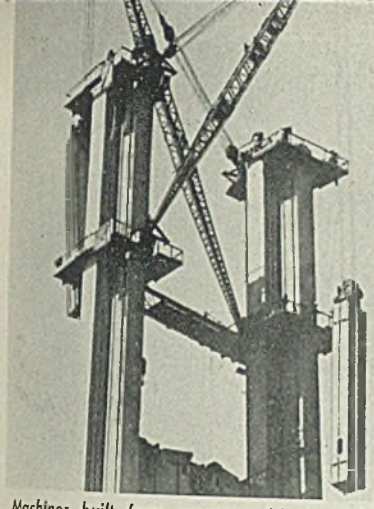

Machines built from scrap enable engineers to dismantle Narrows bridge. Page 64

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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

The Magazine of Metalworking and Metalproducing

MAY 24, 1943

Volume 112

Number 21

NEWS

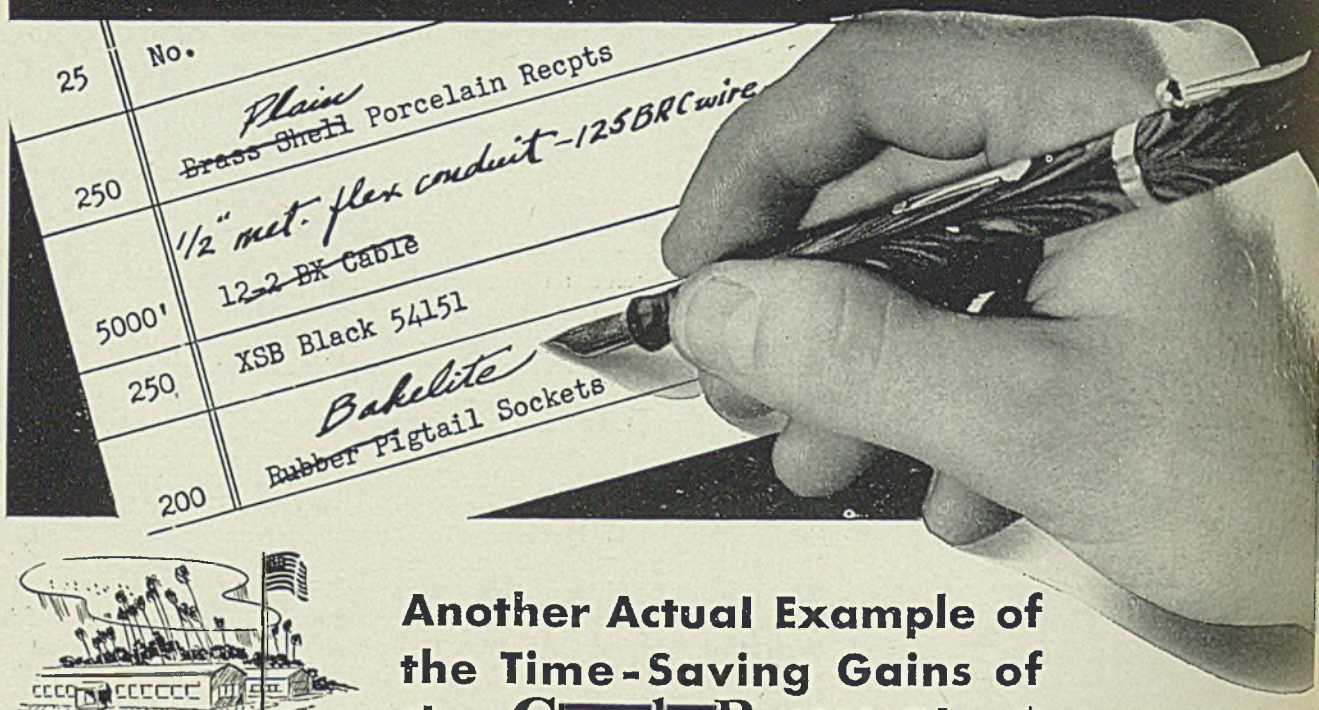
FEATURES

TECHNICAL

PRODUCTION

MARKETS

BY FILLING-IN "Between the Lines" THE ORDER WENT OUT COMPLETE



Another Actual Example of the Time-Saving Gains of the GraybaR MM Plan*

A CONTRACTOR faced with the job of pushing 150 miles of Central American highway through the jungle had to begin with barracks construction and other basic facilities calling for a wide range of electrical supplies. The sailing date for supply ship from a West Coast port had been set for 8 days hence.

THE BILL OF MATERIALS that was rushed to GRAYBAR showed many items that could only be obtained from the East, and then on 8 to 10 weeks delivery. But GRAYBAR looked at the list realistically. In almost every case, "pinch-hitters" which could be substituted for the missing items were available from GRAYBAR's local warehouses or local sources of supply.

GRAYBAR SPECIALISTS sat down with the contractor's engineers and checked through the list item by item. Porcelain outlet boxes replaced steel, Bakelite pigtail sockets replaced rubber, and so on down the line. Years of experience on wiring supplies, plus up-to-the-minute delivery facts, enabled GRAYBAR to build a *complete* list for the job that could be shipped on time.

BY FILLING-IN between the lines, the entire shipment was on board at sailing time. The barracks were satisfactorily wired and equipped.

*Serving as your MATERIALS MOBILIZER

By this GRAYBAR service, your electrical needs are linked to the available output of 200 manufacturers, mobilized locally at more than 80 warehouses. The MM Plan "dovetails" GRAYBAR's procurement work with your own purchasing requirements. You save time in getting estimates, checking specifications, expediting delivery, locating "hard-to-get" items. Ask your local GRAYBAR Representative how this "one-call" service can help you.

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New York, N. Y.

GraybaR

IN OVER 80 PRINCIPAL CITIES

*GraybaR Everything Electrical . . . THAT IT TAKES TO WIN!

STEEL
May 24, 1943

WARTIME CONVENTIONS: This week marks the peak of the 1943 spring convention season. Among the important meetings scheduled (pp. 44, 45) are those of the National Association of Purchasing Agents, National Industrial Conference Board, American Steel Warehouse Association, National Metal Trades Association and American Iron and Steel Institute.

These meetings, in common with scores of others held earlier this year, will be devoted chiefly to the discussion of war problems. The names of high-ranking government officials appear on the program of most of the sessions. In many instances, the heavy attendance expected is due to the desire of industrialists to hear from government and other authorities explanations and interpretations of government orders which affect their businesses.

Thus the American institution of conventions is serving a useful function in wartime. It permits men like Donald M. Nelson, Maj. Gen. Lewis B. Hershey, Joseph P. Eastman, Arthur D. Whiteside and H. G. Batcheller to talk to a majority of the representative leaders of an industry at one time. This conserves time, makes for a better understanding of policies and promotes the war effort.

° ° °

BRILLIANT TEAMWORK: One of the high spots of the past week was Winston Churchill's address to the American Congress. He had the good fortune to be the first leader of an Allied nation to speak formally following the victory of Tunisia.

Referring to the northwest Africa campaign and particularly the Tunisian climax, he said it "is the finest example of the co-operation of the troops of three different countries and of the combination under one supreme commander over sea, land and air forces which has yet been seen."

In these words Mr. Churchill voiced an opinion which already had been formed by many Americans, namely that the victories at Bizerte and Tunis were a spectacular demonstration of what can be done when various factions submerge their individual interests and preferences and co-operate fully to do the No. 1 job confronting them. British, Americans, Frenchmen of various political affiliations and detachments of other nationalities all worked together harmoniously to achieve a brilliant victory.

Many of us at home wonder why the spirit of the forces in Tunisia cannot be injected into the minds and hearts of our officials and representatives in Washington. Had the example of Tunisia been emulated last week in the nation's capitol, this country would not now be facing the gloomy prospect of a prolonged stalemate on taxes.

° ° °

A PART OF THE SHOW: It is significant that the survey on absenteeism conducted by the National Association of Manufacturers did not reveal any principal causes which had not already been anticipated by most employers. In short, there is no one startling cause. The too-high rate of absenteeism is the result of a combination of expected factors.

N.A.M. lists as chief causes (p. 68) "sickness, accidents, housing and transportation problems, high earnings, inexperience in regular employment and irresponsibility."

More attention to common colds and other minor illnesses and a more intensive drive for safety in industrial operations will tend to solve the first two problems. Absenteeism due to inadequate housing and transportation will continue to be high because there seems to be no quick way of providing more houses or better transit facilities in many districts.

Employes with more money to spend than heretofore are bound to take more time off. Newcomers to industry, who are not familiar with the importance of regularity in employment, will be a problem until they gain more experience. "Irresponsibility" probably covers the shiftless, undisciplinable worker who never could hold a job in normal times. He is a difficult problem. Perhaps he should be taken off the job, because the trouble he causes usually outweighs his contributions to production.

Beyond all of these factors is the important item of psychology. Many employes do not realize exactly how the work they perform fits into the war effort. N.A.M. is right when it says that the "big job is to bring home to people the fact they are a

(OVER)

part of the show." If it were possible to prove to Jim Jones that the piston pin he ground was in a tank which battered the Nazis at Bizerte, he would think twice before being absent needlessly.

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SKIMPING TOO MUCH? Land transportation on the home front is vitally important in wartime. For more than a year reports from Europe have indicated that Hitler has been having trouble because of the inadequacy of railroad service. Recently Raymond Clapper, writing from Stockholm, quoted Swedish industrialists to the effect that airplane bombings in the Ruhr had crippled tube plants and that as a result the problem of replacing boiler tubes in locomotives had become acute.

Here in the United States we do not have to contend with damage from bombs, but we do have to deal with the problem of railroad maintenance and repair. The railroads are doing a magnificent job, but they are threatened with trouble which can be avoided only by prompt attention to imperative needs.

More than anything else, the roads need steel rail and motive power. In order to supply as much steel as possible for direct war purposes, WPB has scaled down allotments of steel for rails, locomotives, cars and repairs to absolute minimum. Today one is justified in asking whether or not the railroads are being skimped to the point of danger.

The question is pertinent because a belated replacement of rails or a tardy delivery of locomotives (p. 41) would compound trouble for the roads. Slowing schedules because of rail deficiencies would lead immediately to a rapid deterioration of railroad service. Likewise, a creeping paralysis would follow on the heels of a shortage of motive power.

° ° °

WHAT DOES IT COST? It is a common trait of human nature to appreciate the known value of things. The average man will handle a fine $100 watch much more carefully than he will treat a dollar timepiece bought at the corner drug store. He knows the former is more difficult to replace.

Manufacturers can utilize this inherent respect for value in connection with the conservation of small tools. A check of a hundred or more machine tool operators in three plants showed that most of them grossly underestimate the dollar value of spiral milling cutters, reamers, special drills, snap gages, tool bits, etc. It is reasonable to assume that if employes actually know the value of the tools they use, they will take better care of them.

Acting upon this supposition, the Chrysler Corp. is conducting a program of education to impress foremen and machine operators with the value of cutting tools and gages. One feature of the program, which is under the supervision of the corporation's director of education (p. 78), is an exhibit showing the actual cost of typical tools and gages. Other aids to tool conservation include a training manual entitled "Perishable Tools in War Production" and educational films.

Not every manufacturing plant can go into the subject as thoroughly as Chrysler has, but every shop—regardless of size—can adapt some of the Chrysler ideas to great advantage. Merely making it known throughout a shop that a spiral milling cutter really costs $220 and not $25, as many employes think, will do wonders in inducing greater care in the use of this and similar tools.

° ° °

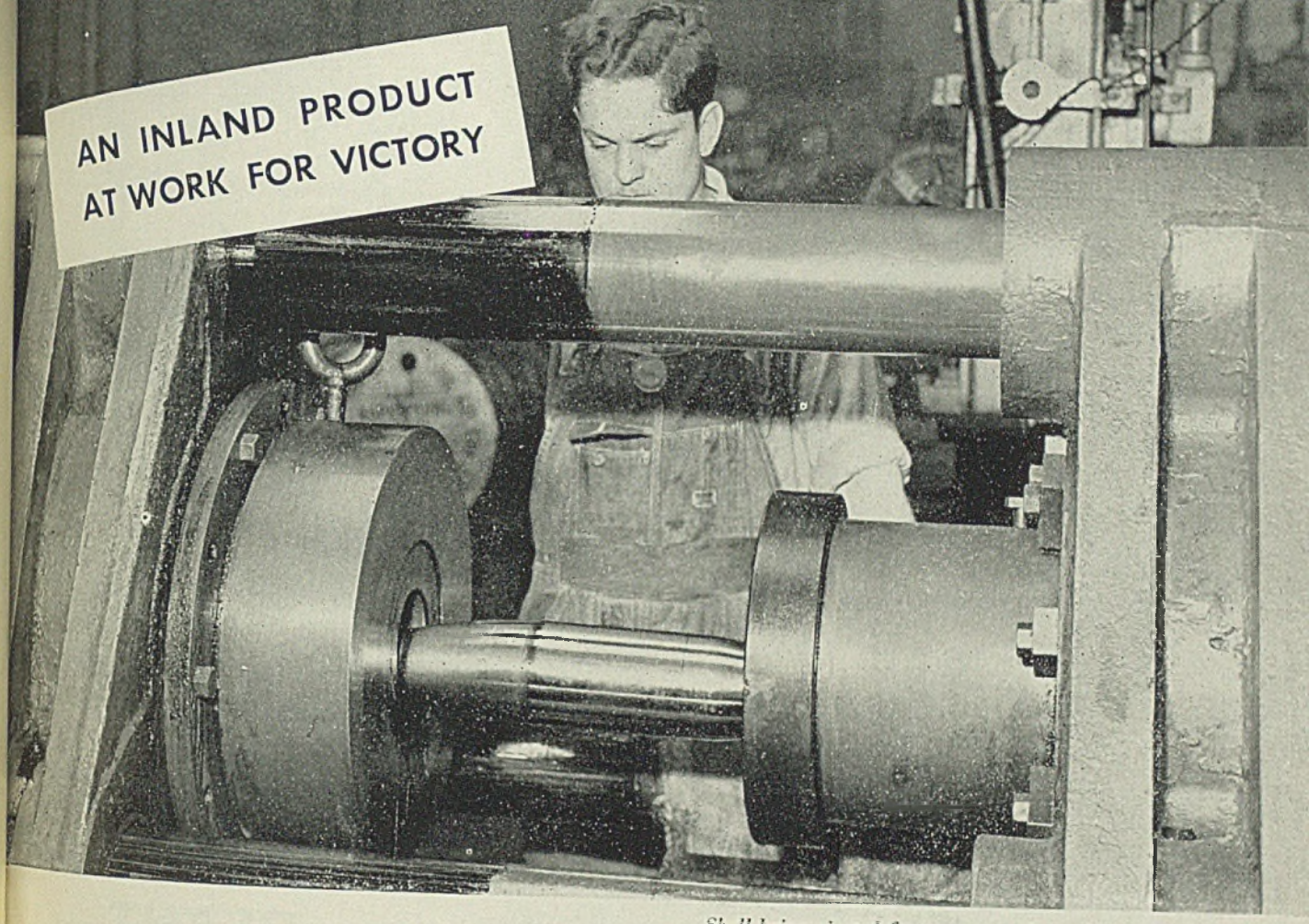
FLEXIBILITY NEEDED: In suggesting to War Manpower Commissioner McNutt that the effective date of the 48-hour week in the steel industry be deferred pending a restudy of the factors involved (p. 46), steelmakers are not questioning or debating the objectives of the 48-hour policy. They are simply asking that the conditions be restudied to see whether or not the order issued by WMC is flexible enough to be practical.

The specific provisions of the order which are in question are, first, that "a minimum wartime workweek of 48-hours shall be established in each blast furnace, steelworks and rolling mill" and secondly, that "if the work week of any worker . . . subject to this order is less than 48 hours per week on and after July 1, 1943, no additional workers shall be hired for work without the approval of WMC. . . ."

Steel companies, as well as many producers and manufacturers in other branches of industry, know from experience that uniform hours throughout every department are wasteful of manpower. The chief purpose of the WMC's order is to conserve manpower. We believe any study of the factors involved will show that extreme flexibility in work schedules is necessary to the achievement of the WMC objectives.

E. L. Shaner

EDITOR-IN-CHIEF



Shell being ejected from a press after cold nosing

Steel from Inland—Preferred

Many new users of Inland steel, like our long-time customers, know the importance and value of Inland Uniform Quality. They know that steel of unvarying quality is a major factor in conserving tools—in lowering costs—in reducing rejects to the minimum—and, in meeting, even exceeding, war-time production schedules.

Take, for instance, a certain household appliance manufacturer, who not only never had made ammunition, or any other war product, but who never before had machined rolled steel. Soon after Pearl Harbor, this manufacturer accepted a large contract for forging and machining shell. Inland immediately started shipping great quantities of shell steel—Inland Uniform Quality. Steel that has proved so satisfactory—so trouble-free—that this manufacturer's preference is for *steel from Inland.*

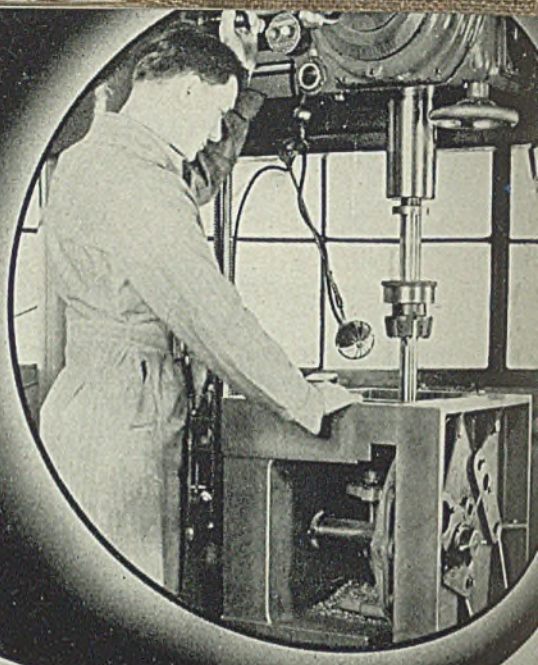
Supplying steel for shell is only one of Inland's war jobs. Every ton of steel made at the great Indiana Harbor Works goes into war products—from ships to parts weighing only a few ounces—war products that are helping close a ring of steel around the Axis.

ARMY E NAVY

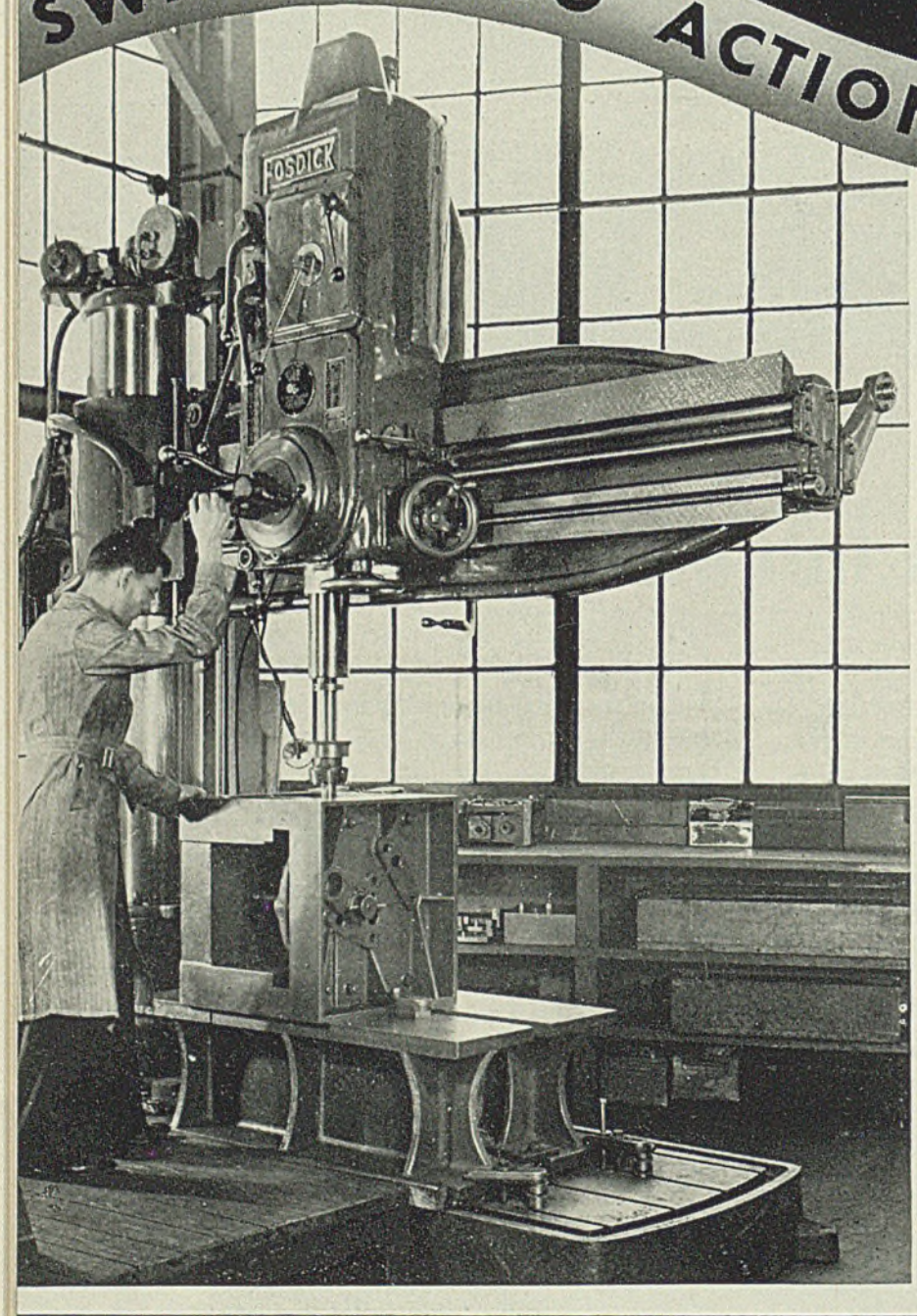
INLAND STEEL CO.

38 S. Dearborn Street, Chic...

FOSDICK RADIAL



SWINGS INTO ACTION AT . . .



A PROMINEN MACHINE TOO PLANT

A box jig is used to hold work on this Fosdick Radial for drilling—reaming or tapp various diameter holes from two more sides.

The jig facilitates handling work while the centralized con in the head make instantly av able for the operator a selec of feeds and speeds as well hand feed.

This is only one of many pa of various machines built by concern that are drilled, tapped bored on this Fosdick Rad quicker—easier—at lower cost.

If your work can be handled a Radial put it on a Fosdick.

Fosdick Radial Bulletin RS gi full particulars. Write for one.

FOSDICK MACHINE TOOL COMPANY
CINCINNATI . . . OHIO

More Railroad Equipment Needed To Haul War Traffic

"You can't argue with a broken rail," apprehensive carrier executives declare. Locomotive shortage acute. Maintenance supplies critical

By ERLE F. ROSS
Chicago Editor

AMERICAN railroads are operating close to maximum capacity and must have new rail, more motive power and additional cars if serious congestion of wartime traffic is to be avoided. This is the consensus of well-informed railroad officials and one that has been voiced repeatedly and emphatically.

One expression to this effect came from Ralph Budd, president, Chicago, Burlington & Quincy railroad, Chicago, who in addressing the company's stockholders said the need for rail is critical and emphasized that "there is no compromise with a broken rail—it must be taken up and replaced." As to the present state of carrier efficiency, he stated that this has increased to such an extent that freight and passengers can be carried profitably at lower rates, even with higher wages and taxes.

Apprehension over the railway supply situation has been expressed widely following recent disclosure by WPB that no materials would be allocated for freight cars in the third quarter and that original estimates for rail in those months would be cut. The announcement is taken to mean that the carriers will have to get along on about half a year's equipment production program instead of a full year's output.

Face Probable Slow Down

Railroad officials are unanimous in stating shortages of rail and motive power are more critical than cars. Maintenance supplies are next. Despite WPB statement that locomotive production is being maintained, deliveries are a mere trickle.

