundry extension now underway.

VALCARTIER, QUE.—Department of Munitions and Supply, Ottawa, H. H. Turnbull, secretary, has given general contract to Magliore Couchon Ltd., 211 de la Salle street, Quebec, for construction of addition to Dominion Arsenal here comprising five buildings, at estimated cost of about $2,500,000, including equipment.

USED and REBUILT EQUIPMENT
MATERIALS

LIMITED QUANTITY—USED WOOD

HEVI-DUTY—SELECT

BOXES

Doubly reinforced with band steel around sides and bottom. Handle spaces in ends.

STACK TO ANY HEIGHT

IDEAL FOR STORAGE

No. 121—18" x 12" x 10"—$.39 each

Weight 8 lbs. each

F.O.B. Warehouse—Milwaukee, Wis.

Equipped with solid cover attached by sturdy steel hinges and iron snap lock—prevents opening.

CAN CARRY 500 LBS.

IMMEDIATE DELIVERY

Address: Box Division—Dept. 40

KOTLER BROS. CO., INC.

4129 Port Washington Rd. Milwaukee, Wis.

2000 UNIFORM SIZE

SHOP BOXES

HEAVY DUTY USED WOOD

$.54 EACH

F.O.B. Factory Milwaukee

IMMEDIATE DELIVERY

Weight 7 lbs. Well constructed. Newly painted black or battleship grey

PERFECT STACKING BOX

No. 11—

18" x 12" x 7¾"—⅜"+½" wood

Reinforced with sturdy band iron around points of wear.

Handle spaces in ends.

KOTLER BROS. CO., INC.

Box Division—Dept. 41

4129 Port Washington Rd. Milwaukee, Wis.

FOR SALE

One Swartwout Tunnel Type drying oven, demountable metal panel construction, 3" Rockwool insulation. Length 120' 6", width 11' 6", Height 6' 9".

2 drag chain conveyors (operated by one motor).

2 indirect oil fired 500,000 B.T.U. heaters per hour.

1 input motor driven fan.

1 recirculating motor driven fan.

1 exhaust motor driven fan.

Maximum oven temperature 325° F.

Pair of swing doors at each end.

One lift door at each end 8' from end of oven with one electric hoist to lift both doors.

Complete set of temperature controls and recording thermometer.

Complete set of electric controls for all motors.

May be seen at

METAL DOOR & TRIM CO.

LAPORTE, INDIANA

THE MORECO BARGAIN CORNER

WELDERS

300 amp., 12 KW, 0/40 volt Hobart ball bearing with 20 HP., 220/440 volt, 3 phase, 60 cycle 1750 RPM MD.
400 amp., 25 volt Lincoln ball bearing with 20 HP., 3 phase, 220/440 volt 1800 RPM M.D.
600 amp. 24 KW, 40 volt Gen. Elec. ball bearing type WD 36, with 40 H.P. 3 phase, 60 cycle 1750 RPM type KF Motor.

THE MOTOR REPAIR & MFG. CO.

1558 Hamilton Ave. Cleveland, Ohio

RAILS
AND ACCESSORIES

RELAYING RAILS — Super-quality machine-reconditioned—not ordinary Relayers.

NEW RAILS, Angle and Splice Bars, Bolts, Nuts, Frogs, Switches, Tie Plates, and all other Track Accessories.

Although our tonnages are not as large as heretofore, most sizes are usually available from warehouse stocks.

Every effort made to take care of emergency requirements. *Phone, Write or Wire . . .*

L. B. FOSTER COMPANY, Inc.

PITTSBURGH NEW YORK CHICAGO

FOR SALE

ONE ROLLING MACHINE

10 Stands rolls; 2¾" roll shaft diameter.
Maximum distance between housings 22".
Maximum diameter of rolls 12½".
RPM of rolls (variable) 5 to 15.
Overall length (includes straightening rolls) 29'6".
Overall width 5'6" (does not include motor).
Overall height 4'6".
Motor 50 H.P. 860 RPM, 440 volts, 3 phase, 60 cycle.
Drum switch and resistance bank for variable speed.
Approximate weight 50,000 lbs.
Maximum thickness of material that can be rolled on this machine, ⅛".