These officials assert that regardless of the number of cars available and how efficiently they are used, "we must have locomotives to pull them and rail to run them on." "Unless the roads are given sufficient rail and other track material," says R. L. Williams, chief executive officer, Chicago & North Western railroad, "a slowing down of car movements will become imperative in the interest of safety. Such a slowing down would only emphasize the present tight equipment situation. A lack of adequate maintenance supplies will likewise emphasize the tight car situation."

F. G. Gurley, vice president, Atchison, Topeka, Santa Fe, comments that "there will be more than a slowing down of trains—they will stop without motive power." Terming the equipment situation "serious," with rail and motive power more important than new cars, J. D. Farrington, chief executive officer, Chicago, Rock Island & Pacific, declares "There is no temporizing with worn rail."

Situation "Not Too Bright"

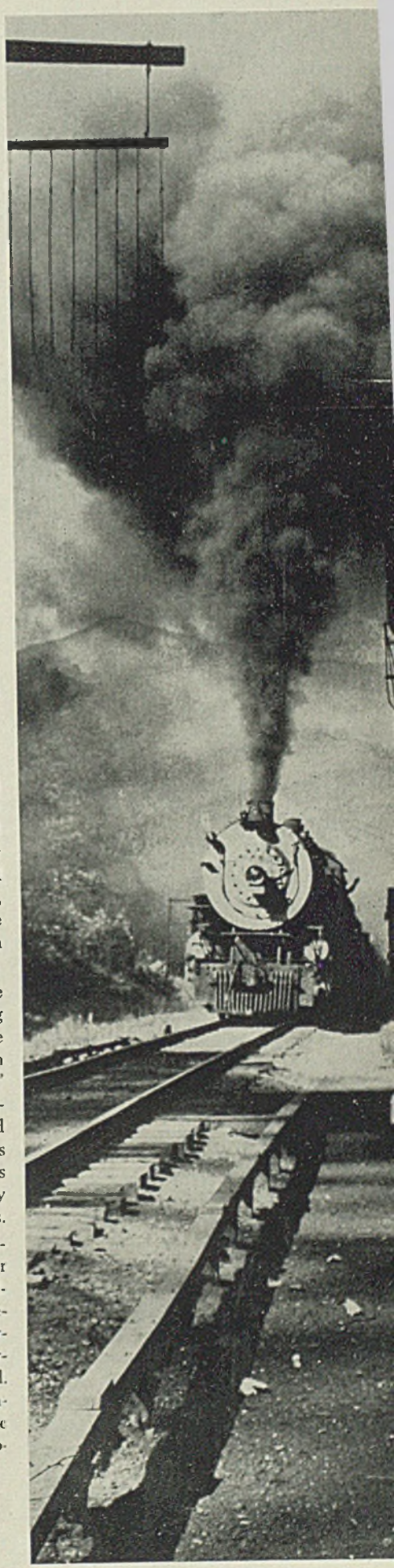
The foregoing comments were elicited after Joseph B. Eastman, defense transportation director, announced on May 14 the WPB clamping down on material for new freight cars in third quarter and slashing down on rail in these months, and informed railroads they will have to exercise even greater efficiency in handling continued increase in traffic.

Mr. Eastman pointed out that while domestic transportation has been holding its own against heavy wartime odds, the equipment and maintenance situation in the railroad industry "is not too bright."

WPB, in announcing third quarter allotments of controlled materials, stated that requests from claimant agencies amounted to more than 20,000,000 tons of carbon steel, while estimated supply will be slightly under 15,000,000 tons.

WPB's requirements committee has denied ODT's request for materials for rail car manufacture beyond those already authorized, and cut the rail replacement program—originally authorized to extend through the third quarter, extensively, Mr. Eastman disclosed.

Thus, according to Mr. Eastman, unless WPB eventually finds it can pry some steel and other metals from overall sup-



Essential to the war effort are the nation's railroads—to transport materiel and troops. Steel for rail, locomotives, cars and maintenance supplies must be provided to keep the vast output of munitions factories moving. NEA photo

ply assignments in the quarter beginning July 1, new freight car production will cease after current schedules are completed. This would make the equipment situation even tighter in coming months than it has been in the past.

Denial of full third quarter claims for additional materials does not mean, Mr. Eastman pointed out, that production of new freight cars will stop abruptly on July 1. Materials for 20,000 new freight cars were allocated previously and production of these cars is expected to extend into the third quarter.

"The railroads are carrying far more traffic now than they did during the last war and doing it with less equipment. Unless material can be found, at least for replacements, I fear that serious consequences may result. At the same time, it is the responsibilty of the railroads to take every additional step they can to conserve equipment and improve the efficiency of their operations.

"The rail situation is being watched closely," Mr. Eastman said. "Should the amount of steel for this purpose prove inadequate to maintain reasonable operating standards, further steps will have to be taken. Obviously, rail cannot be allowed to deteriorate beyond a certain point before being replaced. I shall pursue this matter, and also construction of additional freight cars, with WPB.

Locomotive Plants at Capacity

"The requirements committee has allocated sufficient material to maintain locomotive production to full plant capacity," Mr. Eastman pointed out. Domestic roads will get approximately 258 freight locomotives in the third quarter and 307 in the fourth quarter, on the basis of present production. The engines expected to be delivered in the third quarter will include 145 steam locomotives, 27 diesel-electric 5400-horsepower road locomotives, 85 diesel switch engines, and 1 electric locomotive.

On the basis of present estimates, total deliveries of new transportation equipment for 1943, including those already made, will be as follows: Locomotives, more than 900; and freight cars, 26,000 (including approximately 6000 which were authorized but not built in 1942).

Looking at railroad traffic prospects over the balance of the year, the Department of Commerce estimates a combined physical volume of commodity and passenger transportation will exceed the high record of last year by 16 per cent.

About 200,000 of the nation's 4,500,000 trucks have been put out of operation by manpower, rubber and other shortages. Although the ton-mileage being hauled currently in intercity service shows a gain of 10 per cent over an earlier figure, the fact that so many trucks now are idle has imposed a still greater burden on rail transportation.

Volume of freight traffic handled in 1942 reached a new high level. Number of cars loaded was 2 per cent greater than in 1941, heavier loadings resulted in an increase of 25 per cent in freight transported. Average haul also was greater. Taking all these factors into consideration, the railroads performed 36 per cent more service than in the preceding year.

These results were attained with less

JOSEPH B. EASTMAN

Transportation holding its own against heavy odds, but equipment picture "not too bright"

equipment than in a decade or more. At the end of 1941, Class I railroads had 41,759 locomotives in service, compared with 57,571 in 1929 and 53,316 in 1932. These roads had in service 1,703,304 freight cars at the end of 1942, compared with 2,277,505 in 1929 and 2,144,730 in 1932.

Railroads in 1942 attained a new high record, for the fourth consecutive year, in the average number of tons per carload of freight. The new high was 40.1 tons a car. In 1941 it was 38.2 and in 1940 it was 37.7 tons.

Freight car loadings in 1942 aggregated 43,814,000, as compared with 42,279,000 in 1941, and 36,354,000 in 1940. In the first 19 weeks of 1943, loadings have totaled 14,389,000, as compared with 15,155,000 in the corresponding period of 1942. Comparable figures are 13,805,000 for 1941, and 12,004,000 for 1940.

Loadings in the second quarter, 1943, are expected to be 9,170,439 cars, or 25 per cent above the loadings in the same quarter of 1942, when they totaled 8,947,071, according to estimates compiled by 13 Shippers' Advisory Boards on the 28 principal commodities.

Enlarged allocation of steel to carriers in 1943 had been deemed essential to a continuance of good service. Otherwise, it was felt that restrictions would have to be placed on traffic in favor of war purposes.

In late November, 1942, the WPB Requirements Committee outlined a program covering deliveries for railroads over various periods in 1943, as follows: Steam locomotives, 250, for delivery in first eight months; road diesels, 36, in first eight months; switching diesels, 100, for first six months; freight cars, 20,000, for first six months; passenger cars, none. For first quarter, plan provided 330,000 tons of steel for repairs to equipment, 480,000 tons of rails and 288,000 tons of track accessories. Announcement was made to allow railroad executives to outline their programs and place orders for rails and equipment at once to assure delivery early in 1943.

Reduced Estimate 1,000,000 Tons

On the basis of this program, allocation of steel for maintenance of equipment and lines for first quarter would have totaled 1,098,000 tons, and if this pace were continued throughout the year, annual requirements would aggregate 4,392,000 tons. It was generally regarded, however, that the figure could not be maintained the entire year, as WPB wanted the new rails to go down quickly, hoping for old rails for scrap. Consequently, railroad officials calculated about 1,000,000 tons under the yearly estimate.

The roads had asked WPB to provide 6,650,000 tons of steel in 1943. They sought 80,000 cars and received approval of 20,000, with the prospect that this might become the actual quarterly figure, although buildable over six months. They asked for 900 locomotives, received approval for only 350, but if equaled on the basis of a year, there would be a prospect for 450. They obtained in trackage and other material about what they asked for.

Announcement made early in 1943 was that first quarter rail allocation would be 400,000 tons with 200,000 tons for accessories. In the first quarter of 1942, rail allocation was 538,000 tons with half for accessories. Actual tonnage, how-

ever, was about 300,000 tons, so that the full allocation been provided this year, the carriers would have had more rails than a year ago.

Up until WPB's announcement a few days ago that the program for 1943 was being curtailed, the carriers had expected approval for 44,000 domestic freight cars for the last half of the year, although it was known that until military requirements could be appraised more closely no definite domestic schedule would be set up. Of the 20,000 cars approved for building in first half, little steel was obtained until May, making it clear deliveries would extend into third quarter.

Actual domestic freight car buying in the first four months of 1943 totaled 8765, compared with 22,183 in the corresponding period of 1942, and 43,396 in 1941. The 8765 cars bought in the first four months this year virtually completed the 20,000-car program for first half, the bulk of the buying having been consumated before the end of 1942.

Due to the delay in obtaining steel for freight car construction so far this year, Class I railroads had 20,712 new cars on order as of April 1. This compares with 69,515 on order on the same day, a year ago. New locomotives on order April 1 was 586, against 930 on April 1, 1942.

In the first three months of 1943, Class I carriers put 4667 new freight cars in service, compared with 27,263 in the same period of last year.

Postwar Equipment Demand Mounting

Active postwar markets for railroad equipment are forecast by equipment builders. Potential business at the end of the war will amount to several hundred million dollars, in addition to normal requirements.

Equipment builders estimate the railroads will require about 100,000 freight cars a year for five years following the war. These will cost between $7500 and $15,000 each.

Passenger car requirements will be about 700 a year—each to cost between $60,000 and $85,000.

Equipment builders recognize that any true picture of how actual orders will be placed after the war depends to large extent on how much money railroads will have to spend on new rolling stock. Little or nothing is being put aside at present for this purpose, as the carriers receive no tax credit for such reserves.

An export market of considerable volume also is anticipated by the industry. Vast destruction that has taken place in war areas plus wear and tear on equipment in service is accumulating a huge postwar export demand.

Present, Past and Pending

WILLOW RUN EXCEEDING PRODUCTION SCHEDULE

DETROIT—The Truman investigated Ford Willow Run bomber plant now is exceeding the production schedule since the manpower problem which slowed production earlier this year has been eliminated, Edward L. Cushman, district deputy, WMC, reported last week.

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URGE LIFTING ORE DOCK SUSPENSION

WASHINGTON—Rescinding of the WPB order suspending work on the new ore loading dock at Escanaba, Mich., urged by ODT as completion even late in the shipping season will alleviate ore stockpiling problem.

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BATTLEFIELD SCRAP UNIT REPORTED PLANNED

WASHINGTON—A new unit is being set up within the War Department to collect and bring "battlefield" scrap to the United States.

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FIRST OF NEW LAKE FLEET OPERATING

LORAIN, O.—First of the 16 ore carriers being built by Maritime Commission for the Great Lakes trade went into service last week, sailing from this port under the house flag of the Wilson Transit Co. Vessel is named the THOMAS WILSON.

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FORGINGS REMAIN CLASS A PRODUCT

WASHINGTON—Proposal to change forgings to a controlled material effective Oct. 1 has been disapproved, WPB ruling they will remain class A product because of objections to the proposed change raised by certain claimant agencies. Same procedure must be followed as heretofore in extending allotments.

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WEST COAST STEEL EXPANSION REFLECTED

LOS ANGELES—Purchase of Refractories Corp. by General Refractories Co., Philadelphia, announced by Floyd L. Greene, president of General. Recent growth of the steel industry on West Coast has greatly increased demand for refractories.

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UNIFORM POLICY ON RESERVES NEEDED

LOS ANGELES—Government's failure to adopt uniform policy recognizing need of the aircraft industry for large reserves against uncertain future will have serious consequences for plane builders after the war, Harry Woodhead, president, Consolidated-Vultee Aircraft Corp. told an aviation forum here last week.

o o o

WAR CONTRACTS PLACED IN NEW YORK

NEW YORK—More than $500,000,000 in war contracts placed in this city during the first three months of this year, Mrs. Anna Rosenberg, regional director, War Manpower Commission, reports. More than $446,000,000 in contracts came from the Navy alone.

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SILVER CONSUMPTION BOOSTED BY WAR

NEW YORK—Silver used for military production boosted consumption of the metal to new high last year with total of 193,933,000 ounces consumed for all purposes compared with 135,064,000 ounces in 1941, and 62,239,000 ounces in 1940, according to the American Bureau of Metal Statistics.

o o o

KANSAS LABOR CONTROL LAW OPPOSED

KANSAS CITY, MO.—Attorneys for the American Federation of Labor, Kansas Federation of Labor, Committee for Industrial Organization and four major railway brotherhoods filed suits in federal district court at Topeka enjoining state officials from enforcing the Kansas Labor Control law. They contend the law is unconstitutional and discriminatory.

Gearmakers Speculate on Postwar Possibilities; Elect Officers

RYE, N. Y.

AMERICAN Gear Manufacturers Association, during its 27th annual meeting at Westchester Country Club, May 17, 18 and 19, drew 153 members and 50 guests not only because of subjects of vital wartime interest, but likewise because several speakers gave vivid flashes of what the postwar era holds for this industry. The record attendance justified the association's decision to hold the convention.

The subject, "Gears and the National War Effort", was covered by R. C. Sollenberger, deputy chief, WPB Material Handling Equipment Branch, War Production Board, assisted by Maj. John D. Tebbin and Maj. J. W. Tillier of the U. S. Army Air Corps; Lieut. Commander T. A. Canty, U. S. N. R.; John Rewalt of WPB; and others.

Among technical subjects of great postwar significance, "Induction Hardening of Gear Teeth" by Frank W. Curtis, Van Norman Machine Tool Co., and "Improving Fatigue Strength by Shot Blasting", by John O. Almen, General Motors Co., were typical examples.

At the annual dinner on Tuesday evening, John H. Flagg, retiring president of the Association, introduced the new officers.

New president is Russell C. Ball, president, Philadelphia Gear Works, with which company his entire business career has been spent. Mr. Ball has been active in AGMA affairs for many years. He was vice president, 1942-43, has served as chairman of many important committees, and a guiding influence in promulgating AGMA standards.

He is succeeded as vice president by Louis R. Botsai, manager, gearing department, Nuttall Works, Westinghouse Electric & Mfg. Co., with which company he has been affiliated ever since his graduation from college. Mr. Botsai was treasurer of AGMA for four years and has been chairman of the finance and gear motor committees.

A complete account of this 27th annual meeting of AGMA will be published in the May 31 issue of STEEL.

RUSSELL C. BALL
President, American Gear Mfrs. Association

LOUIS R. BOTSAI
Vice President, American Gear Mfrs. Association

Nelson To Head Speakers At Purchasers' Meeting

"Production *is* Winning Battles—On All Fronts," Donald M. Nelson, War Production Board Chairman, will tell purchasing agents from all parts of the country at their twenty-eighth annual convention and war conference opening today at the Waldorf-Astoria in New York and running through Wednesday, May 26.

Other headliners on the program of the three-day war conference include Arthur D. Whiteside, director of Civilian Supply, and former chief, Iron and Steel Branch, WPB, and Leon Henderson, former head of the office of Price Administration and now chairman, editorial board, Research Institute of America.

Mr. Whiteside will discuss what industry can plan for and expect. Mr. Henderson will talk on price problems.

At one session, the complex Controlled Materials Plan will be explained with the aid of a simplified plan worked out by the Purchasing Agent's Association of Northern California. Specific features of CMP will be discussed by a number of authorities from industry and WPB.

A second session will be held on materials available now and likely to be available in the future. Present and postwar planning will be covered at another. George W. Romney, managing director, Automotive Council for War Production, Detroit, will cover the subject from the standpoint of an industry and David C. Prince, from a company standpoint. Fuels and containers will be covered at a fourth session.

A number of committee and group meetings are planned on specific subjects. The Iron and Steel Committee, under the chairmanship of W. W. MacMillen, director of purchases, National Malleable & Steel Castings Co., Cleveland, will meet May 25 at 4 p.m. for its session.

Attendance Record

Expected at warehouse convention . . . Program stresses wartime problems of industry

HEAVY advance registrations for the thirty-fourth annual meeting of the American Steel Warehouse Association to be held at the Plaza, New York, May 26, reflects exceptional interest in the new warehouse orders of the War Production Board, the zone price schedules issued by the Office of Price Administration, and the Controlled Materials Plan, according to Walter S. Doxsey, president, who predicts record-breaking attendance.

The three speakers from the warehouse industry are John W. B. Foringer, director of Industrial Relations, United States Steel Supply Co., Chicago, who will talk on "Management and Labor and Post War Planning"; R. D. Cortelyou, secretary, Northern California chapter of the association, who will describe the "San Francisco Plan" for maintaining consolidated warehouse inventories; and Mr. Doxsey.

Merrill Stubbs, chief, Industrial Salvage Branch, Salvage Division, WPB, will outline current resources of scrap iron and steel, and tell what part the dormant scrap campaign will play in assuring continuous supplies during the war period. A. O. Fulton, consultant, Steel Division, WPB, and George L. Stewart, president, Steel Recovery Corp., Pittsburgh, will describe the steel recovery program.

The afternoon meeting of the association will be opened by H. G. Batcheller, director, Steel Division, War Production Board, who will talk on "The Battle for Steel".

Donald D. Kennedy, price executive, and E. L. Wyman, head of the Warehouse and Jobbers Section, Iron and Steel Price Branch, OPA, will speak on

present and future price policies, and the development and plans for Revised Price Schedule No. 49.

Lt. Col. Joseph P. Woodlock, will outline the problems of the Services of Supply and tell how this organization's plans begin with raw material resources and carry through finished products for the men on the front.

The program will be concluded by J. R. Stuart, chief, Warehouse Branch, WPB, who will explain recently issued warehouse orders and answer questions about their application to various phases of the steel distributing business.

Sheet Metal Distributors Told Nation Fully Tooled

The United States is now fully tooled for the all-out war effort and the first major phase of the big battle of war production has been won, Joseph H. Liston, special representative, War Production Board, told members of the National Association of Sheet Metal Distributors meeting at Cleveland last week.

E. L. Wyman, Warehouse and Jobbers Section, OPA, talked on the pricing of iron and steel products and George C. Hench, Industrial and Hardware supplies Branch, WPB, discussed the distribution of heating equipment.

Other talks included: "Civilian Requirements", by Henry Dinegar, chief, Consumers Durable Goods Branch, Office of Civilian Supply, WPB; "Distribution and Use of Copper", by Ernest B. Humpstone, Copper Division, WPB; "Sheet Metal Building Materials", by S. L. Wirgman, chief, Metal Building Materials Section, WPB; "Distributors' Part in the War Program", by Herbert L. George, chief, Hardware Supplies Section, WPB; and "Flow of Iron and Steel Products", by J. R. Stuart, chief, Warehouse Branch, Steel Division of WPB.

Major War Figures To Address Metal Trades

Major figures in the war effort including Maj. Gen. Lewis B. Hershey, director of Selective Service, and Dr. William Haber, director of planning, War Manpower Commission, will be featured speakers at the forty-fifth annual convention and production conference of the National Metal Trades Association at the Palmer House, Chicago, May 26-27.

Sessions will be opened by Roe S. Clark, of Springfield, Mass., association president, who will offer a report on association activities for the past year, including job and salary rating, apprentice and foreman training, and wage surveys.

Sheet Association Is Dissolved

DISSOLUTION of the National Association of Flat Rolled Steel Manufacturers, Inc. has been completed. This association dates back more than 50 years to the beginning of the sheet steel industry though it did not become a formal organization until 1916 under the name of the National Association of Sheet and Tin Plate Manufacturers.

In 1927 the association reorganized, consolidating with the Hot Rolled Strip Steel Institute and the Cold Rolled Strip Steel Institute, taking its present name at that time.

George H. Charls was the first president, resigning in 1931 to become secretary of the American Iron and Steel Institute. A. N. Flora succeeded Mr. Charls and was president until his death in 1942. Since then Harry H. Burris, who has been connected with the association since 1916, was named president.

Association headquarters have been in the Oliver building, Pittsburgh, since 1933.

Dissolution of the association primarily is due to basic changes in the flat rolled steel industry. The organization reached its greatest period of usefulness when there was a large number of small sheet mills. Its effectiveness has gradually been declining with the concentration of the sheet business in the hands of a fewer number of mills. For this and other reasons members of the association reached the decision to dissolve early this year.

Eleven Technical Papers To Be Read At Steel Institute's Annual Meeting

MEMBERS of the American Iron and Steel Institute will gather for the fifty-second general meeting of the organization at the Waldorf-Astoria in New York Thursday May 27. One of the fullest programs in the history of the institute has been prepared.

A general session in the morning will be high-lighted by the annual address of President Walter S. Tower.

Two sessions will be held simultaneously in the afternoon on problems arising out of the war, covering technical matters as well as industrial relations. Eleven papers are tentatively scheduled for the technical session as follows:

"Wartime Production of Constructional Steels in the Basic Electric Furnace" by H. W. McQuaid, assistant chief metallurgist, Republic Steel Corp., Cleveland.

"Trend in Alloy Steels" by John Mitchell, metallurgical engineer, alloys, Carnegie-Illinois Steel Corp., Pittsburgh.

"Wartime Scrap Problems" by F. E. Vigor, vice president, American Rolling Mill Co., Middletown, O.

"Production of Steel Plates" by C. L. McGranahan, assistant general superintendent, Jones & Laughlin Steel Corp., Pittsburgh.

"The Conservation of Critical Materials" by C. H. Herty Jr., assistant to vice president, Bethlehem Steel Co., Bethlehem, Pa.

"The Wire Industry and the War Effort" by J. S. Richards, director of research, American Steel & Wire Co., Cleveland.

"War Expansion Program of the Steel Industry" by J. A. Kenney, assistant to vice president, Bethlehem Steel Co., Bethlehem, Pa.

"Increase in Open Hearth Production and How Achieved" by A. P. Miller, assistant general superintendent, Inland Steel Co., Chicago.

"Increased Blast Furnace Capacity and How Accomplished" by George T. Williams, superintendent blast furnaces and coke plant, Indiana Harbor Works, and B. M. Stubblefield, superintendent blast furnaces and coke plant, Campbell Works, Youngstown Sheet & Tube Co.

"Effects of Temperature on Blooming Mill Production of Hot Top Steels" by H. J. Forsyth, metallurgist, Buffalo district, Republic Steel Corp.

Conference Board Will Discuss Postwar Problems

National Industrial Conference Board will hold a series of roundtable conferences on planning for postwar reconversion in conjunction with its annual meeting May 26 at Waldorf-Astoria, New York.

Joseph B. Eastman, ODT director, will serve as chairman of the transportation conference and E. V. O'Daniel, vice president, American Cyanamid Co., as chairman of industry sessions.

Paul G. Hoffman, chairman, Committee for Economic Development, will speak at the general session,

Deferment of 48-Hour Week in Steel Sought Pending Restudy

PENDING restudy of the problems involved in applying the 48-hour week ordered in the steel industry effective July 1, a subcommittee of the Steel Industry Advisory Committee has suggested to War Manpower Commissioner McNutt that effective date of the order be deferred and that no restrictions be placed on hiring in the industry to meet the need arising to meet the labor turnover.