May be seen at

METAL DOOR & TRIM CO.

LAPORTE, INDIANA

—REBUILT—

BLOWERS - FANS - EXHAUSTERS

Connersville-Roots positive blowers.
Centrifugals for gas and oil burning.
Sand blast, grinder and dust exhausters.
Ventilating fans and roof ventilators.

GENERAL BLOWER CO.

404 North Peoria St. Chicago, Ill.

FOR SALE

Hydraulic Riveting Machines, 48" throat, 1½" daylight.
400 lb. Air or Steam-Operated Drop hammer.
No. 3 Williams, White Bulldozer.
Canton Portable Alligator Shears.
2", 4" & 8" Bolt & Pipe Threading Machines.
Metal Cleaning Machines.

Address Box 490
STEEL, Penton Bldg., Cleveland

WANTED AT ONCE

U. S. Smelting Furnace
4-A or 4-B

Address Box 640

STEEL, Penton Bldg., Cleveland

More for Your Dollar!

IRON & STEEL PRODUCTS, INC.

36 Years' Experience

13462 S. Brainard Ave., Chicago, Illinois

"Anything containing IRON or STEEL"

SELLERS — BUYERS — TRADERS

GEAR CUTTERS, Spur 30", 40" & 84", M.D.
GEAR PLANERS, Bevel 36" & 54" Gleason, M.D.
LATHES, 48"x22½' & 48"x26½' Johnson.
PLANERS, 30"x30"x8', 36"x36"x10' & 36"x36"x11'
PUNCH, Multiple "E" L & A, cap. 340 tons
SHEARS, Plate, 96"x1" Mesta, 72"x1¼" United, 51"x3/16" Hyde Park, 36"x1/8" United.

LANG MACHINERY COMPANY

28th Street & A.V. R.R. Pittsburgh, Pa.

WANTED

Two Pickling Tanks approximately twenty to thirty feet long and one grease tank approximately twelve to twenty feet long.

Advise full details, construction, conditions, and price.

Address Box 641,
STEEL, Penton Bldg., Cleveland

IF YOU WANT TO BUY OR SELL

good used or rebuilt equipment or materials—Place an advertisement in this section. Write STEEL, Penton Bldg., Cleveland, Ohio

CLASSIFIED

CLASSIFIED RATES

All classifications other than "Positions Wanted," set solid, minimum 50 words, 5.00, each additional word .10; all capitals, minimum 50 words, 6.50, each additional word .13; all capitals, leaded, minimum 50 words 7.50, each additional word .15. "Positions Wanted," set solid, minimum 25 words 1.25, each additional word .05; all capitals, minimum 25 words 1.75, each additional word .07; all capitals, leaded, minimum 25 words 2.50, each additional word .10. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge.

Displayed classified rates on request.

Address your copy and instructions to STEEL, Penton Bldg., Cleveland.

Employment Service

SALARIED POSITIONS
$2,500 to $25,000

This thoroughly organized advertising service of 32 years' recognized standing and reputation, carries on preliminary negotiations for positions of the caliber indicated above, through a procedure individualized to each client's personal requirements. Several weeks are required to negotiate and each individual must finance the moderate cost of his own campaign. Retaining fee protected by refund provision as stipulated in our agreement. Identity is covered and, if employed, present position protected. If your salary has been $2,500 or more, send only name and address for details. R. W. Bixby, Inc., 110 Delward Bldg., Buffalo, N. Y.

Accounts Wanted

MANUFACTURERS' AGENT WITH WIDE acquaintance in industrial Detroit wishes additional lines to represent. Address Box 646, STEEL, Penton Bldg., Cleveland.

Positions Wanted

FACTORY MANAGER FOR SHEET METAL products or contract stamping company. Twenty three years' broad engineering, manufacturing, and business background. Excellent knowledge of designing, tooling, economical mass production, purchasing, factory organization and sales. Age 43. Married. Address Box 644, STEEL, Penton Bldg., Cleveland.

SALES POSITION OR PRODUCTION MANAGER—Fifteen years' experience on open hearth and electric steel castings. Acquainted with trade in East and Middle West. Address Box 639, STEEL, Penton Bldg., Cleveland.