The subcommittee suggested to Commissioner McNutt at a meeting that both the question for the need of the order and the scope of the regulations to implement it be restudied, the industry offering to co-operate fully in this respect.

The policy of the steel industry, to insure maximum output of steels for war needs, is that whatever hours are necessary to produce war-essential steel must be worked, subject only to due regard for employe's health and safety, representatives of the industry said.

Any move which will increase the production of steel for war, or which will aid in the more effective utilization of manpower, will be welcomed by the industry, it was declared.

In presenting data concerning the effect of the Manpower Commission's order, if applied universally throughout all operations of steel production, the spokesmen for the industry stated: "There is no conflict in principle between the industry and the Manpower Commission, nor in their objectives. Both are motivated by the desire to produce steel to the maximum of capacity and to utilize manpower to the maximum degree of efficiency. The industry, however, seriously questions that the commission's order will permit the attainment of those objectives.

"Continuous operating departments can, and in fact do, operate on a schedule of 168 hours per week. Operations beyond the continuous departments, however, present problems of scheduling which must be determined on the basis of the needs for finished or semifinished products as determined and specified in the war program. Flexibility in these operations are bound to necessitate fluctuating schedules of work hours. For some time past employes in both continuous and noncontinuous departments have been working 48 hours and more as the needs of production require.

"Among the provisions of the order which may retard rather than aid production," Commissioner McNutt was told, "are the requirements that a minimum wartime work-week of 48 hours shall be established in each blast furnace, steelworks and rolling mill and that if the work-week of any worker employed in any blast furnace, steelworks or rolling mill subject to this order, is less than 48 hours per week on and after July 1, 1943, no additional worker shall be hired for work therein without the approval of the War Manpower Commission for the specified job and department involved. The industry seriously questions whether the flexible needs of steel production can be satisfied in this manner.

"The necessity of maintaining skilled crews for each department some of which, while not requiring 48 hours in one week, may nevertheless be required in a succeeding week, because of the need of the war program for specific types of products, illustrates the impracticability of the suspension of hiring required under the order, where the work-week of any worker is less than 48 hours."

Pending further study, it was stated, the Manpower Commission's order could be applied to the continuous producing departments of the steel plants, namely, coke plants, blast furnaces and open hearths, compliance being ordered on the basis of average departmental work-week hours.

Natural depletion of the labor force through selective service and other influences, it was argued, would result in an orderly yet flexible expansion of hours and manpower utilization during that period.

Steel Union Leaders Discuss Longer Week

Officials of steel company locals of the United Steelworkers of America met with Philip Murray and other national officers of the union in Pittsburgh, last week, to discuss policies of the union in regard to the 48-hour week in steel.

Job Freezing Is Eased In Illinois District

Job freezing regulations in the Illinois-Indiana-Wisconsin district were eased for a 60-day period, effective May 16, in a temporary order by William H. Spencer, regional WMC director, Chicago. The order permits conditional job transfers of workers in essential industries during this time and was issued to relax somewhat the general job freeze imposed April 18.

Coal Mine Truce Extended to May 31

John L. Lewis, balked by government, applies for reaffiliation with AFL

RECURRENT threat of a coal mining stoppage again was averted temporarily last week when John L. Lewis, president of the United Mine Workers, agreed to keep miners at work until May 31.

Renewal of the truce was the third since the contract between miners and operators expired March 31. Notwithstanding the extension of the contract, sporadic walkouts occurred in many mines and an estimated 4000 were idle in central Pennsylvania at week's end.

Meanwhile bickering between Mr. Lewis and Secretary of the Interior Harold L. Ickes, who was placed in charge of the mines when the government assumed control, continued. Mr. Lewis has refused to co-operate with or to abide by the decisions of the National War Labor Board and has suggested that the dispute be taken out of the board's hands. Mr. Ickes last week warned the UMW that any settlement must have the approval of the NWLB.

The dispute affects 409,000 miners in more than 3000 mines. Operators contend that the miners' demands for a $2-a-day wage increase, portal-to-portal pay, increase in vacation pay from $20 to $50, minimum rate of $8 a day, and overtime guarantees would increase the labor costs of mining coal 77.59 per cent, or $1.18 a ton.

Mr. Lewis, at long last balked by the government, is confronted with a face-saving problem. Many observers believe the easiest "out" for the miners would be to accept a 6-day work-week which, with overtime, would give the miners approximately the wage increase they are asking. The 6-day week actually has been in effect in mines producing about 95 per cent of the coal for the past several months.

In a move, the significance of which is not yet apparent, Mr. Lewis last week applied for return of the United Mine Workers to the American Federation of Labor. Originally a unit of the AFL, the UMW withdrew eight years ago.

Government Storage Advocated To Avert Postwar Market Collapse

By DAN HARRINGTON
President
Machine Tool Dealers' Association

SINCE the war started, much has been said about the bottleneck in production caused by inability of manufacturers to secure machine tools in the quantities desired. According to recent reports, however, this bottleneck is no longer existent because of the marvelous job done in producing enough tools to consume all the raw materials this country has available for fabrication.

The machine tool industry is a basic industry. The products of its shops must be used for building tanks, ships, guns, airplanes, ammunition and other implements of war. Machine tools are responsible for our industrial expansion and everything that is manufactured from metals originally starts with them. They are the only machines that reproduce themselves and they have been responsible for our great industries such as the automobile industry, the steel industry, our railroads and our airplane industry.

1942 Volume Ten Times Normal

Being such a basic industry, it should not produce or manufacture itself out of business. During 1940, 1941, 1942 and 1943, the machine tool manufacturers manufactured and produced more tools in dollar volume and units than were produced during the previous history of the country. During 1942 approximately $1,300,000,000 worth of machine tools was produced. It took the manufacturers four or five years to reach this peak production and many individual tool manufacturers produced in 1942 more units than they would normally produce over a period of ten years.

Of course, this tremendous production could not be reached over night because machine tool manufacturers also need machine tools to make machine tools. This leads to the conclusion that at the end of the war, there will be a tremendous surplus of machine tools and there will have to be a solution to this problem if the machine tool industry is to survive. A tremendous surplus must not be allowed to get into the hands of speculators such as happened at the end of the first World War as this would wipe out the demand for new tools and necessitate closing up many vital machine tool shops.

We realize that, due to present curtailment in production of peacetime consumers' products, a potential postwar market is being made. Many standard machine tools can be diverted from wartime uses to peacetime factories. Therefore, the machine tool industry, in helping the government build up its tremendous war machine, has destroyed its postwar market.

It is my suggestion that the following plan be given consideration. Where machine tools are owned by the government through Defense Plant Corp., or any of the other government agencies such as the Army, Navy, Treasury Department or Maritime Commission, that

DAN HARRINGTON

they be stored at the end of the war unless they are kept in continuous use by these various agencies. These machines can be thoroughly greased and can be stored at little expense in the factories and warehouses which the government now owns. It is generally agreed the average life of a machine tool is approximately twenty years under normal usage and, while over a period of years the machines in storage might become somewhat obsolete, they could still be put into immediate service in case of an emergency and they would produce again with almost the same efficiency as a later model machine. At present there is a large percentage of tools in operation that are in excess of twenty years old and they are performing a valuable service to the war effort.

This surplus equipment, if stored, would be in the nature of an insurance policy and any country would hesitate to attack us if they knew we had a tremendous supply of machine tools on hand that could be put into immediate use making the implements of war. If these surplus machines are put on the market, the amount of money the government would receive for them would be infinitesimal compared to the amount we are spending day by day for bombs and shells.

For the sake of argument, let's say that the government did put in storage $1,000,000,000 worth of tools. If this equipment were thrown on the market for sale, if the experience in the last war teaches us anything, it would probably bring from ten to twenty cents on the dollar. This means that the government would then be carrying on its books from $200,000,000 to $400,000,000 in idle machine tools which would be the best insurance in the world as they would enable us, if need be, to get back into immediate wartime production in case of an emergency.

The government spends millions and subsidizes other interests in this country and the comparatively small amount of money required to keep these surplus machine tools available for immediate use would not amount to anywhere near the millions spent otherwise.

Mostly Special Purpose Tools

Many tools now in use are special purpose machines made especially for particular operations on war products. While these machines would not seriously injure the machine tool industry if put on the market, as they would probably be sold for junk, nevertheless, they most certainly should be stored and preserved as insurance against a future emergency.

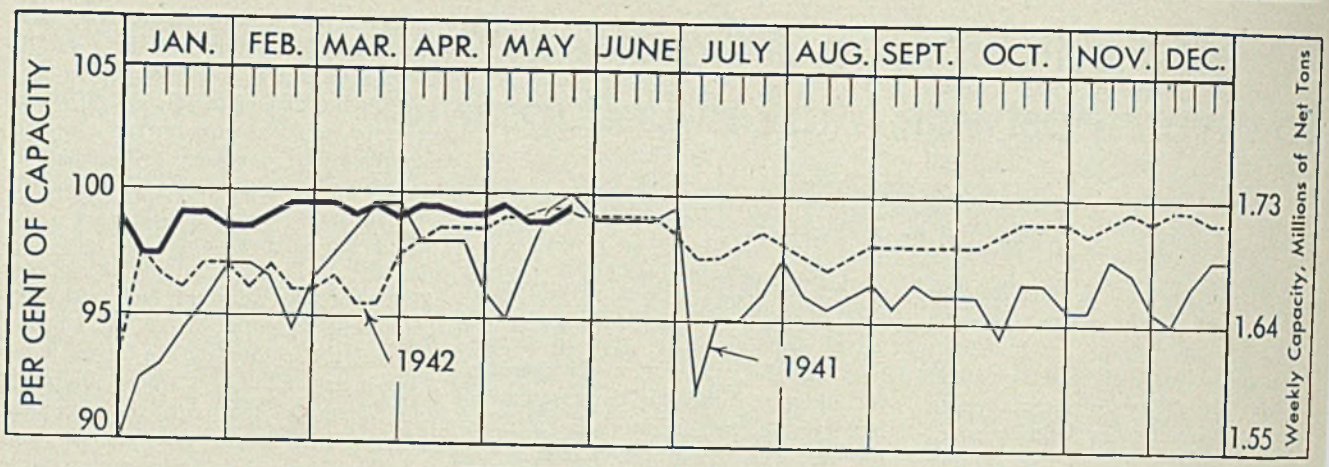
If the Navy yards, arsenals and even private industry keep government machine tools in operation after the war, there should be a time limit set to prevent them from selling the tools in a year or two and thus disrupt the market.

Some tools owned by the government could be placed in technical schools. This would absorb a small portion of the surplus.

Justice Department To Prosecute Labor Pirates

Prosecution is threatened by the Department of Justice against companies seeking to induce tool and die makers and other mechanics to quit their jobs with war firms, Robert C. Goodwin, WMC director of the fifth region states.

"Representatives of labor brokers have operated from hotel rooms, as a rule," Mr. Goodwin says. "They have been offering these workers tremendous increases in pay, sometimes twice as much as they are now getting."



STEEL INGOT PRODUCTION BY MONTHS

Net Tons, 000 omitted

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1943	7,408	6,811	7,670	7,374	....	....	....	....	....	....	....	....
1942	7,124	6,521	7,392	7,122	7,386	7,022	7,148	7,233	7,067	7,584	7,184	7,203
1941	6,922	6,230	7,134	6,754	7,044	6,792	6,812	6,997	6,811	7,236	6,960	7,150

PIG IRON PRODUCTION

1943	5,194	4,766	5,314	5,035	....	....	....	....	....	....	....	....
1942	4,983	4,500	5,055	4,896	5,073	4,935	5,051	5,009	4,937	5,236	5,083	5,201
1941	4,666	4,206	4,702	4,340	4,596	4,551	4,766	4,784	4,721	4,860	4,767	5,014

Ore Use Drops

Stocks at furnaces and docks lower than year ago. Active stacks total 178

CONSUMPTION of Lake Superior iron ore in April totaled 7,186,201 gross tons, compared with 7,723,461 tons in March, the Lake Superior Iron Ore Association reports. Ore stocks at furnaces and Lake Erie docks May 1 were 18,496,988 tons, compared with 25,088,209 tons April 1 and 20,064,744 tons a year ago.

As of May 1 inactive furnaces numbered 13, all in the United States, compared with eight a month earlier. All Canadian stacks were active. Total stacks in production was 178, of which 169 were in the United States.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week ended May 22	Change	Same week 1942	Same week 1941
Pittsburgh	99	None	94	100.5
Chicago	96.5	—0.5	104	102.5
Eastern Pa.	95	—1	96	96
Youngstown	97	+2	94	97
Wheeling	93	+5.5	78	89
Cleveland	96	+2	91.5	96.5
Buffalo	90.5	None	90.5	93
Birmingham	100	None	95	95
New England	95	None	100	90
Cincinnati	94	+2	91.5	89
St. Louis	90	None	98	98
Detroit	96	None	93	89
Average	99	+0.5	°99	°100

°Computed on bases of steelmaking capacity as of those dates.

Ingot Rate 99%

Steelworks operations rise ½-point. Coke supply situation uncertain

PRODUCTION of open-hearth, bessemer and electric furnace ingots last week advanced ½-point to 99 per cent of capacity. Four districts made small gains, two declined slightly and six held to the prior week's rate.

A year ago the rate was 99 per cent; two years ago it was 100 per cent, both based on capacities as of those dates.

As a result of uncertainty of coke supply in view of the unsettled coal mining situation Bethlehem Steel Co. has delayed blowing in new stacks at its Lackawanna, N. Y., and Bethlehem, Pa., plants, one being ready at each location.

APRIL PIG IRON OUTPUT FALLS BELOW MARCH

Pig iron production in April fell below the all-time record of March, with 5,035,178 net tons, compared with 5,314,201 tons in the prior month, due partially to one less working day, according to the American Iron and Steel Institute. The April tonnage was made up of 4,975,012 tons of pig iron and 60,166 tons of ferromanganese and spiegeleisen.

For four months this year production aggregated 20,326,130 tons, compared with 19,421,340 tons in the corresponding period in 1942. In April the industry operated at 96.6 per cent of capacity, compared with 98.7 per cent in March and 98.8 per cent in April, 1942. For the four months, production was at an average rate of 97.5 per cent, compared with 98 per cent last year.

District	Annual capacity	Pig iron	Ferro, spiegel	Total	Per cent capacity
Eastern	12,868,680	916,569	24,349	940,918	88.9
Pittsburgh-Youngstown	25,732,160	2,070,049	21,273	2,091,322	98.8
Cleveland-Detroit	6,125,110	506,791	.....	506,791	100.6
Chicago	13,081,540	1,064,464	.....	1,064,464	98.9
Southern	4,425,540	336,165	14,544	350,709	96.3
Western	1,134,100	80,974	.....	80,974	86.8
Total	63,367,130	4,975,012	60,166	5,035,178	96.6

During 1942 the companies included above represented 99.8 per cent of the total blast furnace production.

Carnegie-Illinois Breaks More Production Records

More than 1500 individual unit production records have been broken since Pearl Harbor by employes of the Carnegie-Illinois Steel Corp., Pittsburgh, but last month the Clairton Works added another record at furnace No. 2 when April production exceeded by 6 per cent the March total which was the previous high.

Homestead works' 48-inch rolling mill broke the March, 1943, production record. Crews on No. 2 five stand tandem mill at Irvin works, also set an April production figure that exceeded March output, the previous record. Producing cars for mine and industrial railways, the Johnstown-Lorain works more than doubled normal production.

Rules Mills Must Accept Small Lots When Rollings Permit

STEEL producers have been informed by H. G. Batcheller, director, Steel Division, War Production Board, that small orders should be accepted where such orders can be fitted into existing schedules without loss of production.

Some misunderstanding had arisen in the industry regarding CMPL-54, dated Feb. 1, which called attention to certain provisions of CMP Regulation No. 1 and indicated orders for less than minimum mill quantities specified in schedule IV should be rejected except under unusual circumstances.

The whole intent of that provision, Mr. Batcheller emphasized, is to avoid in the interest of maximum production the necessity for making frequent roll changes and set-ups to take care of small orders which in themselves are impractical to produce.

"For example," Mr. Batcheller said, "a producer should reject an order for less than a minimum quantity if at the time the order is presented he has no melting or rolling schedule of the particular grade or size involved, nor any reasonable prospect of being able to ship it in the month required. On the other hand, he is not justified in rejecting the order if it can be included in scheduled rollings without detriment to his overall production, and if in the normal course of business heretofore he would have accepted such an order.

There must be no discrimination between customers, but a producer must be guided by the situation at the time he receives a small order. For example, it would be proper for him to reject such an order from one consumer, and at a later date accept a similar or identical order from the same consumer or another consumer, because of changed conditions in his production schedules."

WPB Rules on Sales Of Aluminum Patterns

Procedure for purchase of aluminum patterns under the Controlled Materials Plan is set forth in direction No. 1 to CMP regulation No. 5, superseding instructions in CMPL-196.

The word "patterns" in the direction means only match plates, patterns, core boxes, core driers and snap flasks made of aluminum and does not include jigs, fixtures, or forming blocks.

When a purchaser furnishes the pattern foundry with all the aluminum required to fill the order, in the form of obsolete or defective patterns the following instructions apply:

(1) No preference rating or CMP allotment symbol, number or certification is required on the order to the foundry or pattern maker;

(2) Any foundry may remelt aluminum in the form of obsolete or defective patterns furnished by the prospective purchaser of the new pattern without prior authorization;

(3) Wherever possible, old patterns should be used to make new ones.

Limit Placed on Purchases

When the purchaser does not furnish a sufficient amount of obsolete or defective patterns to fill his needs, he may place authorized controlled material orders up to 600 pounds of aluminum patterns in any calendar quarter, over the weight of the patterns he turned in to the foundry in the quarter, by placing on the order the symbol MRO and the certification of CMP regulation No. 7.

If a purchaser requires in any quarter more than 600 pounds of aluminum patterns over the weight of those turned in by him in that quarter, he may apply for an allotment for the additional amount by letter to the Aluminum and Magnesium Division of the War Production Board.

If an allotment is granted, the applicant may place an authorized controlled material order for the additional amount allotted by endorsing on his order the symbol shown on the allotment, and the certification described in CMP regulation No. 7.

The direction also applies to a company which makes its own patterns. Such company places authorized controlled material orders on its own pattern foundry which makes delivery of the patterns.

Pattern manufacturers are not required to apply for an allotment of aluminum. They are authorized to use the MRO symbol endorsed on their customers' orders to obtain aluminum pattern castings.

Adopts New System To Produce Heavier Planes

New aircraft production planning and control system to bring about increased production of heavier types of combat airplanes was adopted last week at a three-day conference of airplane manufacturers, aluminum fabricators, and Army, Navy and WPB officials with the Aircraft Production Board.

"Operation of the new plan will mean establishment of a planning and control group under the Aircraft Production Board," C. E. Wilson, WPB executive vice chairman, said. "This group, which will be set up on a somewhat informal basis, will include representatives of the airframe manufacturers, producers of various airplane parts, Aircraft Scheduling Unit, and the Aluminum and Magnesium Division of WPB."

He pointed out part of the job of the group will be to study inventory positions in the field of fabricated parts where demand is increasing so that month by month output of parts can be used to fullest advantage in current production.

Scrapping of Serviceable Auto Parts Prohibited

Serviceable auto parts no longer may be scrapped under a new conservation order, M-311, effective June 1. The only exceptions made to this ruling are when parts are: no longer serviceable; are already in transit; have been prepared by June 1 for shipment to steel mills, foundries, or furnaces; mingled with other scrap so that segregation is impossible; or when used cars are sold to wreckers, scrap dealers, or repair shops.

Ruling on Normalized Steel Shipments Modified

Controlled Materials Plan regulation against shipping normalized or heat-treated carbon steel on commercial warehouse orders refers only to carbon or alloy steel bars but not all carbon or alloy steels. War Production Board emphasizes that if the steel to fill warehouse orders already had been heat-treated or processed on April 19, it may be shipped when completed. Shipments of steel for aircraft use are not affected by the regulation.

Ends Use of Allotment Numbers for Up-rating

Use of allotment numbers as an up-rating device for obtaining non-controlled materials will end on June 30. This action was taken by the WPB Controlled Materials Plan Division by amending CMP Regulation No. 3.

Orders placed during the second quarter, accompanied by preference rating and allotment number, will continue to be "up-rated" orders. However, the application of an allotment number to a rated order after June 30 will not have any effect on the rating.

WINDOWS of WASHINGTON

Money Well Spent

IN THE fiscal year 1943-1944 the Federal Bureau of Investigation expects to spend in the neighborhood of $43,568,000. When the full story is told it will be generally recognized that money spent by the bureau during the period of the war is money exceedingly well spent. Unobtrusive, using methods utterly unlike those of the Nazi Gestapo, the bureau maintains a record of which the Gestapo might well be proud in suppressing industrial sabotage or in keeping it within negligible proportions. The surveillance is so thorough that no attempt at sabotage on any large scale can be successfully launched in this war.

Strange Phenomena

Strange phenomena come to light in time of war. Foremost among governmental offices that prepare bombing maps of European industrial centers is the Board of Economic Warfare Section of the Department of Justice's Antitrust Division. Reason is that it has in its files an enormous amount of information about European industry as a result of its Standard Oil, du Pont, insurance and other investigations; also it has a corps of men thoroughly trained in assembling such information into useful patterns.

Locking Ahead

While most railroads advertise to the public to stay at home rather than travel unnecessarily, actually they are anxious to have travel sustained as much as possible. They hope to keep the traveling public "railroad conscious", having in mind, of course, not only restoration of automobile traffic after the war but also likelihood that the airlines will offer keen competition. Some railroads, incidentally, are working on ambitious improvement programs to be placed in effect after the emergency has been passed in order to meet competition from other forms of transportation.

Wink at Violations

Many violations of the antitrust laws have been certified to the Department of Justice as being requisite to the war effort pursuant to Public Law 603 which was enacted on June 11, 1942 by the seventy-seventh Congress.

Altogether some 62 plans have been "approved" by the Department of Justice. Not all of them permit practices that normally would be in violation of the antitrust laws. In a good many instances these practices are not held by the department to be in violation of the antitrust laws but approval was necessary so as to assure participants in these practices of immunity. As an example, General Electric Co. and Westinghouse Electric & Mfg. Co. are permitted to pool information in reference to design and production of auxiliary turbine generators. Manufacturers of electrical equipment for the Army Air Force have been authorized to collaborate.

WAR STRATEGY

There are signs that overall war strategy, now that victory has been won in the African campaign, may be sharply revised.

With Germany and Italy now imprisoned in Europe, with uncertainty as to whether Russia will join in the war with Japan, with reluctance on making Russia the dominant power in a postwar Europe — thus placing her in better position to spread her political doctrines, and with a more general acceptance of the warnings of General MacArthur, Madame Chiang Kai-shek, and of Australian and New Zealand officials, it is possible we may now undertake an all-out offensive in the Pacific arena — always making sure that Great Britain has adequate defenses.

It may be that air raids on Europe will be continued on a vast scale but it remains to be seen whether actual invasion is on the calendar for an early date.

Helping Business

Small business section of the Antitrust Division is a government unit that small business should bear in mind. This section has stepped up its efforts to prevent war contingencies from driving small businesses into bankruptcy on any larger scale than is absolutely necessary. It defines a small businessman as "anybody who cannot afford a representative in Washington.

"We attempt to develop his case and be his representative," says a spokesman.

In one case it kept a small business alive by persuading a large company to divert some of its material. In another it kept small manufacturers of cold cathode fluorescent lamps going by prevailing on the War Production Board to allocate materials to them. There have been many such instances. Small manufacturers will do well to get in touch with the Small Business Section when they have such problems.

Military Secrecy

Speaking of military secrecy, it is interesting to note that one secret government publication has a total circulation of 200 copies. The list starts with the Commander-in-Chief and includes only the rarified upper strata of the entire military personnel. Copies are numbered on the outside cover and those to whom they are addressed are charged with responsibility for keeping them in safe places. So secret is this publication that even the editors who create it are not allowed to retain even a single file copy.