TWENTY YEARS' EXPERIENCE STRUCTURAL and Plate shop Superintendent open for position. Furnish former employers references. Moderate salary until proven results. Address Box 621, STEEL, Penton Bldg., Cleveland.

EXPERIENCED IRON AND STEEL CHEMIST desires position. Past the draft age, healthy and active. Address Box 647, STEEL, Penton Bldg., Cleveland.

Help Wanted

Wanted
FOR HEAVY FORGE SHOP

- **SUPERINTENDENT**
- **FOREMAN**
- **STEAM HAMMERMEN**
- **PRESS FORGER** (Hydraulic Press—1000-2000 Ton. Experienced on open die work.)

State age, experience, wages expected. U. S. Citizens only need apply. Address Box No. 634, STEEL, Penton Bldg., Cleveland.

WANTED: IN JOBBING FOUNDRY LOcated in Eastern Pennsylvania, producing steel castings, electric process, ranging from 1 lb. to 2 tons, a man who is thoroughly familiar with heading and gating and has a good knowledge of molding and core making and is capable of handling men; acting in the capacity of assistant to foundry superintendent. In reply, please state age, experience and salary desired. Address Box 635, STEEL, Penton Bldg., Cleveland.

WANTED—MAN WITH EXTENSIVE EXperience to serve as assistant superintendent of blast furnaces in large steel company. 35 to 45 years of age with technical training preferred. State salary expected. Address Box 637, STEEL, Penton Bldg., Cleveland.

WANTED: EXPERIENCED ROLLING MILL superintendent to take charge of a twenty four inch mill rolling rounds and shell steel. Some experience on alloy steel advantageous. Address Box 632, STEEL, Penton Bldg., Cleveland.

WANTED: HEAT TREATMENT ENGIneer. Experienced with WD-4150 material preferred. Address Box 643, STEEL, Penton Bldg., Cleveland.

TOOL STEEL WAREHOUSE, NORTHERN Ohio, interested in contacting party capable of filling position as Office Manager. Write stating experience, etc. Address Box 642, STEEL, Penton Bldg., Cleveland.

WANTED: EXPERIENCED AND COMPEtent process metallurgist for electric furnace plant making aircraft, alloy and tool steels. Replies confidential. Address Box 645, STEEL, Penton Bldg., Cleveland.

IF YOU HAVE AN OPPORTUNITY TO OFFER

Use the "Help Wanted" columns of STEEL. Your advertisement in STEEL will put you in touch with qualified, high-calibre men who have had wide training in the various branches of the Metal Producing and Metalworking Industries.

CONTRACT WORK

Castings

NORTH WALES MACHINE CO., INC., North Wales. Grey Iron, Nickel, Chrome, Molybdenum Alloys, Semi-steel. Superior quality machine and hand molded sand blast and tumbled.

ADVERTISING INDEX

Where-to-Buy Products Index carried in first issue of month.

ADVERTISING INDEX

Where-to-Buy Products Index carried in first issue of month.

"Watchmen"

that Protect Your Defense Assemblies!

From careful analysis of the raw material, through every step in production, *each lot* of Parker-Kalon Socket Screws is guarded by these "watchmen" . . . the quality-control records you see here. One reports on the Parker-Kalon Laboratory's analysis of the special alloy steel . . . another is the Lab's point-by-point okay of all physical characteristics of the finished screws. A third record covers an extensive series of critical inspections of dimensions and other details.

The uniformly high standard of quality which MUST RESULT from such rigid control is ample reason why industry specifies PARKER-KALON for important defense assemblies. Besides, it costs no more to have this protection against "doubtful screws" . . . screws that *look* all right but some of which fail to *work* right. Parker-Kalon Corp., 194-200 Varick Street, New York.

PARKER-KALON

Quality-Controlled

SOCKET SCREWS

Give the Green Light to Defense Assemblies

Quality-Controlled

Complete test and inspection routine covers: Chemical Analysis; Tensile and Torsional Strength; Ductility; Shock Resistance under Tension and Shear; Hardness; Head diameter, height and concentricity; Socket shape, size, depth and centricality; Class 3 Fit Threads; Clean-starting Threads.