New Scarcity Seen

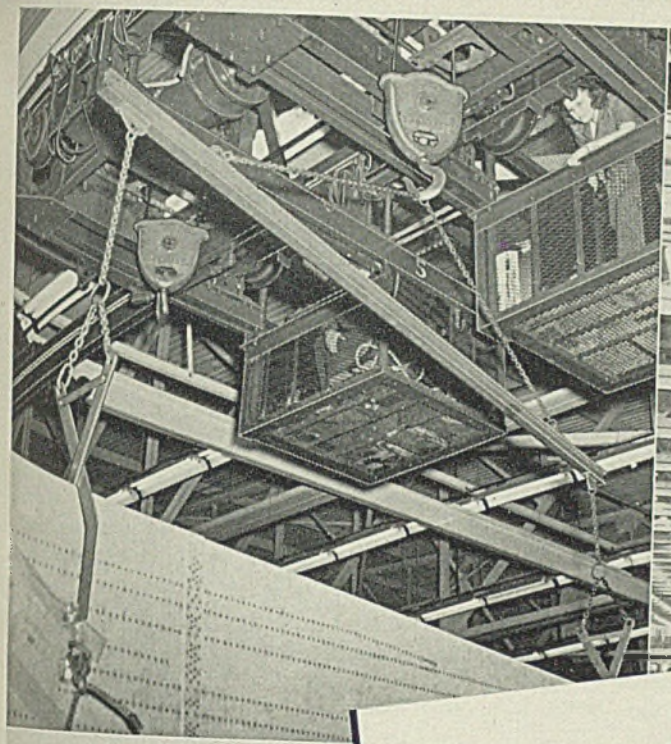
A new scarcity that is beginning to materialize is in cordage, both soft and hard fiber. The problem of meeting requirements is expected to become acute by September at latest. In the meantime a program aimed at stimulating conservation is being planned. Also, possibilities of using substitute materials in certain applications are being studied. It seems likely that wire rope will be a substitute of considerable importance.

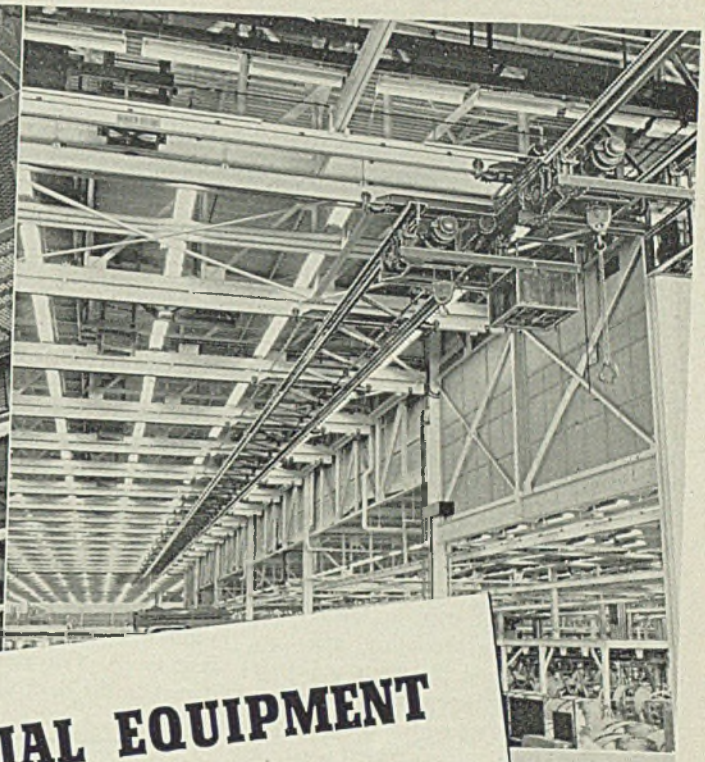
Patent Licensing

Some 80 licenses granting rights to use seized patents so far have been issued by the Alien Property Custodian to American manufacturers. Some 2500 manufacturers have purchased copies of the $5 volume that classifies all the patents available—some 45,000 in number—so that as manufacturers study this list the number of applications for licenses should increase rapidly. To keep off those who are merely curious the custodian charges a fee of $50 for each application for license, plus an additional $5 fee for each additional related patent included in the same license.

Industry Co-operates

During the year following enactment of the war contract renegotiation law on April 28, 1942, the War Department effected price reductions and obtained cash refunds aggregating $1,527,000,000. This news was conveyed in a letter written to Senator David I. Walsh by Robert P. Patterson, under secretary of war. Mr. Patterson reported war contractors increasingly are showing a disposition to co-operate fully and voluntarily with the War Department Price Adjustment Board. Among the good effects from price renegotiation, he said, is that it protects private industry against charges of profiteering at the expense of taxpayers and men in the armed forces.





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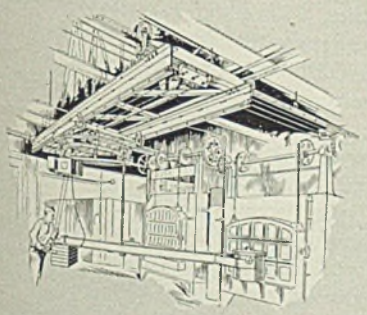
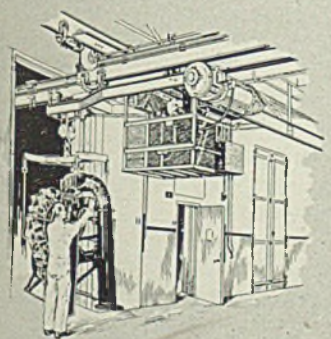


Overhead Loop for Quick Pouring



Spotting Motor in Test Cell

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Good Neighbors Co-operate

Joint approach of government and private enterprise in United States and other American republics required to foster sound economic hemispheric development

By WILLIAM P. MACHOLD
Executive Director
United States Commission of
Inter-American Development

TO IMPLEMENT the Good Neighbor policy our government is fostering, planning and guiding action through governmental, semi-governmental and private agencies toward the economic development of this hemisphere.

This co-operative joint approach of government and private enterprise will continue since not only in the United States but also in the other American republics, the Good Neighbor policy is becoming widely accepted as nonpartisan and strongly supported by business.

Sound economic development must be broad in its scope, including such directly related fields as education, housing, nutrition and sanitation, for its practical objectives rest on the achievement of greatly increased per capita purchasing power essential for greater trade and "good business". It is to the enlightened self-interest of all the American republics that these aims be fulfilled.

By no means is the road toward this goal an easy or a short one. It calls for intelligence, patience, hard work. "Pet" projects will have to be reexamined realistically by their sponsors in the light of their economic feasibility; exploitive, quick turnover, "adventure" schemes are unwelcome, and not only the United States but also many of the other American republics will have grave problems to solve in the conversion of war production to peace time uses and outlets.

Loans Aid Our Neighbors

It is natural that in the midst of war, the role of government in the implementation of the Good Neighbor policy should be the dominant one. Long before Pearl Harbor the United States aided the other republics through stabilization loans, Export-Import Bank credits for needed capital goods which were delivered, and the carrying out of a policy to purchase from them raw materials for our then expanding defense effort as well as merchandise we had formerly bought in Europe. Since Pearl Harbor our government has perforce concentrated on developing maximum production of vital war materials, including copper, tin, tungsten, rubber, quinine, fibers.

Closely allied with these activities are health and sanitation, food production, highway, railroad, and air transportation development and rehabilitation operations, not only of great importance now but with potentially profound effect in the postwar period as nuclei factually demonstrating to the peoples of the other American republics significant operations which they can carry on and expand. Most of these activities stem from the Rio Conference which, although it met in the dark days of the Japanese drive into the South Pacific, nevertheless foresaw the inestimable value of hemispheric unity as a great spiritual and material reservoir of the highest importance in the battle for victory over the Axis. The contributions of our allies in the Western Hemisphere are a substantial weight in the scales of the world struggle, and as members of the United Nations they will participate in the postwar adjustments which will inevitably follow.

The war has not wholly precluded development or expansion of consumer goods production and light industries such as textile mills, cement plants, and rolling mills. Construction of the widely known Brazilian steel mill continues. Furthermore, Latin Americans have often demonstrated their ingenuity in utilizing available material and machinery towards the production of consumer goods for local needs.

While our agencies charged with the control of machinery and materials sincerely are doing their best to meet the minimum essential needs of our neighboring republics, the backlog of Latin American development projects "deferred for the duration" will continue to increase for the grim demands of war lead but to one conclusioin—less shipping space, less machinery and materials. When, in a recent three month period, the War Production Board canceled nearly a billion and a quarter dollars of construction projects in the United States not directly related to the war effort and when our shipbuilding program had been increased 50 per cent from twelve million to eighteen million tons annually, it should be clear through the Americas that the civilian belt is being tightened not one but many notches.

After reflecting on the sorry plight of France, Spain, Greece and other parts of the world, we in all the Americas should rejoice that the road to realism, to development for war, is being followed for, were it not, there might well be no "manana" for the realization of these many projects of government and private enterprise which will contribute so much toward a higher standard of living in the Americas.

It is the postwar period which will see the fulfillment of the Americas' mounting backlog of demands for consumer goods and the machinery for their production, as well as equipment for power plants, transportation and basic industries. Here the role of United States private enterprise is one of heavy responsibility, for our participation as a partner will be of material assistance in meeting local capital and technological needs. We have capital, we have technical skill and managerial "know how". Latin America has natural resources and manpower. A singling of these elements will further impressively the economic development of the other Americas, the increase of their per capita purchasing power and their becoming a larger market for United States products as are the industrialized nations of the world.

Co-operation Overcomes Obstacles

The partnership basis for our participation may well be taken as a basic assumption deserving of much consideration now. It is not new, for in the early days of our own internal development we are often partners with foreign interests which only by the end of the last war we had financially replaced. Business men as partners with all the two-way give and take that this implies, are far more effective in overcoming obstacles to trade than are alien corporations or individuals.

United States business is already do-

Postwar Planning Reprints Available

■ **The series of ten articles on Postwar Planning which ran in STEEL, Jan. 25, 1943-March 29, 1943 has been reprinted in a 48-page booklet for further distribution and easy reference. Copies are now available to regular subscribers free of charge in limited quantities. Please send your request to STEEL, Readers' Service Department, Penton Building, Cleveland.**

ing much thinking about its role in foreign economic development after the war.

Time and money are needed for the sound preparation of postwar activities abroad. Among many subjects where "a little learning is a dangerous thing", knowledge must be obtained concerning laws and taxes, the nature and demands of markets, availability of labor, raw materials, and transportation, climatic conditions and business customs.

Good Sources of Information

It is wishful thinking to assume that any United States business can be duplicated lock, stock and barrel abroad without reorientation to the new conditions under which it must operate. Much useful information and advice can be obtained from those long-experienced in Latin American trade and business. This is a time-absorbing job, but thoroughly worthwhile to the newcomer to foreign fields. Our government agencies in Washington, including the Department of Commerce, Argriculture and State, and the Tariff Commission offer much. Our banks, the export offices of our industries, our engineering firms, too, have had much experience.

It would seem well for business men to know that as a result of the Panama Conference of 1939, all the governments of the Americas took action in forming and recognizing a system of national commissions in each of the 21 American republics as a channel for co-operation between government and business for furthering the development of the trade and industries within the Americas. At the head of this system is the Inter-American Development Commission of which Nelson A. Rockefeller is chairman.

With the formation of the United States Commission of Inter-American Development in January of this year under the chairmanship of Eric A. Johnston, president, United States Chamber of Commerce, the chain of national commissions in each republic was completed. These commissions, in co-operation with their governments, are endeavoring to assist private enterprise toward the preparation now and the execution after the war of sound developmental projects within the other American republics.

Urges Public Works To Avert Unemployment

Sound national program of public works to take up the unemployment slack after the war was urged in New York by Maj. Gen. Philip B. Fleming, federal works administrator.

He presented figures on postwar unemployment, pointing out that 6,000,000 will be discharged from aircraft, shipbuilding and machine building, 2,000,000 from government service, 400,000 from transporation, and 7,500,000 from the forces.

Of this total of 15,900,000, industries now "under the wraps of government control" may employ 1,000,000 additional workers, leaving 14,900,000 jobless after the war. Of this latter number, about 5,000,000 may be expected to retire from the labor market, including women, old people and youngsters resuming studies. About 2,000,000 may go into agriculture, 1,000,000 will get jobs in services and finance, another 1,000,000 will find work as servants or as self-employed and 2,000,000 go into trades.

Of the remainder, 2,000,000 of the less physically fit will probably have to be carried on as permanently unemployed, still leaving almost 2,000,000.

"But what about these latter?" General Fleming asked. "As yet no mention has been made of the construction industry. At the peak of the war effort, it is estimated that construction will employ about 500,000 workers. If, in addition, it could absorb 2,000,000 more after the war, the problem of unemployment would apparently be solved. This is a large number for construction. By way of comparison it is estimated that in 1939 construction, both private and public, accounted for 1,200,000."

He emphasized that a soundly conceived public works program on a scale much larger than normal would contribute importantly to the postwar unemployment program.

Westinghouse Postwar Policy Is Outlined

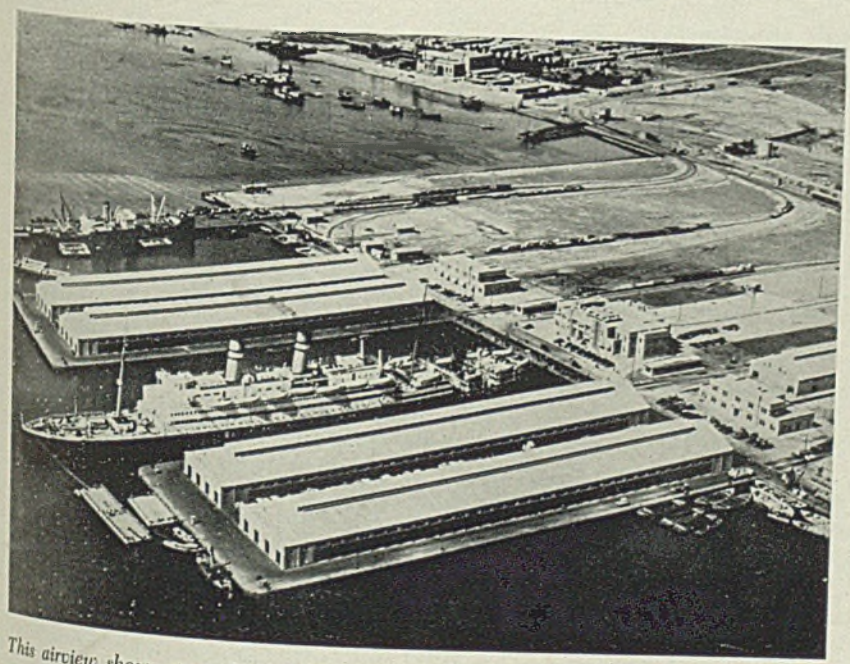
Postwar policy is outlined by T. J. Newcomb, sales manager, Westinghouse Electric Appliance Division, Mansfield, O., in an open letter to 32,000 electrical dealers throughout the nation.

"Our postwar planning in the interests of consumers and dealers covers two stages," Mr. Newcomb reported. "First, when the war is over we plan to get into production fast on essentially those products you sold just before the war. We shall improve them but won't experiment with radical changes."

The second phase, he explained, is "bring along the revolutionary new developments as quickly as they can be proved."

"We believe you will want a line of products which you can get for actual selling—fast. It's all right to talk about new plastic refrigerators and glass ranges, but if you have to wait for months before you can get such products, you're not going to play many tunes on your cash register. You will want products that have acceptance. Neither you nor your customers will want to experiment with new and untried products and materials, no matter how novel and glamorous.

"So we think postwar planning in your interest means our getting into production fast; getting you a line of products you know will give customer satisfaction —products that give you low selling cost, low service cost, quick turnover, and profits."



This airview shows steamship docks and waterfront facilities at the South American port of Callao, Peru. Postwar trade possibilities are enhanced by well-equipped ports of entry. NEA photo

PRIORITIES–ALLOCATIONS–PRICES

Weekly summary of orders and regulations issued by WPB and OPA, supplementary to Priorities-Allocations-Prices Guide as published in Section II of STEEL, May 10, 1943

CMP REGULATIONS

No. 2 (Amendment): **Inventories**, effective, May 10. Exempts persons converting controlled materials, which they received under specific direction, to other forms of controlled materials. Permits such producers to receive deliveries of controlled materials in excess of the amount which will be placed in production during the following 60 days. Applicable Steel, Copper and Aluminum Divisions will be responsible for regulating inventories of exempted producers.

L ORDERS

L-2-i (Revocation): **Passenger Automobiles**, effective May 13. Revokes order which had prohibited manufacturers of passenger automobiles or parts from selling any part of their inventories of steel except under specified conditions. Control over these inventories now exercised under Priorities Regulation No. 13.

L-28 (Amendment): **Incandescent, Fluorescent Lamps**, effective May 17. Provides that only ratings of AA-4 or higher can be applied or extended for purchase of incandescent, photoflash, photoflood, fluorescent, and glow discharge lamps. Previously, an AA-5 rating was acceptable.

L-97 (Amendment): **Railroad Equipment**, effective May 17. Permits immediate leasing or lending of locomotives between different types of enterprises. Recipient of the locomotive is required only to forward form PD-747 to WPB within 48 hours after the locomotive is delivered. Permits: customary daily switching operations for which charges are made; transfer of locomotives from one branch or section of a company to another of the same enterprise; lending or leasing of locomotives between companies which are parents and subsidiaries of each other or which are subsidiaries of the same parent company.

L-142(Amendment): **Metal Doors, Door Frames, Shutters**, effective May 13. Permits manufacture of these items to fill orders rated AA-5 or higher, provided that 85% of the material required was put into process prior to Sept. 26, 1942, or was in possession of the manufacturer on that date, and is heavier than 24 gauge. Permits manufacture to fill an order for the Army or Navy for use in bombproof or splinter-proof structures, sea coast fortifications, magazines for the storage of other than inert material, ammunition loading or handling spaces, bombsight storage spaces, radar equipment storage spaces or finance vaults in standard finance buildings. Permits manufacture of hangar-type doors and manufacture of items for specified fire prevention purposes.

M ORDERS

M-9-c (Amendment): **Copper**, effective May 17. Prohibits use in oil wells; water wells; pari-mutual, gambling and gaming machines, devices and accessories. Prohibits production of slide fasteners and similar closures with copper for all purposes. Restricts use further in hot water heaters, tanks and coils for military purposes. Lifts restrictions on use of brass in manufacture of bells for shipboard use where brass is necessary for proper functioning of the parts; on use of copper in certain industrial and other essential brushes; on use of copper in flooring to permit use of crude arsenical copper precipitate in flooring for hospital operating and anesthesia rooms and for places where explosive vapors may be present. Permits use of: brass reduction gears in speed reducers for cooling towers; copper screens and points for municipal, industrial, Army or Navy water supply systems; brass slide fasteners and tack buttons on Army and Navy flying suits and on Navy flying boots, as well as on jungle clothing and equipment; copper springs on snap fasteners for any application by the Army, Navy, Maritime Commission, or War Shipping Administration.

M-21-h (Amendment): **Tool Steel**, effective May 10. Permits production and purchase of tungsten-type high-speed steels up to 35% of production of total high-speed steel. Forbids purchase of molybdenum types for purpose of obtaining complementary quantities of tungsten types, if the former are not put to productive use within the time allowed by applicable WPB inventory regulations.

M-104 (Amendment): **Closures for Glass Containers**, effective May 17. Directs manufacturers to use 0.50 electrolytic tinplate to the greatest extent available, instead of hot dipped tinplate, in production of tinplate closures permitted by the order. Permits use of any "menders" (instead of 0.50 electrolytic tinplate) arising in production of 0.50 electrolytic tin plate which have not been dipped with a maximum tin coating of 1.25 lb. per base box. Permits use of any tinplate (wherever tinplate is permitted by the order) which has a coating of 1.25 lb. per base box, if on May 17 it was in process, in inventory at the tin mill for the account of a closure manufacturer, or in inventory of a closure manufacturer. Permits use of closures for packing additional products in glass. Provides that closures to fill orders for armed forces or other specified exceptions must be included by bottlers in computing their permissable inventory. Tightens control over use of plate waste in manufacture of closures. Removes restrictions on sales of home canning jars to jobbers; on use of metal closures for milk bottles for fluid milk after Sept. 30, 1943. Permits packing of ointments, cerates, petroleum and pastes in unlimited quantities. Prohibits use of closures for artists paints. Permits use of closures for polishes and pastes in unlimited quantities.

M-126 (Amendment): **Iron and Steel**, effective May 13. Prohibits use of steel in luggage except as permitted by order L-284; in shutter-type ventilators except as permitted by order L-142.

P ORDERS

P-98-b (Amendment): **Petroleum Industry Materials**, effective May 15. Provides improved method of securing new materials through the Petroleum Administration for War for (1) discovery, development and depletion of oil and gas fields; (2) construction operations; (3) maintenance, repair and operating supplies.

To obtain controlled materials, operators must submit copies of delivery orders for $100 or more to either PAW district office or the oil controller, showing serial number assigned on form PD-873 and use to which material is to be put. If any single item is $500 or more, or total is $1000 or more, approval must be obtained prior to placing the order. If no single item is $500 or more and total is less than $1000, approval is not required and copy of delivery order is filed for information purposes only.

Materials for construction for marketing, natural gasoline, refining or transportation projects are obtained by method set forth in tabular form in Schedule "E" of the order and in all cases requires use of form PD-200 to obtain priorities assistance.

Materials for MRO supplies for all branches of the petroleum industry may be secured by use of a preference rating of AA-1 and an allotment symbol MRO-P-98-b, subject to specific conditions.

PRIORITIES REGULATIONS

No. 1 (Amendment), effective May 17. Makes use of facilities subject to preference rating system. Ratings will be assigned for following three types of contracts: Those entered into by an individual producer calling for processing of material or products but excluding contracts for processing material for an ultimate consumer; those calling for use of equipment in essential construction work not requiring delivery of materials; those for use of substantial facilities needed in maintenance or repair of machinery, plant or equipment of essential producers or manufacturers, excluding contracts for ordinary plumbing, heating, electrical or automotive repairs.

Re-establishes preference rating of AA-2. Orders rated AA-2 prior to issuance of this amendment retain status of AA-1.

Provides for disposition of fabricated articles when material for their production was obtained with use of priorities and the article can no longer be used for purpose for which priorities were granted.

Provides that when any person rejects a rated order upon written request of person placing the order the reason for the rejection must be given in writing.

No. 11B: **Ratings for Manufacturers Not Obtaining Production Materials under CMP**, effective May 12. Manufacturers producing unclassified products may apply for priorities assistance on form PD-870. Manufacturers of Class A or Class B products whose requirements of controlled materials are so small that they can obtain the materials without placing authorized controlled material orders under CMP regulations, may treat their products as unclassified products and obtain priorities assistance for production materials under this regulation.

Each assignment of ratings on PD-870 will include authorization of production schedule for which materials are required, establishing a maximum limit of production for manufacturer receiving authorization for the quarter. Prohibits fabricating, assembling, or otherwise processing or acquiring raw materials or parts in excess of practicable working minimum required to meet authorized production schedules. Prohibits extention of ratings (obtained on PD-870 for production materials for a specified product) received from customers to purchase production materials for the same product during quarter covered by the form, except as follows: (1) orders calling for delivery in same quarter which already have been rated in accordance with applicable regulations or orders of WPB need not be re-rated; (2) A rating of AAA may be extended where necessary to obtain production materials actually required to fill an order rated AAA if such material is not actually on hand, but this rating may not be extended to replace inventories.

Applications for assistance under the regulation for third quarter must be returned to WPB by May 31.

No. 18: **Frozen Schedules**, effective May 11. Prohibits producers from interfering with any frozen production or delivery schedule by eliminating, displacing or altering precedence of any purchase order listed for production and delivery. Exempts producers who are specifically authorized to interfere with their schedules by (1) an amendment of the schedule of WPB, or (2) one of the outstanding special directions relating to a synthetic rubber, toluene, high octane gasoline, or related projects having a status of 56 or better. Producers must notify appropriate Industry Division of WPB in writing when a special direction is issued requiring interference with a frozen schedule or when a producer's adherence to a frozen schedule prevents the fulfillment of an order not subject to the frozen schedule; which order, in the absence of scheduling, will take precedence over any such order on the frozen schedule.

Drastic Revisions Made in Order Governing MRO Supply Purchases

PREFERENCE ratings assigned under CMP regulation No. 5, dealing with maintenance, repair and operating supplies have been changed by the War Production Board. Preference rating AA-2X, assigned to persons engaged in activities listed in Schedule II of the regulation, has been changed to AA-2, a rating re-established by an amendment to Priorities Regulation No. 1. The A-10 rating, available to persons engaged in businesses not listed on either Schedules I or II, has been lowered to AA-5.

Schedules I and II have been completely revised, altering the preference ratings which may be used by the industries involved.

Sets $500 Limit

The amended order now permits minor capital additions to be purchased under the MRO procedure where the cost of any one complete capital addition does not exceed $500, excluding the purchaser's cost of labor. "One complete capital addition" means a group of items customarily purchased together or all items which normally would be purchased as part of a single project or plan. Where such a capital addition involves construction, authorization to construct must be obtained to the extent required by conservation order L-41, or by any other applicable WPB order.

A delivery order rated under the regulation and bearing the appropriate certification and MRO symbol has the status of a delivery order bearing a preference rating with an allotment symbol as provided in CMP regulation No. 3.

Quantity restrictions of the regulation as amended provide that no person who uses the allotment symbols or preference ratings assigned by it to obtain any MRO supplies shall order for delivery during any calendar quarter MRO supplies in an aggregate amount exceeding one-quarter of the aggregate expenditures for MRO supplies during the calendar year 1942 (or his fiscal year ending nearest to Dec. 31, 1942), except that a person engaged in a seasonal business using such allotment symbol or preference rating may order for delivery during any calendar quarter up to, but not in excess of his aggregate expenditure for MRO items during the corresponding quarter of 1942 (or such fiscal year). This amendment placed the quantity limit definitely upon an "order" basis, rather than upon a receipt of delivery basis.

In determining the dollar amount expended for MRO supplies during an operating quarter, expenditures made without the use of preference rating or symbol plus amounts expended in acquiring minor capital additions must be included as well as MRO items obtained with the use of the allotment symbol or preference ratings assigned under CMP regulation No. 5. In determining the amount expended for MRO items during the base period, the same procedure must be followed, except that expenditures for minor capital additions shall not be included.

Quantity restrictions on the use of MRO procedure are removed from manufacturers whose aggregate requirements for MRO supplies do not exceed $5000 per year.

The MRO procedures have been made available to manufacturers operating in Canada. Upon application by the Department of Munitions and Supply, Ottawa, such manufacturers may be authorized by the WPB to operate under CMP regulation No. 5, subject to specified conditions.

Persons engaged in the business of doing maintenance or repair work for others may use the same allotment symbol and preference rating to obtain materials for the performance of such work which their customers would be entitled to use if the customers did the work themselves.

Persons requiring MRO items who are unable to obtain them with ratings assigned by CMP regulation No. 5 and persons requiring controlled materials, except aluminum, for MRO purposes and who are not listed in Schedule I or II may apply for a higher rating, or the right to use the MRO symbol to obtain copper and steel, to the nearest local office of the WPB form PD-1A.

Steel Producers Must Report Orders Daily

Producers of carbon steel, including wrought iron and alloy steel but not including castings, must report daily after May 25 to the Steel Division, War Production, all accepted authorized controlled material orders for these products. The reports must be filed on a new form, CMP-26.

The initial report must be submitted not later than May 25 and will cover all authorized controlled material orders booked prior to May 16. It must show full or partial cancellations as well as any increases to the original orders accepted prior to that date it is stressed.

Subsequent reports on CMP-26 must be submitted each day to reflect all changes in orders on books, identifying claimant agencies, month to which allotted, steel product code number, weight in net tons of products other than stainless and tool steel, and weight in pounds of stainless and tool steel.

WPB Tests Priorities for Machine Tools, Equipment

Items requested must be required urgently and no suitable second hand equipment or subcontracting facilities should be available before regional offices of the WPB will approve the granting of priority ratings assigned by officers of the Army, Navy or other government agencies for delivery of machine tools and capital equipment, it was announced recently.

The tests are established by amendment of priorities directive No. 2. These checks are waived when deliveries are valued under $500, when counter-signed by a procurement officer outside continental United States or Canada, and when purchases are approved by commanding officers and others listed in the directive in emergencies precluding advance approval by a WPB official.

Field Offices Process PD-1A's up to $500

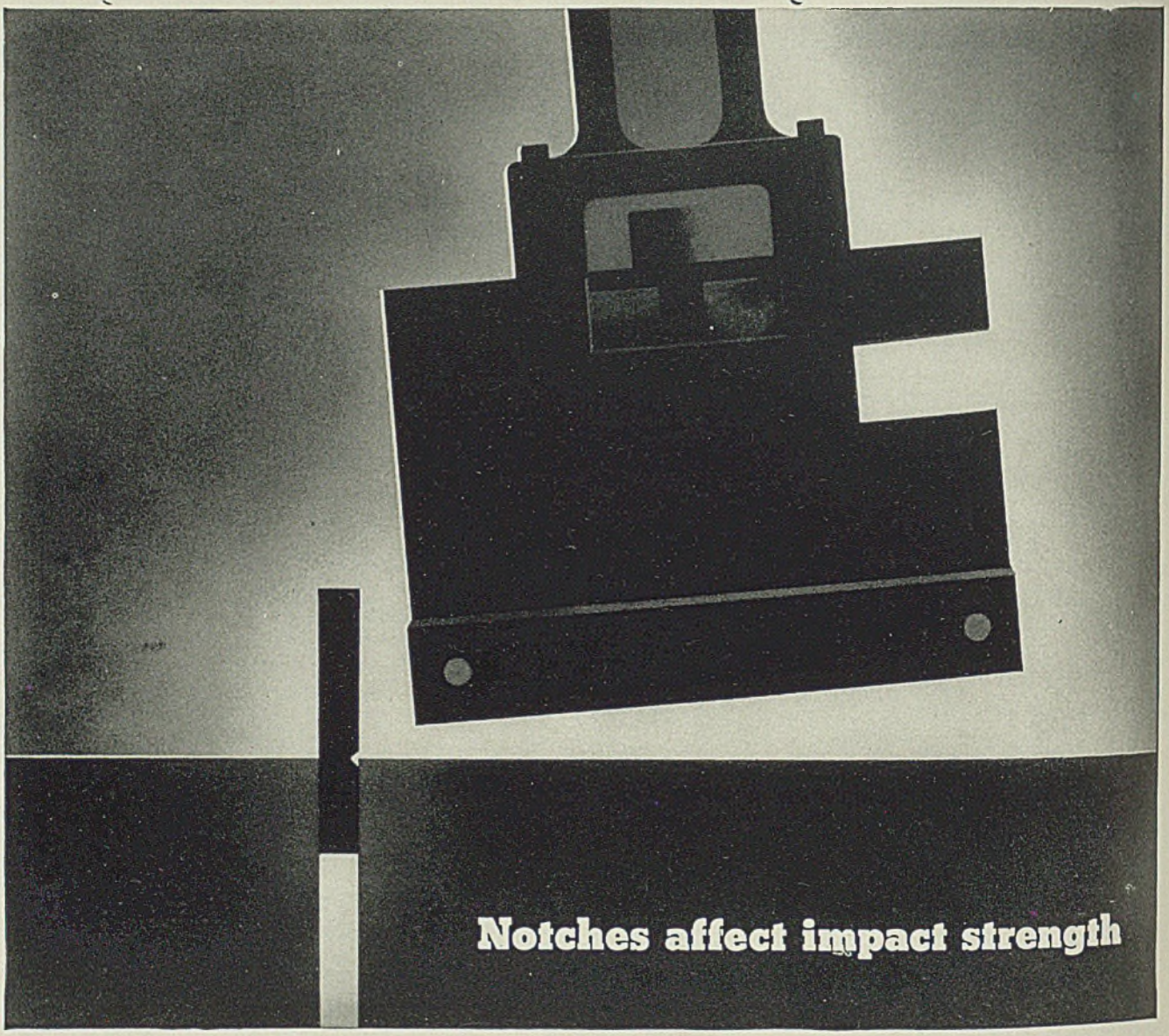
War Production Board has raised the dollar limit of PD-1A applications processed in the field from $100 to $500. All PD-1A applications, involving not more than $500 worth of materials on which priority assistance is requested, now are processed in either the district or regional offices, according to the direction of the respective regional directors except where otherwise specifically directed by the director of the Distribution Bureau.

In all other cases, PD-1A applications are forwarded to Washington.

OCR Plan Will Provide Needed Items to Farmers

The War Production Board's newly created Office of Civilian Requirements last week advanced the first of a series of steps designed to provide farmers with 50 items needed in the nation's vital food program.

Army, Navy and Lend-Lease have agreed to relinquish a part of current production, originally assigned to them, to make possible temporary diversion of small quantities of materials and finished articles to the farm program. The plan provides a simple mechanism for farmers to make purchases.



Information supplied by an Industrial Publication

The effect of fillet radius on the life of machine parts operating under alternating stress has been known for a long time. The knowledge has been put to good use in designing parts so as to avoid fatigue failures.

The effect of variation in the notch radius of Izod impact bars has shown the way towards the elimination of impact failures in filleted parts.

Two sets of standard size impact bars were machined from one heat of steel, both with a 45° notch. In one set the notch radius was 0.01 inch and in the other 0.05 inch. After quenching, and in some cases tempering, the bars with 0.05 inch radius consistently showed about 140% improvement in impact strength.

The practical application of these results, which consisted of increasing the existing fillet radius, has eliminated impact failures in a part where the problem had become serious.

By A. H. ALLEN Detroit Editor, STEEL

MIRRORS of MOTORDOM

Westerners regard Detroit as "miracle" production center. . . City's vast industry concentration to result in decentralization in postwar era. . . General Motors' fire-power output totals 118,000 units in one month

DETROIT

AFTER a six-week swing around the southern and western edge of the country, traversing better than 8000 miles of all kinds of topography from the Louisiana swamps and the deserts of the Southwest to the rocky shores of the Pacific and the snow-tipped peaks of the Cascade range, the voyager returning to Detroit cannot help but have a new perspective on the motor industry and on all war industry. Everywhere you go, the name Detroit is magic; everyone you talk to asks the same question: Is Willow Run really going to produce? Is Detroit war production really as tremendous as we hear?

Knowing the answers by virtue of reasonably close contact with the job industry here is doing, you reassure your interrogators, but at the same time you come to realize that Detroit has no corner on the productive brains of the country, for under the pressure of war, industry has flowered even in the lazy heat of the South, in the balmy breezes (and foggy mornings) of southern California, in the cool crispness (when it is not raining) of the Pacific Northwest.

Nevertheless Detroit has the reputation, established from its long association with motor car manufacture, for somehow even the resident of Los Angeles associates his Chevrolet with Detroit, despite the fact it probably was assembled in Oakland from parts made principally in Flint, Bay City, Saginaw, Muncie, Ind., and elsewhere. To the owner it is still Detroit stuff.

Back in the motor city there are civic stirrings in the direction of making the name Detroit a similar by-word in aviation. Breast-beaters point to the large volume of aircraft parts now going on in Detroit, to the 500,000 increase in population which war industry has brought to the area, to the reservoir of production know-how, to the extensive airport projects which other cities are engineering, and to the fancied hundreds of thousands of airplanes which the country will be lining up to buy after the war.

It may be a pessimistic attitude to take and it may reflect a woeful lack of pride in Detroit's capabilities, but we say simply: Hogwash!

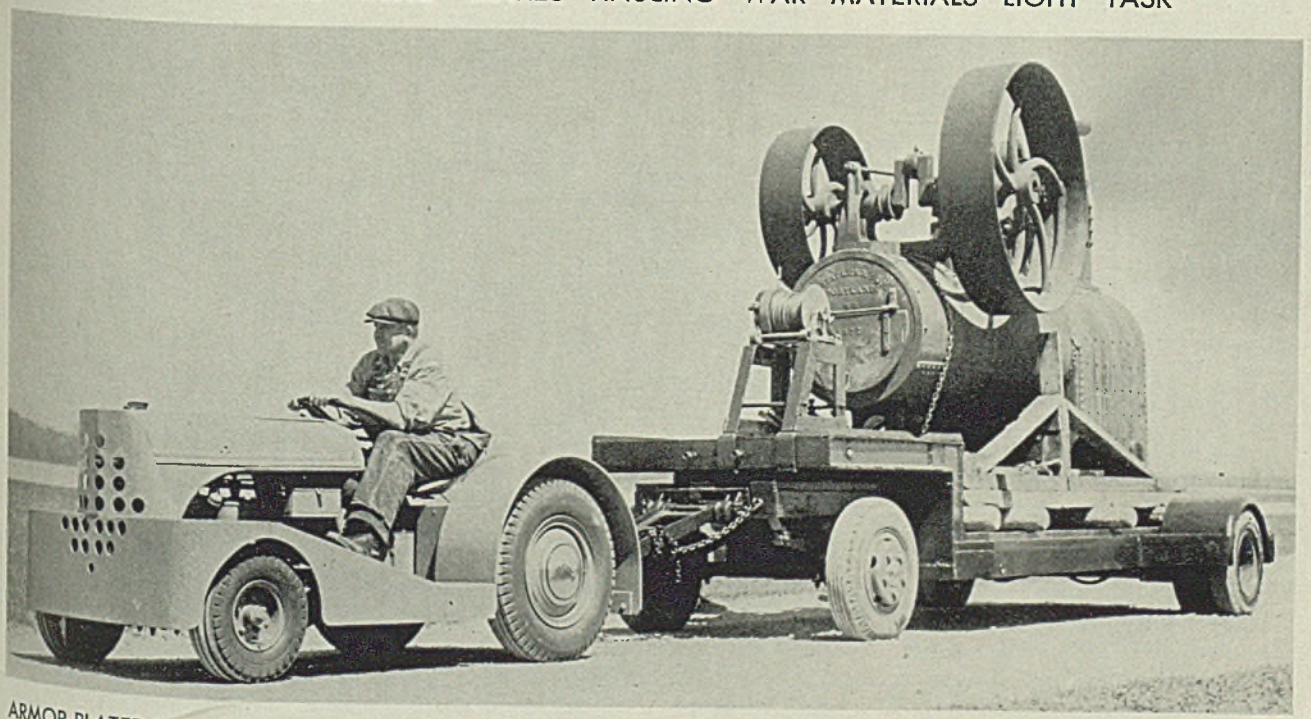
In the first place Detroit has actually become too big to function smoothly in an industrial way. There are too many people crowded into the area now, too many plants, large and small, already in operation ever to survive in a peacetime economy. Concentration such as is now exemplified in Detroit is productive only of labor strife, transportation snarls and overall moral deterioration. Decentralization doubtless will be accelerated when war production fervor has abated.

Will New Plants Go Rural?

Talk to any operator of a plant rooted in the heart of a congested metropolitan area and he will start dreaming dreams of a brand new little plant out in the country.

That is the direction which postwar industry will take, because the motor car and the motor truck and refurbished railroads will facilitate it. Include the airplane too, if you are one of those who

RUGGED LITTLE "MULE" MAKES HAULING WAR MATERIALS LIGHT TASK



ARMOR-PLATED mule, latest mechanized warfare development of Ford Motor Co. and Harry Ferguson Inc. (Ford tractor organization), is designed primarily to pull and haul material aboard aircraft carriers, on beach-heads and at airfields. Engineered at the request of the Navy department, the mule or Moto-Tug as it is called, is built around the Ford tractor, with armor-plated bumpers front and rear, and built lower and narrower to permit shorter turns and maneuverability under an airplane wing. Additional weight has been added to improve traction in sand, ice, snow and mud. The rugged little unit is built in two sizes, one weighing 3600 pounds with drawbar pull of 2500 pounds, the other weighing 5700 pounds with drawbar pull of 4000 pounds

see America taking to the sky in droves. It is only another means to assist the decentralization of industry.

As far as Detroit becoming the hub of the aircraft manufacturing industry, it is just idle chatter. Detroit will have its job cut out when motor cars can again be built—and this may be sooner than many think. There are enough problems involved in being the motor capital of the world without trying to grab off the title of airplane capital as well. Southern California is the logical place to build airplanes as we now know them. Year-'round mild weather, a convenient ocean to launch seaplanes, nearness to the vast aluminum supplies of the Pacific Northwest and ample low-cost electric power—not forgetting an appreciably lower tax rate on industrial property—are undeniable magnets.

No Engine Building Facilities

It may be argued logically that the West Coast has no engine-building facilities and must wastefully haul its power plants across the Rockies for installation. This is true enough, but it simply raises the question of whether it is more economical to bring the engine plants to the aircraft plants or vice versa. The two are together on the East Coast and it would be a good guess that the future may see expansion of airplane engine manufacture in the Far West.

Meanwhile production schedules in Detroit area war plants are being yanked around in no uncertain fashion. Inconsistencies are the rule rather than the exception and they often baffle both management and working forces. The only explanation is that schedules today must be delicately geared to the needs of men at the fighting fronts and changes in strategical requirements are quickly reflected in armament plants.

Actual figures on cutbacks in schedules naturally are not released but there appears general unanimity among observers that tank production has been slowed something like 40 per cent from its highest level. But this cut is not applied horizontally to all builders. One plant, for example, was forced to shut down tank assembly lines for four days and shortly thereafter had to work overtime on a Sunday.

Should there be no further restrictions in tank requirements, it might become feasible to concentrate production in one or two of the new tank arsenals and turn attention to other work in the remaining plants. Just what would fit into the equipment of a heavy tank plant is the question. One of the most logical suggestions is locomotive building, an obvious proposal since a large locomotive builder is making tanks. However, a projected invasion of Europe unquestionably would call for considerable quantities of locomotives for transport of *materiel* in the invaded countries, since the enemy would remove or destroy what motive power remained there. So conceivably some of the tank plants might turn their attention now to building armor-plated locomotives, probably in medium or light weight models, for invasion uses. Doubtless some such equipment is already waiting the day, but replacement needs might run fairly high.

The principal blackamoor in the kindling with respect to production shifts is tied in with morale of workmen, and there is no one whose morale causes more concern these days than the American workman. One case mentioned recently deals with a group of workmen who visited an army camp and found the boys lacking equipment which they were producing in their plant back home and on which production curtailment had just been received. But this does not compare with the classic tale of the workers in a certain shell plant who last fall decided to forego their annual deer-hunting expedition to stay home and turn out more shells. On the very day the hunting season opened, shell production at the plant was brought to a standstill by ordnance department orders!

General Motors' spokesmen say the corporation now is the nation's largest producer of firepower, in one recent month having turned out 118,000 guns ranging in size from carbines to cannon. Twenty-three divisions of GM in the U. S. and Canada are in production on 15 different types of weapons and assorted gun parts. Smallest weapon is the new 0.30-caliber semi-automatic carbine, being built by Inland Manufacturing division in Dayton and the Saginaw Steering Gear division, the latter retooling for the carbine after an extensive production job on 0.30-caliber Browning machine guns.

Machine guns, both 0.30 and 0.50-caliber, were the first weapons for which GM received contracts, this program getting under way in the spring of 1941 at AC Spark Plug, Frigidaire, Saginaw Steering Gear and Brown-Lipe-Chapin. A Fisher Body division in Detroit at about the same time began work on 3 and 5-inch gun breech housings for the Navy, while other Fisher plants now make 90-millimeter and 4.7-inch anti-aircraft guns for the Army, major assemblies coming from Chevrolet and Buick. Pontiac produces the 20-millimeter Oerlikon and 40-millimeter Bofors antiaircraft guns and has completed a virtual redesign of the former, reprocessing or revising 409 of the gun's 565 parts. Pontiac's newest production job, bare details of which were released last week, is in connection with aerial torpedoes.

Oldsmobile Division is Leader

Oldsmobile division probably leads the corporation in point of firepower produced, turning out 20-millimeter Hispano-Suiza aircraft cannon, two types of 37-millimeter aircraft cannon and still heavier cannons for tanks and tank destroyers. Over 90 per cent of the 769 parts used in Olds-built guns are subcontracted.

Net income after taxes of automotive companies dropped to 4.5 per cent of sales in 1942, according to an analysis of reports from 36 automobile and parts manufacturers made by the Automotive Council for War Production. In the preceding year net income was 6.7 per cent of sales and in 1940 was 8.3 per cent.

War Spending Mounts

The government's war expenditures during April totaled $7,290,000,000, increase of $178,000,000 or 3 per cent over March, the Office of War Information announced recently.

Daily expenditures averaged $280,400,000 compared with $163,400,000 in March. This was a 6 per cent increase. From July, 1940, through April, 1943, $94,900,000,000 had been spent for war purposes.

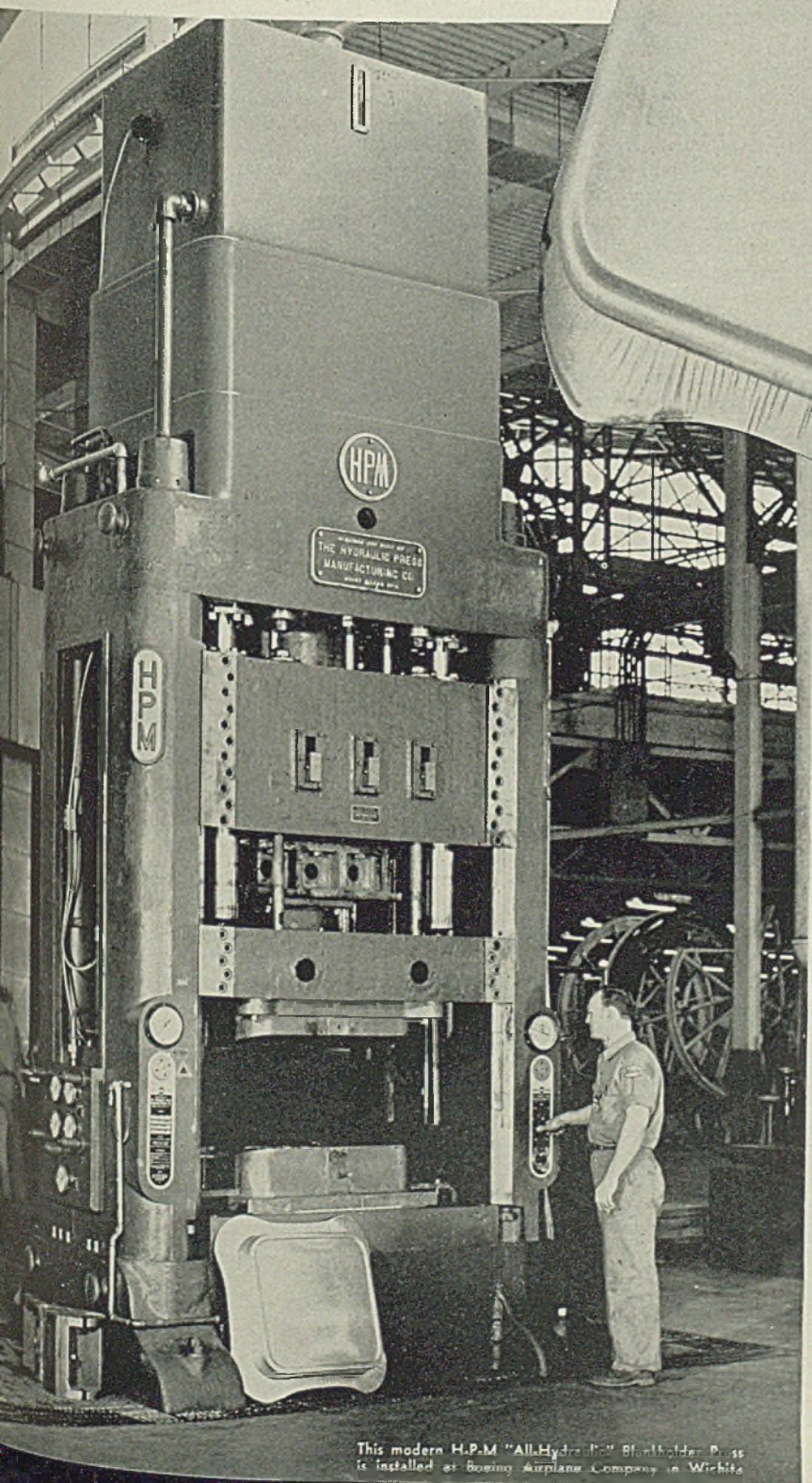
Pass Freight Rate Savings to Consumers

Saving in transportation costs of $350,000,000 annually on iron and steel products resulting from rescinding last year's 6 per cent general increase in freight rates will be passed on to consumers, the Office of Price Administration announced last week. The increase, which became effective March 18, 1942, terminated May 15.

Rescinding of the increase was ordered by the Interstate Commerce Commission on a petition by the OPA. Revised price schedule No. 6 (iron and steel products) automatically passes on the saving in freight to consumers except in certain Mid-western and Gulf areas where arbitrary delivered prices are in effect. In these latter areas, freight savings are to accrue to steel users through Amendment No. 9 to the schedule.

The new amendment No. 9, effective May 15, revokes amendment No. 4 which was issued last year.

Aircraft Builders use H·P·M BLANKHOLDER PRESSES For Today's Mass Production of Deep Drawn Metal Parts . . .



This modern H-P-M "All-Hydraulic" Blankholder Press is installed at Boeing Airplane Company in Wichita

H-P-M FASTRAVERSE Presses, equipped with both hydraulic blankholder and die cushion, are designed to accommodate all standard types of steel and "Kirksite" dies. Die set-up is quick and simple. A single pump generates hydraulic pressure for all press actions. All strokes and pressures are adjustable, including variable pressure at each of the four corners of the blankholder slide. The H-P-M "valveless" Closed Circuit operating system guarantees a fast, smooth press cycle with shockless reversal. Write today for Bulletin 4206 featuring H-P-M Metal Working Presses.

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The dependable long life H-P-M HYDRO-POWER Radial Pump powers every H-P-M Hydraulic Press.

Boeing output in 1942 eight times greater than previous year . . . Actively planning for postwar period with research studies, market analyses, and surveys. . . Gross income last year totaled $390,000,000, exclusive of Canadian subsidiary

SEATTLE, WASH.

IN THE annual report of stockholders, Phil Johnson, president, Boeing Airplane Co. shed light on how the war and accelerated demand for aircraft have affected this 27-year old aviation company.

Boeing Airplane now owns capital stock of the Seattle manufacturing subsidiary, Boeing Aircraft, and also is an operating company through its Wichita division at Wichita, Kans.

Boeing Aircraft has two main divisions, one at Renton on Lake Washington near Seattle, and the other in Seattle, the latter extending over several plants, one an old Fisher Body plant.

The Renton division was built originally to turn out the Sea Ranger, a two-bomber, two-motor patrol bomber for the Navy, but is now being equipped for a different plane, the nature of which can not yet be disclosed.

Last Year's Production Increased

Boeing Aircraft also owns capital stock of Boeing Aircraft of Canada Ltd. at Vancouver, B. C. where four plants are operated.

Deliveries of B-17 Flying Fortresses in 1942 increased better than eight times over 1941, and the schedule this year will be boosted still further. While most of the new plant facilities built in recent months are financed by the DPC and leased by the company, Boeing has negotiated with the government for acquisition of the DPC interest in facilities which cost $7,769,363, comprising principally a factory and office building at the main Seattle plant, together with machinery and equipment. Purchase of these facilities was considered by Boeing directors as necessary to provide the company with an integrated plant for future operations.

Boeing is actively though quietly planning for the postwar period. This is brought out in Mr. Johnson's annual report, in which he states that—"Plans for postwar operations are being developed to the best of the company's ability. Research in aircraft design as well as studies of possible non-aircraft products which could be developed by the company's engineering talent and manufactured by its facilities are being conducted by a special division of the engineering department.

"Additional research studies, market analyses and surveys are being conducted by an independent agency. These studies have been undertaken to better equip the management with information on which to base important decisions that will confront the company in the postwar future."

Along this line of thinking is keyed what Boeing calls a "conservative national campaign of institutional advertising," the object of which is to acquaint the public with the company's accomplishments and with its varied engineering and manufacturing talents and experience which will be reflected in any future product to be offered for sale under the name of Boeing.

Engineering activity and a glimpse at the Boeing engineering department at the No. 2 plant in Seattle, impressive to say the least, still is concentrated on aircraft for war purposes. Numerous modifications have been made in the B-17F Fortress Model, some of which are of such importance that they would suggest moving on to the B-17G Model. In addition, two new experimental designs were completed during 1942 and test flown, while a contract was negotiated for a third experimental type.

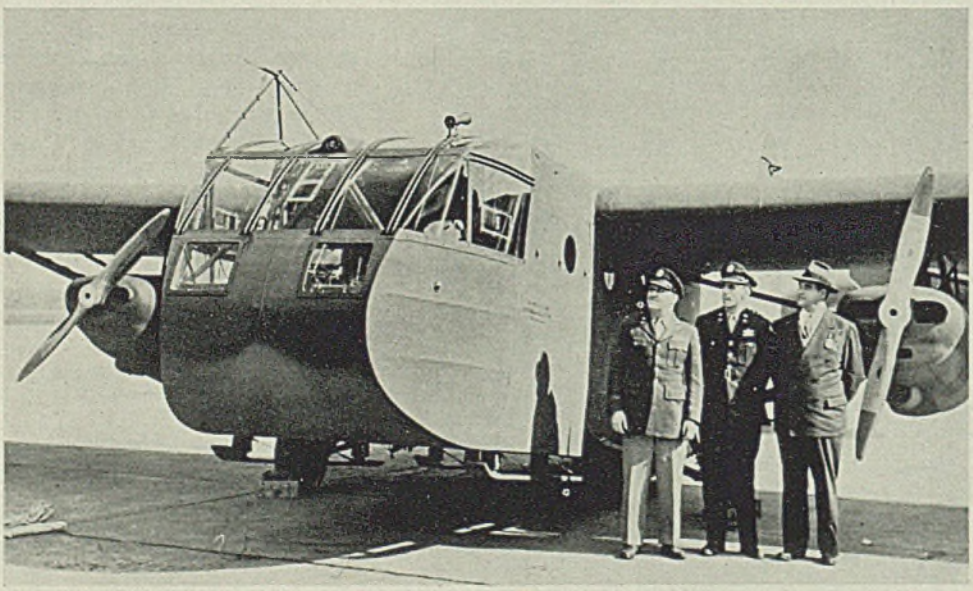
Engineering field service activities were increased, including the sending of overseas engineering service groups to all combat areas where flying fortresses are in action. Fundamental flight research likewise has been pressed, and construction is now well along on one of the most modern wind tunnels and aeronautical laboratories in the industry.

Sell Engineering Data

Gross income of Boeing companies not including Canadian interest for 1942 was something over $390,000,000 which includes about $3,500,000 for sales of engineering and other information and manufacturing rights. Using gross income as an index figure of 100 per cent, it was disposed of as follows, (all figures in percentage):

Payments to vendors and subcontractors for materials and parts used in production and required to repair and maintain buildings and equipment 59.73

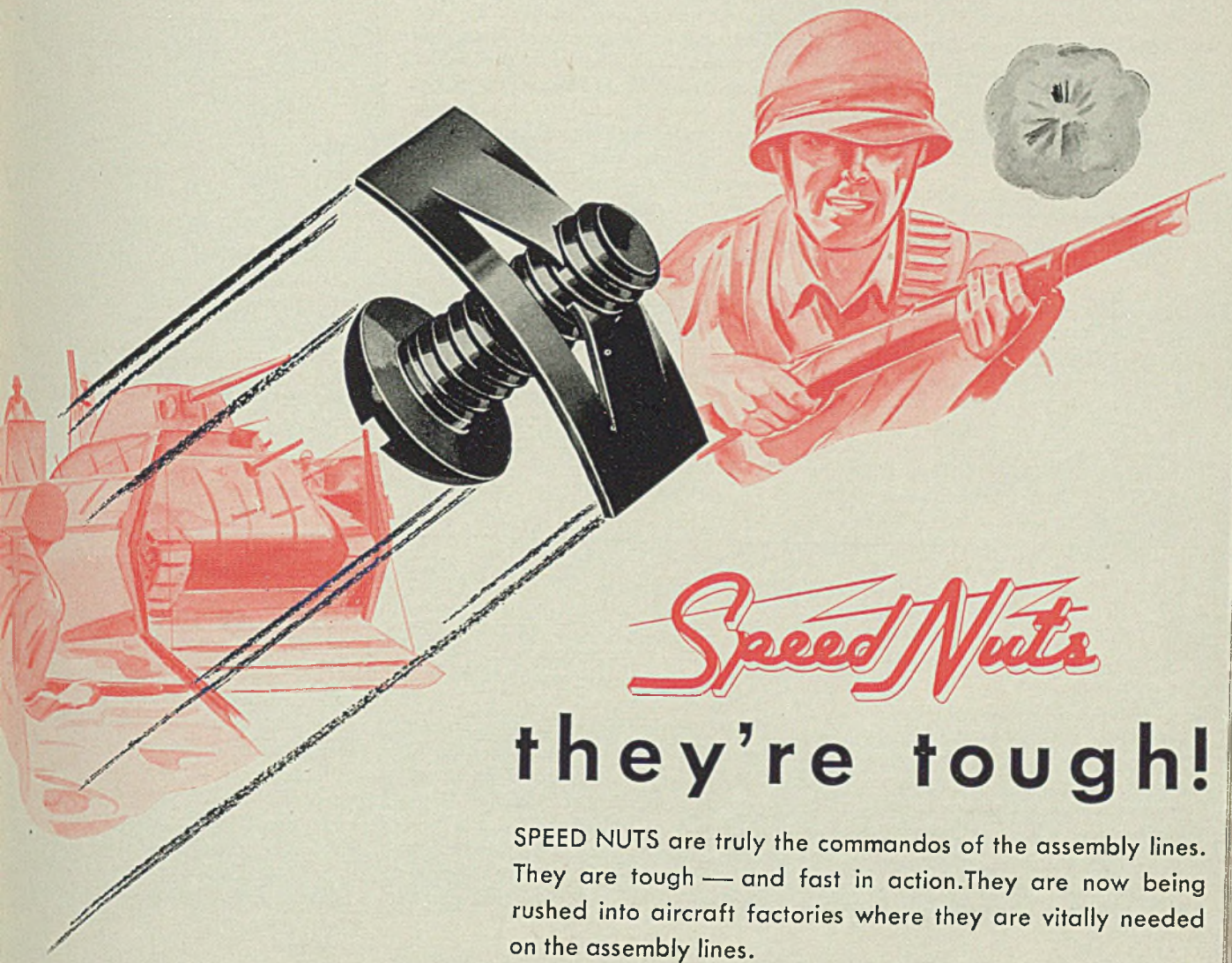
ARMY EXPLORING POSSIBILITIES OF SELF-POWERED TROOP-CARRYING GLIDERS



ONE of the Air Corps' latest innovations, exact use of which remains a military secret, is conversion of troop-carrying gliders to self-powered units of propulsion by attaching small air-cooled engines beneath the wings. Col. Fred Dent, head of the Army's experimental glider school, Wright Field, Dayton, O., flew the glider and reported the test "successful."

NEA photo

COMMANDOS of the Assembly Line...



Speed Nuts they're tough!

SPEED NUTS are truly the commandos of the assembly lines. They are tough — and fast in action.They are now being rushed into aircraft factories where they are vitally needed on the assembly lines.

Spring Steel SPEED NUTS are approved by the U. S. Army Air Forces and the Bureau of Aeronautics for most all non-structural attachments. Conversion to the use of Speed Nuts on all approved applications releases critical bar stock steel for other important uses.

Our Engineering Dept. will be glad to assist you in determining the proper approved locations where SPEED NUTS may be used. Request for information or assistance will receive immediate attention.

AIRCRAFT Speed Nuts KEEP 'EM FLYING

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Speed Nuts THE FASTEST THING IN FASTENINGS! Speed Clips

Wages and salaries paid to employes excluding officers salaries, per cent	27.70
Salaries of officers, per cent	0.05
Insurance, utilities, professional fees, advertising and other services, per cent	0.93
Wear out and amortization of equipment and facilities, per cent	0.25
Provision to cover indeterminate expenses resulting from wartime conditions, adjustments arising from acquisition of government's interest in facilities and possible further refunds, per cent	0.81
Taxes payable to United States government, per cent	8.72
State and local taxes, per cent	0.47
Total	98.66

This leaves net profit of 1.34 per cent, which was divided into 0.28 per cent for stockholders' dividends, and 1.06 per cent reinvested in the business. In this connection, notwithstanding the fact that gross income increased from $97,210,000 in 1941 to $390,320,000 in 1942, net profits decreased from $6,113,000 to $5,238,000—distinctly a wartime phenomenon but certainly not peculiar to Boeing, as most companies have experienced a similar situation where the war has boomed total volume of business in these proportions.

But if past history is any indication, Boeing will be in there plugging when the war orders have dwindled. For one thing, it has the experience of the last war to fall back on, when the sudden cancellation of airplane orders forced the company to turn its woodworking crews to the building of bedroom furniture and sea sleds. With the help of a large and aggressive crew of engineers it should be able to turn its welders, riveters and metalworking crews to products required by a starved civilian economy.

The company has moved a long way since the day in 1916 when William E. Boeing and a few associates started an "aeroplane" shop on the shores of Seattle's busy Lake Union, ostensibly for the purpose of repairing a damaged seaplane. Today Mr. Boeing has retired to the obscurity of a company consultant, but his namesake rolls on.

American Rolling Mill Dedicates New Foundry

New foundry of the American Rolling Mill Co., Middletown, O., designed to produce large steel castings, was dedicated last week with simple ceremonies.

Guests from the community, Defense Plant Corp., War Production Board and the industry, heard Calvin Verity, executive vice president and general manager, describe the new plant as a "medal of merit" for the men of company's foundry department who until the completion of the foundry had used improvised equipment to make large castings vital to the war program.

Equipment includes the largest bell-type annealing furnace yet constructed, to handle castings weighing up to 260,000 pounds.

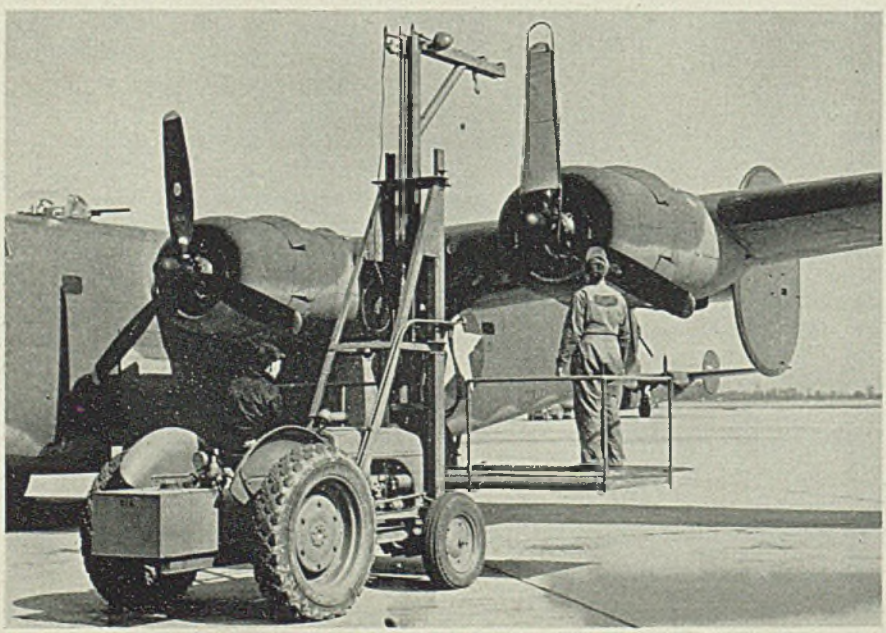
L. F. Reinartz, manager, Armco's Middletown Division, was master of ceremonies.

The plant was constructed with Defense Plant Corp. funds and will be operated under lease to Armco.

HYDRAULIC PROPELLER HOIST SAVES VITAL MAN-HOURS AT WILLOW RUN

HYDRAULIC propeller hoist built up on a standard Ford tractor is saving valuable man-hours at the Ford Willow Run bomber plant. Formerly it was necessary, in changing a propeller on a bomber outside the plant, to haul out steel platform ladders and transfer the propeller to a truck after it was dismounted. The new tractor hoist can dash out on the field with tools aboard, raise a 4¼ x 11-foot platform, large enough to hold five men, lift off the prop and carry it back to the hangar. If two prop changes are necessary, the tractor hoist tows a special propeller dolly with the second prop.

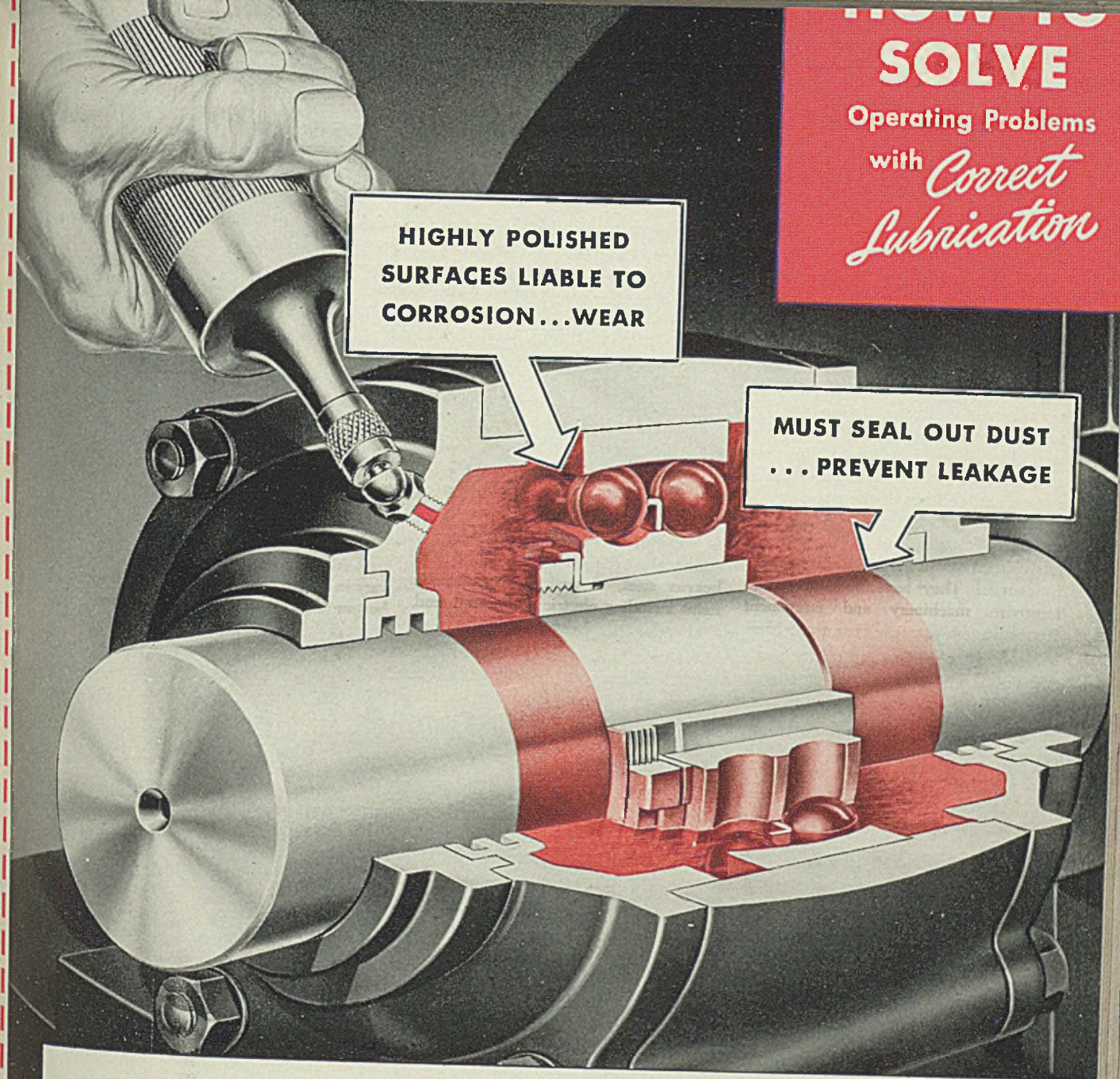
Idea for the equipment was suggested by W. A. Wilson, general foreman in the Willow Run propeller department, who states the original idea was developed back in 1925 when Ford was building trimotor planes. At that time a prop hoist was worked out for mounting on a Fordson tractor, with power developed from a drum geared to the tractor engine and hoisting the propeller by means of a steel cable.



The new hoist works on a hydraulic system, with an auxiliary oil tank mounted on the rear of the tractor as shown. Hydraulic pump, driven through standard power takeoff, delivers oil under pressure to ½-inch steel tubing and to two four-way hydraulic control valves and a vertical cylinder made of 5½-inch steel tubing. Four-inch channel beams act as guide rails for the lift platform and frame.

Platform and hoist are regulated by the valves. The crane handling the propeller may be lifted 17 feet 6 inches from the ground while the working platform may be raised 6 feet 2 inches. On the B-24 bomber the prop shaft is 9 feet 6 inches off the ground.

Another hydraulic cylinder at the top of the crane swings the propeller shaft into position after it has been raised to the level of the shaft. An unusual lifting strap has been developed to hold the three-blade propeller. It is made from one complete ring of round bar stock, hooked at each end to catch under the blades. Rubber hose is mounted over the hooks to avoid marring the smooth finish of the blades, while a protecting envelope slides over the vertical blade between the two sides of the strap, securing the prop for its ride to the motor.



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CALL IN SOCONY-VACUUM

Engineers Improvise Machinery To Dismantle Wrecked Narrows Bridge

Usable steel, scrap reclaimed from Tacoma span to be used in war program. Project to be completed by July

TACOMA, WASH.

DISMANTLING the Narrows bridge near here to salvage usable steel and scrap is presenting engineers with knotty problems—as complicated if not more so than those which confronted the designers and builders of the span.

Scarcity of materials and equipment necessary to take down the structure has challenged the ingenuity of the men in charge. They have been forced to improvise machinery and equipment from salvaged materials from the bridge.

Notwithstanding these difficulties — and unfavorable weather — good progress is being made on the project and the contract is expected to be completed early in July.

The Narrows bridge, which crosses an inlet of Puget Sound, is more than a mile in length. It is divided into three sections: From the east anchorage to first tower, 1400 feet; from west tower to shore 1600 feet; between towers 2800 feet. It was completed July 1, 1940. On Nov. 7, 1940, the structure was wrecked in a heavy windstorm, some of the parts breaking and dropping into deep water beneath. The main bridge had a clearance over the water of 210 feet.

Immediate Need for Scrap

Under normal conditions, dismantling and salvaging would have been deferred until a contract for reconstruction, of which it would have been a part, had been awarded. However, the need for scrap and of usable steel prompted officers of the Washington Toll Bridge Authority to begin operations earlier.

Late in 1942 a contract on a cost plus fee basis was awarded to J. Philip Murphy, San Francisco, and Woodworth & Co., Tacoma, to dismantle the structure. Under its terms the salvaged material remained state property.

Project is under the general supervision of Charles E. Andrew, chief consulting engineer of the state authority. The contractors are represented on the ground by Grover C. McClain, who during the construction of the span was superintendent for the Bethlehem Steel Co. Previously he was employed on the Golden Gate bridge, San Francisco. On the present project he has performed outstanding work in designing and supervising the construction of equipment in co-operation with Dexter R. Smith, chief of the Toll Bridge Authority design department, and K. B. Arkin, resident engineer for the state.

First phase of dismantling was awarded to J. H. Pomeroy, San Francisco, who had the job of removing the steel on the shore sections. The material salvaged on this phase totaled 2500 tons. An estimated 2500 tons of steel dropped into the waters of Puget Sound.

Involved in the current contract are about 3900 tons of wire and 3800 tons heavier steel, as well as miscellaneous items including electric equipment, lead, zinc and other materials.

Major portion of the salvage is usable either in the war program or in industries engaged in manufacturing products for the government. The remainder will be sold as scrap.

Removal of the cable bands and wrapping wire was the first operation. Three of the four rig maintenance scaffolds were saved intact when the bridge collapsed and now are used in the program.

Removal of the continuous wire wrappings by hand was too costly and an unwrapping machine was devised, mostly from salvaged materials. Following removal of cable bands and wrapping wire, attention was turned to dismantling of the main cable wire, approximately 3900 tons of No. 6 bridge wire.

For this operation reels were set up, six in each of four groups at the east anchorage. Each group is driven by a 35 horsepower step ring motor through reduction gears consisting of truck rear axles and sprocket chain. Diameter of the reels is 54 inches. To permit removal of wire coils, the outer rim of each reel is removable. At each anchorage the wire is cut and the cut end fastened to the reel.

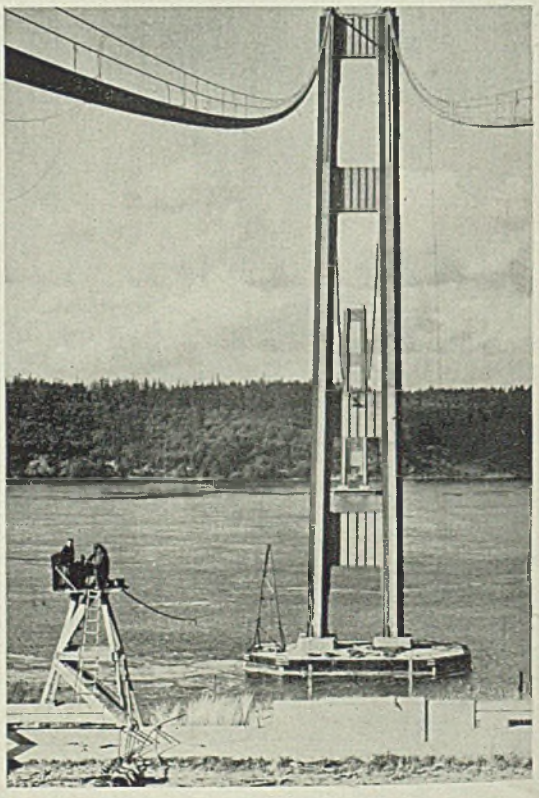
Material taken from the bridge or picked up in junk yards, was used to construct the reeling machines.

Towers Built in Sections

Lowering of the towers is now under way. These were built in sections, weighing from 20 to 40 tons each. They vary in length from 32 to 42 feet. Rivet busters and burning are the methods employed while Chicago booms, with lengths of 90 and 100 feet are used to remove the usable plate, estimated at 3800 tons. One boom is mounted on either tower leg, under a design developed by Mr. Smith and Mr. McClain.

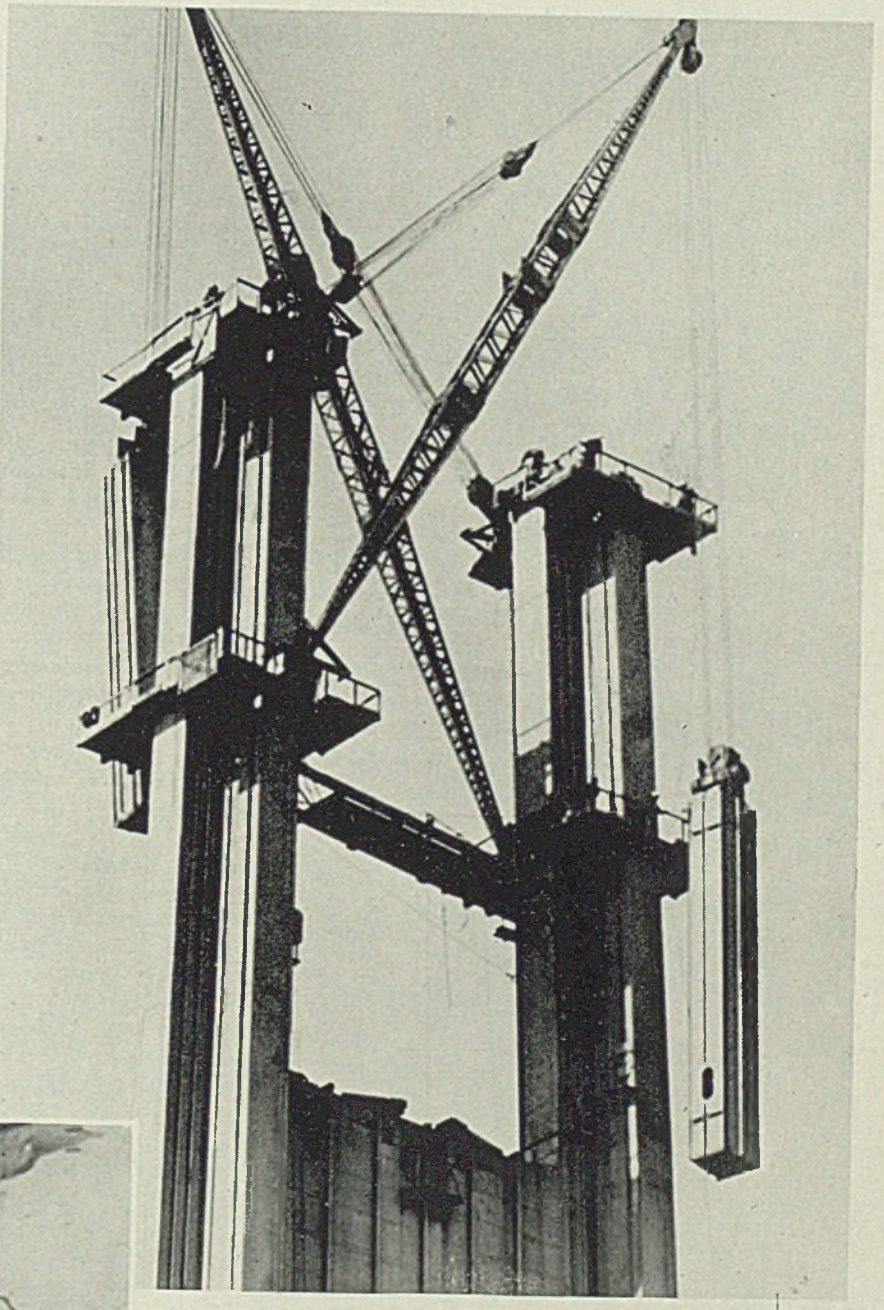
Dismantling is in reverse order to that of erection. The booms are attached to the tower legs with specially designed boom seats by bolting through rivet holes. One boom is stepped down for successive lifts by the boom on the other tower leg.

Booms were built of scrap material. Strand shoe castings were taken from the



bridge to make sheave blocks. Some new load lines were acquired but these will be salvaged upon completion of the job. One of the sheaves weighs two tons. In this gear 5000 feet of ⅞-inch cable in nine parts is used.

Main cables were composed of 12,600 strands of No. 6 wire. There were 332 wires to a strand and 19 strands in each cable. Wrapping wire around these cables had an estimated length of 750 miles. In addition to the main cables and wrapping wire were the suspender cables and hand line cables. These hand cables fitted in nicely when the job of taking down the main cables was under way. Towers are 425 feet high.

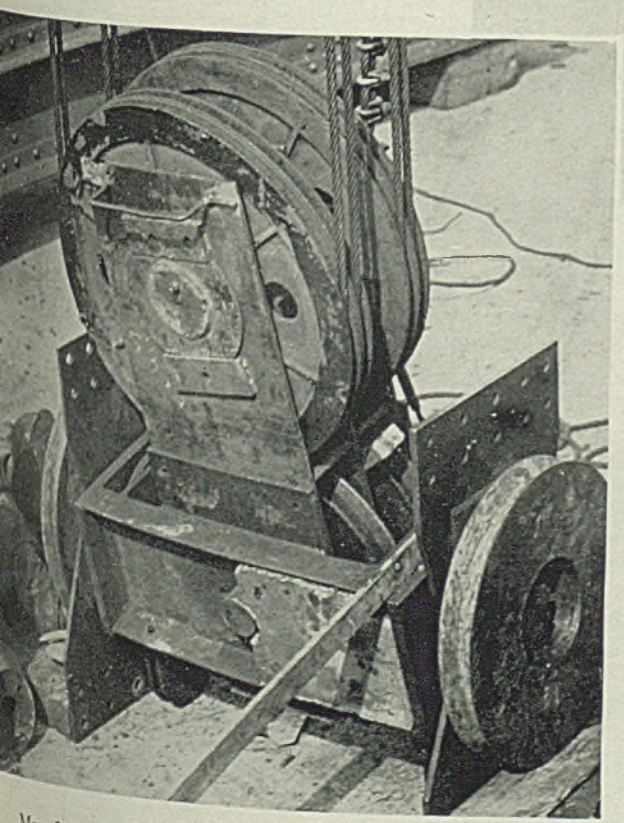


Two tower sections, right, are lowered simultaneously by means of Chicago booms built with steel salvaged from bridge. Sections weigh 40 tons each

Lower left, crew erects power line from shore to operate motors on pier. Strong tidal currents make this task hazardous

Below, a sheave constructed from odds and ends of salvaged steel. It weighs 2 tons

Lower right, in active charge of dismantling span are Grover A. McClain, left, representing contractor, and Kenneth B. Arkin, resident engineer, Toll Bridge Authority. Photos by Washington Toll Bridge Authority



MEN of INDUSTRY

GORDON LEFEBVRE

Who has been elected president, Cooper-Bessemer Corp., as announced in STEEL, May 3, p. 85.

JOHN WOLCOTT HADDOCK

Who has been made president of the Farrel-Birmingham Co. Inc., Ansonia, Conn. as announced in STEEL, May 10, p. 71.

ROY E. SMITH

Who has been appointed sales manager of Kelly O'Leary Steel Works, Chicago, as announced in STEEL, May 17, p. 85.

A. E. Bedell has been appointed chief engineer of Graver Tank & Mfg. Co. Inc., East Chicago, Ind., in charge of all engineering and development covering all divisions of the company.

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Charles A. Conklin has been appointed manager of the Westinghouse Lamp Division's central district, with headquarters in Pittsburgh, and **Robert A. Corvey** has been named manager of the southeastern district, with headquarters in Atlanta, Ga. Mr. Corvey, formerly northeastern district assistant manager, succeeds Mr. Conklin at Atlanta.

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Robert R. Zisette, formerly assistant sales manager, SKF Industries Inc., Philadelphia, has been made sales manager. Joining the company in 1921, Mr. Zisette has served as sales engineer in the Cleveland office and district manager of the Cincinnati office.

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J. Rex Wilson has been made superintendent of the steel division, Phoenix Iron Co., Phoenixville, Pa. He was formerly assistant superintendent of open hearths at Great Lakes Steel Corp., Detroit.

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Charles Chadwick, formerly of Mechanite Research Institute, Pittsburgh, has resigned to become assistant superintendent of the foundry of Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

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Bird Rees, recently with Production Service Division, WPB, and formerly with *Nation's Business* and *Engineering News-Record,* has joined Trundle Engineering Co., Cleveland, to handle sales of management engineering services from New York office.

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James L. Francis, formerly with Vulcan Foundry Co., Oakland, Calif., has joined the metallurgical staff, Mechanite Metal Corp., New Rochelle, N. Y.

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Cedric William Lutz has been appointed purchasing agent, Westinghouse radio division, Baltimore, and **Earle Megathlin,** assistant purchasing agent. Mr. Lutz joined Westinghouse in 1939 and for the past two years has been assistant purchasing agent, Westinghouse steam division, Philadelphia. Mr. Megathlin has served as buyer since 1940 and since 1942 as assistant purchasing agent in Mansfield.

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Charles E. Seman has been appointed eastern representative for the National Founders Association, Chicago, with offices in the Grand Central Terminal building, New York. Mr. Seman who comes from the Houghland-Hardy Sand Co., Evansville, Ind., succeeds R. A. **Ruggle** who resigned recently to become affiliated with the personnel department of the Aluminum Forgings Corp., Erie, Pa.

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Harold F. Hasse, chemical engineer, has been appointed to staff of Battelle Memorial Institute, electrochemical research, Columbus, O. His former affiliations include research with A. O. Smith Corp. and American Can Co.

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Robert Reid, formerly vice president, has been named president, R. & J. Dick Co., to succeed the late **Benjamin Keiley. William M. Barclay,** who retired as vice president several years ago, will return to his former position.

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Edward H. Bell, general manager of American Can Co., northwestern district, New York, has been appointed vice president in charge of west coast operations, including those in Alaska and British Columbia.

—o—

Lorin W. Grubbs, abrasive engineer for Norton Co., Worcester, Mass., for the states of Virginia, North Carolina, South Carolina and parts of West Virginia and Tennessee, has been commissioned a Lieutenant, junior grade, in the United States Navy. **Charles A. Babbitt,** who has had experience in the Norton research laboratories and field work, will take over Mr. Grubbs' territory.

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J. R. Travis, formerly general manager, has been made president, Eaton Metal Products Co., Denver, Colo., to succeed the late **A. N. Eaton.**

—o—

George T. Kearns, comptroller, Delta Mfg. Co., Milwaukee, has accepted executive position, McKenna Metals Co., Latrobe, Pa. He will be succeeded by **Robert Hafer,** formerly with Ernst & Ernst.

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Thomas F. Hanley, treasurer and director of Dowty Equipment Corp., Long Island City and Sunnyside, L. I., has been appointed general manager.

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R. J. Wood, western freight traffic manager, Pennsylvania railroad, Chicago, has been promoted to freight traffic manager, New York, to succeed **W. W. Finley Jr.,** who has been advanced to assistant general traffic manager, Philadelphia. **I. T. Marine,** general freight agent, Chicago has been promoted to western freight traffic manager, Chicago, to succeed Mr. Wood.

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Forest S. Burtch, formerly assistant

FOREST S. BURTCH

T. J. ANDERSON

A. C. BERG

E. Q. SMITH

chief engineer, wire rope engineering department, John A. Roebling's Sons Co., Trenton, N. J., has been made manager of the company's newly formed Aircord division. Mr. Burtch joined Roebling in 1923.

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E. Q. Smith, formerly vice president, Bundy Tubing Co., Detroit, has been elected president of the Aga Metal Tube Co., Elizabeth, N. J. Mr. Smith was connected with Bundy for 15 years and is a member of the Tube Industry Committee, WPB.

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A. C. Berg has been appointed manager of the Road Machinery division of Gar Wood Industries Inc., Detroit. He joined the company in 1919, becoming assistant manager of the division in 1934. **R. S. Headley** has been appointed assistant manager to Mr. Berg.

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Thomas J. Anderson, purchasing agent, Acme Steel Co., Chicago, was elected president, Purchasing Agents' Association of Chicago, at the organization's annual meeting May 13. He succeeds **Roy F. Stiles**, director of purchases, Stewart-Warner Corp. Active in the association's affairs for many years, Mr. Anderson has just completed a term as second vice president. Other officers named include **H. C. Bauer**, Revere Copper & Brass Inc., Dallas division, first vice president; **A. G. Pearson**, National Broadcasting Co., second vice president; **L. R. Seen**, Borg & Beck division, Borg-Warner Corp., secretary; and **H. H. Wise**, Scovill Mfg. Co., treasurer.

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Roland R. Ware has been elected president of Clarage Fan Co., Kalamazoo, Mich., to succeed **Harry Clarage** who has been named chairman of the board of directors. Mr. Ware will continue also as general manager, having held that post for the past 13 years. Other officers elected were: **S. A. Schaeffer**, vice president; **C. A. Kline**, secretary and **C. C. Wheeler**, treasurer.

METAL WORKING INDUSTRY ADVISORY COMMITTEES ANNOUNCED BY WPB

Director of Industry Advisory Committees, War Production Board, has announced formation of the following industry advisory committees:

Rail Steel Mill

Government presiding officer is William F. Vosmer. Committee members: H. P. Bigler, Connors Steel Co. Inc., Birmingham, Ala.; F. G. Carrel, Franklin Steel Works, Franklin, Pa.; M. A. Dowling, Northern Steel Co., Boston; Boyd Jack, Calumet Steeel Co., Chicago; D. C. Schonthal, West Virginia Rail Co., Huntington, W. Va.; Joseph H. Verschleiser, Laclede Steel Co., St. Louis; A. C. Weihl, Pollak Steel Co., Cincinnati.

Farm Machinery, Equipment Suppliers

Government presiding officer is James W. Crofoot. Committee members: H. F. Carroll, Montgomery Ward & Co., Chicago; C. A. Coggin, H. C. Shaw Co., Stockton, Calif.; Howard A. Cowden, Consumers Cooperative Assn., North Kansas City, Mo.; L. A. Hardison, Stratton-Warren Hardware Co., Memphis, Tenn.; Russell G. Lindsay, Lindsay Brothers Inc., Milwaukee; Wade Newbegin, R. M. Wade & Co., Portland, Oreg.; C. J. Reilly, Reilly & McGrevy, Brooklyn, N. Y.; M. B. Sackheim, Brown Fence & Wire Co., Cleveland; I. H. Hull, Indiana Farm Bureau Cooperative Assn., Indianapolis; H. R. Kimmel, Sears, Roebuck & Co.; C. N. Silcox, Cooperative G.L.F. Exchange Inc., Ithaca, N. Y.; E. A. Syftestad, Farmers Union Central Exchange Inc., St. Paul.

General Purpose, Specialty Transformer

Government presiding officer is M. F. Mitschrich. Committee members: J. M. Beman, secretary, Jefferson Electric Co., Bellwood, Ill.; B. J. Brown, vice president, B. F. Miller Co., Trenton, N. J.; M. James Comstock, vice president, Acme Electric & Mfg. Co., Cuba, N. Y.; T. M. Hunter, president, American Transformer Co., Newark, N. J.; I. A. Mitchell, United Transformer Co., New York; R. E. Onstad, president, Thordarson Electric Mfg. Co., Chicago; Arthur Slepian, general manager, Wheeler Insulated Wire Co., Bridgeport, Conn.; P. M. Staehle, sales manager, Specialty Transformer Section, General Electric Co., Fort Wayne, Ind.

Garden Tractor, Equipment

Government presiding officer is K. W. Anderson. Committee members: H. L. Downing, president, American Farm Machinery Co., Minneapolis; W. J. Niederkorn, president, Simplicity Mfg. Co., Port Washington, Wis.; C. A. Peterson, assistant comptroller, David Bradley Mfg. Works, Bradley, Ill.; W. H. Roberts, sales manager, S. L. Allen & Company Inc., Philadelphia; Kenneth L. Thomas, secretary, Gravely Motor Plow & Cultivator Co., Dunbar, W. Va.; E. A. Vallee, vice president, Bolen Products Co., Port Washington, Wis.

Steel Mill Maintenance, Repair

Government presiding officer is F. A. Weidman. Committee members: J. K. Bole, Republic Steel Corp., Cleveland; Harry M. Chapman, Acme Steel Co., Chicago; Philip L. Coddington, The Carpenter Steel Co., Reading, Pa.; T. J. Hudson, Weirton Steel Co., Weirton, W. Va.; P. S. Killian, Bethlehem Steel Corp., Bethlehem, Pa.; F. M. McCleery, Sharon Steel Corp., Sharon, Pa.; William Morris, Jones & Laughlin Steel Co., Pittsburgh; W. H. Stapleton, Inland Steel Co., Chicago; C. G. Strote, United States Steel Corp., Pittsburgh; J. S. Thomas, American Rolling Mill Co., Middletown, O.

Industrial Supply Distributors

Government presiding officer is Thomas A. Calhoun. Committee members: B. H. Ackels, The Rayl Co., Detroit; Carl A. Channon, Great Lakes Supply, Chicago; Fred A. Ellfeldt, Ellfeldt Machinery & Supply Co., Kansas City, Mo.; A. J. Glesener, A. J. Glesener Co., San Francisco; Hesket H. Huhn, The Hardware & Supply Co., Akron, O.; Geo. E. Vandergrift, Desco Corp., Wilmington, Del.; F. Marsena Butts, Butts & Ordway Co., Cambridge, Mass.; Jack B. Dale, Briggs-Weaver Machinery Co., Dallas, Tex.; W. M. Given, The Young & Vann Supply Co., Birmingham, Ala.; T. C. Keeling, Nashville Machine & Supply Co., Nashville, Tenn.; P. G. Maddock, Maddock & Co., Philadelphia.

Wholesale Hardware Distributors

Government presiding officer is H. L. George. Committee members: Wakefield Baker, Baker Hamilton Co., San Francisco; H. A. Hoeynck, Shapleigh Hardware, St. Louis; Arthur May, May Hardware Co., Washington; Glenn E. Jennings, Wright & Wilhemy, Omaha, Neb.; R. R. Witt, Builders Supply Co., San Antonio, Tex.; Henry J. Allison, Glasgow-Allison Co., Charlotte, N. C.; Lewis Herndon, Belknap Hardware & Mfg. Co., Louisville, Ky.; Harvey Firestone, Hardware Division, Montgomery, Ward Co., Chicago; Edmund Orgill, Orgill Brothers & Co., Memphis, Tenn.; I. S. Dillingham, Bigelow Dowse Co., Boston; J. T. Cecil, Interstate Hardware Co., Bristol, Va.; W. A. Parker, Beck & Gregg Hardware, Atlanta, Ga.

NAM Survey Shows 56 Per Cent Rise in 25 Major War Plants

ABSENTEEISM survey in 25 member company war plants has established that the wartime average of absenteeism in those companies increased 56 per cent since the war effort started, the National Association of Manufacturers reported last week.

Present, or wartime, percentage of absenteeism was found 5.42 per cent of workers compared with 3.48 per cent before the war.

The association listed as chief causes of absenteeism sickness, accidents, housing and transportation problems, high earnings, inexperience in regular employment and irresponsibility.

It found also that in industries with a high rate of absenteeism the lost time is greatest on Saturdays and Mondays.

While deploring "irresponsible absenteeism," the NAM survey maintained that "compared with some of the other difficulties that industrial management has mastered, the reduction of absenteeism does not appear an impossible task."

Important Firms Surveyed

The survey was made public in a 30-page pamphlet, entitled "Absenteeism—Realities and Remedies," being distributed to 9000 member companies.

The absenteeism survey was conducted in a group including some of the leading industrial companies in the nation. Among their products are steel, glass, petroleum, chemicals, paper, automotive equipment, mining machinery, machine tools, refractories and shipbuilding.

Referring to current absenteeism, the survey reported:

"Once people are convinced that their individual work is of vital importance there will be very little voluntary absenteeism."

In an effort to reduce absenteeism, the survey made public a check list of 30 suggested steps whereby management can determine how to meet the problem.

It suggested as health and safety measures these 12 steps:

Pre-employment medical examination; preventives of respiratory infection; convenient lunch facilities with well-balanced foods; sufficient time allowance for meals; nutrition information for employes' families; proper ventilation; proper sanitation; plant medical supervision; plant nurses; adequate safety devices and instruction; adjustment of work schedules to prevent cumulative fatigue, and check-up of reported sick absences.

Under the heading of "Morale," the survey suggested:

Appraisal of applicants' aptitudes and responsibility, pre-employment explanation of rules and relation to war effort; information about relation of individual job to war; instruction of foremen on methods of maintaining morale; use of visitors from armed forces; information about ex-employes in service; monetary incentives; incentives other than monetary and plant posters and other exhibits.

The survey suggested to industrial management that it help out in necessary adjustments for personal and family needs—such as housing arrangements, transportation arrangements and time off for attending household or personal duties.

It urged special co-operation between management and labor through special committees; and between management and the community to meet problems of housing, transportation, day nurseries, store and shop hours and health program.

Of the "hangover" evil leading to absenteeism, the survey said that "no one yet has discovered a method for its elimination."

The survey found that in peacetime the men in these minority groups could not hold steady jobs.

WLB Denies Request for Checkoff at Metal Mines

Nonferrous Metals Commission of the War Labor Board has issued directives denying requests of Denver locals of the International Union of Mine, Mill and Smelter Workers for establishment of a checkoff at mines of the Peru Mining Co. at Hanover, N. Mex., and Kennecott Copper Corp. (Chino division) at Hurley, N. Mex. The Commission ordered the companies to enforce maintenance of membership clauses included in previous contracts.

OBITUARIES . . .

Charles Fahlstrom, 57, assistant to the president, American Manganese Steel Division, American Brake Shoe Co., Chicago Heights, Ill., died May 10 in Rochester, Minn. Mr. Fahlstrom had been associated with the company 33 years.

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Edward F. Niedecken, 71, inventor and president of Hoffmann & Billings Mfg. Co., Milwaukee, died May 9 in that city.

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William H. Billings, 69, an executive of the Union Carbide & Carbon Corp., New York, died May 12 in Charleston, W. Va.

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Edward C. Voorhees, 55, former metallurgist, Erie Forge Co., Erie, Pa., died April 24 in Somerville, N. J.

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J. R. Worcester, 83, one of the foremost engineers in design of steel and reinforced structures and foundations, died May 10 at Waltham, Mass. For many years consulting engineer to Boston Transit Commission, Mr. Worcester, designed most of the elevated structures of the Boston Elevated Railway, steel work of the subway, and the viaduct across Charles River Dam. Early in his career he designed the steel work supporting the dome of Bulfinch State House in Boston.

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Lawrence J. Roeder, division accountant, Union Carbide & Carbon Corp., Long Island City, N. Y., died recently in East Orange, N. J.

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George H. Chisholm, 74, president, the Atlas Steel Casting Co., Buffalo, died May 10 in that city. Mr. Chisholm founded the company 32 years ago.

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W. Arnold Houser, general parts and service manager, Cadillac Motor Car Division, General Motors Corp., Detroit, died May 4 in that city.

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Raymond M. Owen, 70, a pioneer automobile manufacturer, died recently in Westport, Conn. Mr. Owen built the Owen-Magnetic and also designed and built the Dyneto starting and lighting equipment, used exclusively by Packard.

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Captain William Sparks, 70, retired president of the Sparks-Withington Co., Jackson, Mich., died May 14 in that city.

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Robert Frank McGinnis, 51, a buyer for the Chile Exploration Co., New York, died May 14 in that city.

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Julius Hegeler, 73, president and founder, Hegeler Zinc Co., Danville, Ill., died April 13 in Washington.

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Hugo V. Lucas, president and treasurer of A. Lucas & Sons, Peoria, Ill., died May 8.

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Harry A. Henderson, 65, assistant to general superintendent, South Works, Carnegie-Illinois Steel Corp., Chicago, died May 16 in that city.

Homestead Steelworks Expansion To Be Finished by End of 1943

HAMPERED by priorities, lack of material and manpower, the Homestead steelworks expansion program, which has been muddling along several months behind schedule, is being pushed to completion as rapidly as possible. First steel is expected to be poured in June.

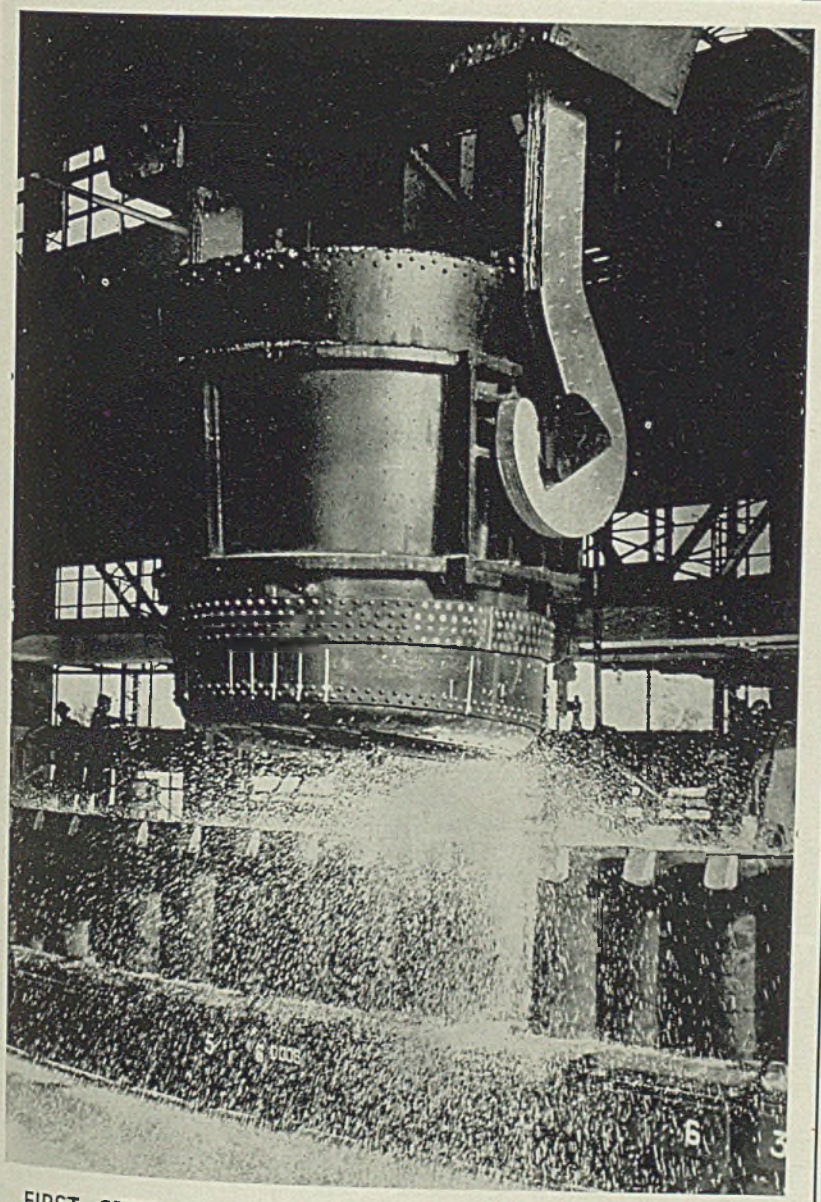
This unit, a completely integrated plant from blast furnace to finished product, has been hampered by adverse priority rulings, dogged by jurisdictional strikes of the construction unions, and at practically no time since its inception has it had clear sailing.

Despite these difficulties, construction progress is described by H. G. Batcheller, chief, WPB Steel Division, as encouraging. Original program called for the first of its 11 open hearths to be in operation in October, 1942. According to that schedule, the plant is about 7 months late. However, plans also called for ultimate completion of the open-hearth program by June, 1943, and it is now estimated this program will be substantially finished before the end of 1943, or about six months behind schedule.

Priority difficulties have pushed back units of the slabbing mill on the books of mill manufacturers, so that work on this unit has now only begun. Because of the looming steel shortage during the last half of this year, the green light is being given to this equipment and it is expected that the mill will be rolling before the close of 1943. There are no estimates yet on possible date of completion of the plate mill. There are as yet no dates set for the blowing in of new blast furnaces.

Over and above the construction problem, one of the knottiest puzzles facing Carnegie-Illinois Steel Corp., which will operate the plant under an agreement with Defense Plant Corp., is that of supplying sufficient numbers of workers to man it. It is estimated about 5000 men will be needed. The corporation activities in the Pittsburgh district are now short by 1500 men.

While the problems of supplying the new plant with necessary raw materials have been partially solved, there remain stumbling blocks, one of which is coke.



FIRST STEEL POURED AT KAISER'S FONTANA PLANT

ELEVEN months after construction started, first steel was poured from 185-ton open hearth furnace at Kaiser Co. Inc., Fontana, Calif., plant, May 14. Above view shows the first melt being poured from a 200-ton ladle into the molds, marking the second phase of the Kaiser project. First phase was completed last Dec. 30 when the 1200-ton blast furnace was blown in

DPC Authorizes Plant Expansions, Equipment

Defense Plant Corp. authorized recently the following expansion and equipment purchases (figures are approximate):

Colorado Fuel & Iron Corp., Denver, plant facilities in Colorado costing $5,500,000.

Duraloy Co., Scottdale, Pa., plant facilities in Pennsylvania costing $350,000.

Tubular Alloys Steel Corp., Pittsburgh, plant equipment in Indiana costing $930,000; overall commitment of $12,000,000.

Sylvania Electric Products Inc., Emporium, Pa., facilities in three plants in Pennsylvania costing $360,000; overall commitment of $600,000.

Commodity Credit Corp., Washington, plant facilities, four in Minnesota, three in Illinois, and one in Wisconsin costing $350,000 each.

Cornwall & Patterson Co., Bridgeport, Conn., equipment and machinery in Connecticut costing $35,000.

Follansbee Steel Corp., Pittsburgh, equipment in Ohio plant costing $500,000.

National Cylinder Gas. Co., Chicago, machinery and equipment in Louisiana and Pennsylvania costing $55,000 in each plant.

Northwestern Ice & Cold Storage Co., Portland, Ore., facilities in Oregon costing $200,000.

Ford Motor Co., machinery and equipment in Michigan costing $260,000.

Continental Aviation & Engineering Corp., Detroit, equipment in Michigan costing $1,600,000; overall commitment, $15,000,000.

Indiana Steel Products Co., Chicago, facilities in Indiana costing $120,000; overall commitment, $775,000.

Midwest Solvents Co., Atchison, Kan., facilities in Kansas for overall commitment of $430,000.

Parker Appliance Co., Cleveland, machinery in Ohio; overall commitment, $1,130,000.

Steel and Related Industries Face Paper Shortage Problem

LACK of a concerted or unified effort is complicating what may become one of industry's most serious supply problems —that of obtaining sufficient paper to fulfill all needs.

Conditions in the paper industry indicate the paper shortage is becoming more aggravated due to manpower and raw material shortages. On the other hand, requirements of industry and government are increasing and eventually the point will be reached where paper needs of a critical nature may not be completely filled.

Canvass of typical steel and manufacturing firms in the Pittsburgh area shows paper conservation is being pressed by many companies, some completely integrated programs being in effect which go so far as to segregate various types of waste paper for ultimate marketing or re-use to best advantage.

In general, the larger the company and the more complicated its internal operations, the more advanced is its conservation effort.

Reports Required Increase

This factor arises originally from the shortage of manpower rather than a shortage of paper. Large concerns with a substantial number of interoffice or inter-company reports have found their office help has been reduced to a point where the load is unbearable. Beginning as far back as a year ago, some of these concerns have made intensive efforts to cut down on the number and types of internal reports required with such good results in some cases current paper consumption is below that of a year ago despite considerable increase in the number of governmental and other reports required of these companies. But the number of reports continues to increase to swell the total required.

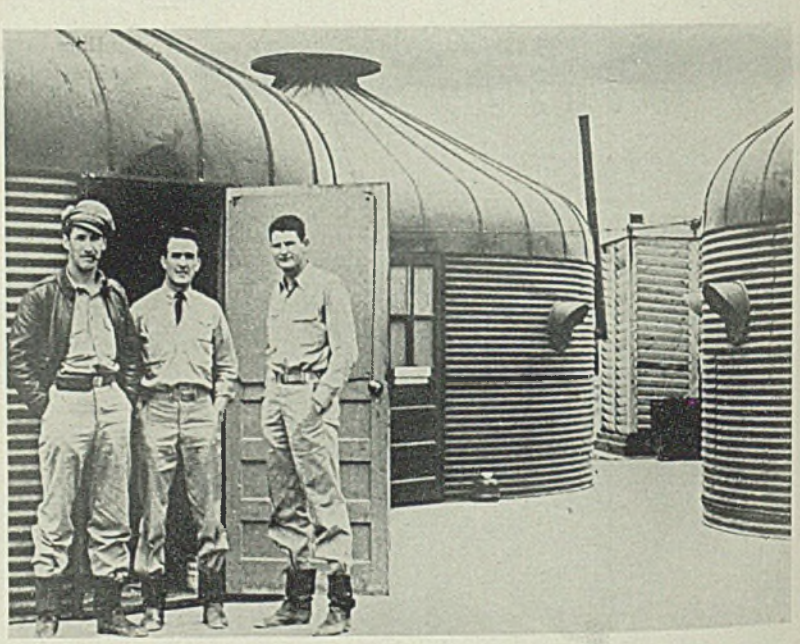
Certain broad general principles are being followed by practically all companies with any paper conservation program. One of these is to go to lighter paper stock for almost every purpose and reduce the size of the necessary forms. Elimination of interoffice envelopes for mail of a non-confidential nature also has decreased paper requirements. Carbons and file copies of letters are to be made on two sides of the paper where there is more than one page. Additional copies of letters have been eliminated where one copy can be routed to several individuals. The use of scratch pads made from old reports and letters which have one side of the page left blank has made a substantial decrease in the volume of paper needed for this purpose. Making a greater number of carbon copies per sheet of carbon paper is a fairly general practice, but this arises from a shortage of carbon paper rather than an attempt to conserve the paper required.

Industrial concerns operating their own printing plants or printers who carry stocks of paper to service particular accounts are carrying out three general types of conservation. The number of different paper grades carried in stock has been substantially reduced. The physical volume of stock, that is, the number of sheets of each type of paper carried in stock, has been cut to the bone. Basic weight of paper used for publications, office forms, advertising material, and similar printed matter has been reduced generally, and in the case of companies with employe magazines and similar publications, the 10 per cent restriction has been made via this route more than any other.

The problem of paper salvage has not yet received widespread attention. Those companies which have made a study of this program have found that wise handling of the material thus collected has resulted in a financial gain, as well as an excellent conservation effort.

One concern on studying its costs found that it was spending $8 to $10 per ton to burn waste paper. Proper segregation of the various types of waste paper and preparation for sale in the open market or for re-use by the company resulted in an income of about the same amount to this concern, as well as an increased supply of the more critical papers, such as blueprint papers. In the case of this commodity, old blueprints and scraps of blueprint are collected and returned to the manufacturer. This increases his stock of raw material, and in turn makes it possible for increased production of blueprint paper to meet the needs of industry. This is also true of any type of specialized manufacturing paper, such as insulating liners, spacing papers and waterproof paper used for wrapping.

A uniform two-pronged effort throughout industry, with one prong aimed at conservation of paper at the source—that is cutting down the quantities required to do business—and the second prong aimed at an efficient salvage operation on used paper, would play an important part in easing any possible future shortage of paper.



GRANARIES PROVIDE "HOMES" FOR YANKEE PILOTS

LACKING conventional sleeping quarters, American test pilots, stationed somewhere in Iran, where American warplanes are unloaded for delivery to Russia, converted these steel granaries into their "homes for the duration." Acme photo

Stop Loose Thinking on Scrap!

Supply problem cannot be gambled with, WPB Steel Division executive warns industry. . . Urges material be taken in regularly to maintain collection momentum

WARNING that unless steel companies take in scrap regularly and protect themselves with high safe inventories, William Kerber, chief, Raw Materials Branch of the WPB Steel Division, at a recent meeting of the Iron and Steel Industry Advisory Committee, said dealers and the public will lose their incentive to go out and get the scrap—momentum in collections will slow up, and the industry suddenly find that the flow pipe is getting empty.

By careful analysis of each individual company's requirements in making a metallics balance, it is estimated total needs for purchased scrap in 1943 will be about 24,500,000 net tons, almost as much as was needed last year, according to Mr. Kerber.

The Steel Division, he said, senses that there has been some loose thinking about the scrap situation due to the fact that during 1942 total inventories were considerably increased.

"This improvement in inventories possibly has resulted in casual statements by some steel company officials that the scrap supply is no longer a worry," he said.

"Difficulty Filling Orders"

"In spite of the increased inventory, certain plants, especially in minus areas, periodically call on the Steel Division for quick scrap. We had considerable difficulty last winter in filling these requests and have some difficulty right today. Therefore, the Steel Division does not agree with this attitude. The scrap supply problem is something that cannot be gambled with in terms of speculative thinking. Certain steel companies believe that just because the Steel Division is charged with the job of allocating scrap that it is a guarantee that it will always be available.

"The great unknown today is the future supply of scrap. No one can actually answer that. Therefore, the point we want to make today is that the important thing is to keep up the regular flow of scrap against the day when it may seriously begin slowing up and be harder to get. This might be for many reasons —the gradually drying up of present sources, greater difficulty in securing it due to distance, lack of manpower and transportation. Let's get it while we can.

"Unless steel companies take in scrap regularly and protect themselves with high safe inventories, the dealers and the public will lose their incentive to go out and get the scrap. We will lose the momentum in collections and suddenly find out that the flow pipe is getting empty. The Salvage Division is also very conscious of this fact and any overall sentiment that the scrap problem is permanently solved has the effect of creating complacency in the attitude of industrial plants, farmers, housewives, etc., in the collection of scrap.

"There are too many factors involved for steel plants to take risks on low inventories or be too choosey under today's continuous peak operations. In normal times with the up and down swings of business, this policy works commercially, but conditions are different today. The Steel Division makes every effort to keep as much high quality scrap moving as possible at the cheapest delivered price, even though we all know the quality is not all that is desired.

"The Steel Division would like to see high safe inventories at all mills, which in the opinion of the Steel Division, means a larger inventory than now exists at a great many of the plants. If this is once obtained and the steel companies inaugurate and stick to a consistent policy of buying to replenish their daily consumption, the problem would be simplified and danger of possible shutdowns due to lack of scrap would be reduced."

New Method Adopted To Classify Iron Ore

A new method for classifying ore reserves as "measured ore," "indicated ore," and "inferred ore" has been adopted by the Bureau of Mines and the Geological Survey as a means of providing a more comprehensive picture of the nation's mineral resources, Harold L. Ickes, Secretary of the Interior, announces.

The two interior department agencies have co-operated in the discovery and exploration of millions of tons of war minerals in the past four years under the strategic minerals act. The following definitions will govern the use of the three new terms:

"Measured ore" is ore for which tonnage is computed from dimensions revealed in outcrops, trenches, workings, and drill holes and for which the grade is computed from detailed sampling.

"Indicated ore" is ore for which tonnage and grade are computed partly from specific measurements, samples, or production data and partly from projection on geologic evidence.

"Inferred ore" is ore for which quantitative estimates are based largely on broad knowledge of the geologic character of the deposit and for which there are few, if any, samples or measurements. Estimates are based on an assumed continuity or repetition with deposits of similar type.

Limits Lake Coal

Shipments restricted in move to divert more vessels to ore trade

TO MAKE more cargo space available for movement of iron ore on the Great Lakes, Joseph B. Eastman, director, Office of Defense Transportation, issued general order No. 9A, establishing new controls over transportation of coal on lake routes. The order, effective May 17, controls transportation of coal by rail to lake ports and by vessel on the lakes.

A "tentative policy" announced by Mr. Eastman calls for limitation of 1943 lake coal movement from any United States port to the Buffalo and Chicago areas to 80 per cent of the aggregate quantity carried in 1942; to Lake Superior ports to 110 per cent and all other areas 100 per cent. Only ships equipped with belt conveyor unloading devices will be allowed to move coal to Detroit.

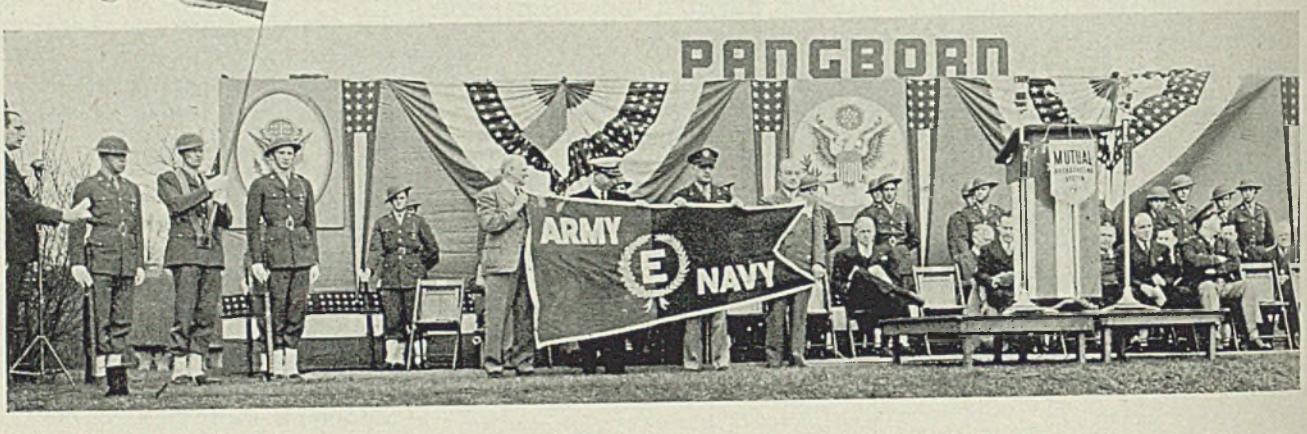
Shipments already made this season will be included in total shipments authorized. The new order revoked order No. 9, which provided less control.

With ore movement about 7,000,000 tons behind the 1942 figures, due to late opening of navigation, full-scale operations now are under way in the effort to meet the revised WPB goal of 91,000,000 tons for the 1943 season.

According to recent estimates lake carriers will move about 50,000,000 tons of coal this season, against some 49,000,000 tons last year.

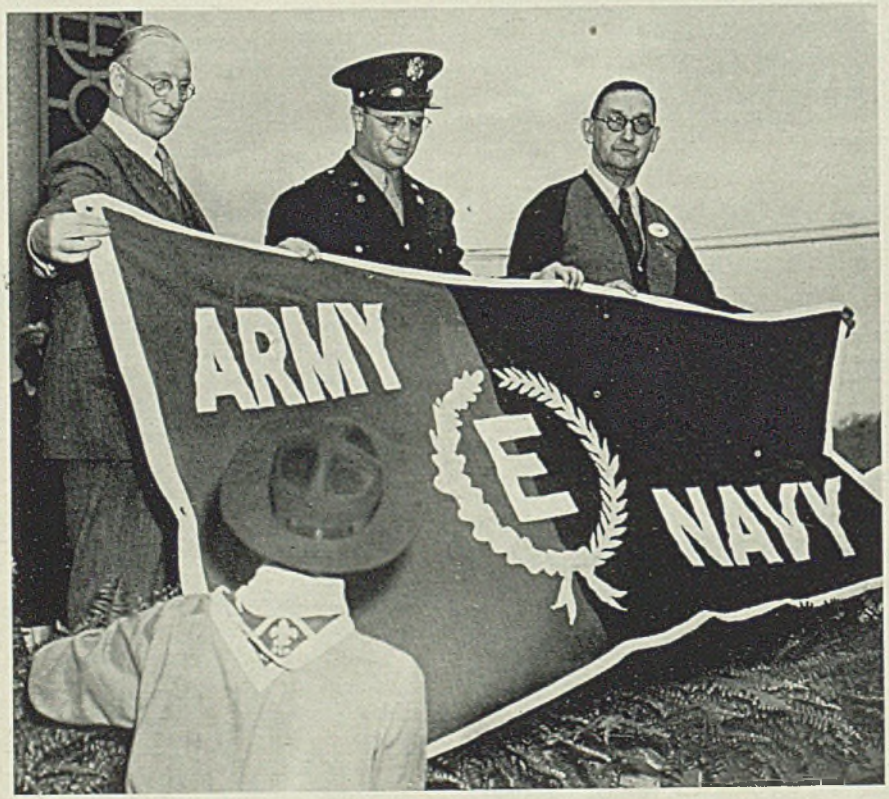
Production of usable iron ore in the United States in March totaled 3,457,508 net tons, compared with 3,045,696 tons in February, according to the Bureau of Mines. Shipments from mines in March were 1,457,732 tons, against 1,311,449 tons in February. About 92 per cent of ore mined each month was for blast furnace use. Mine stocks were 9,654,106 tons at the end of March, compared with 7,668,554 tons at the close of February.

Pangborn Corp., Hagerstown, Md., manufacturers of blast cleaning equipment widely used in production of war materiel, receives joint Army-Navy "E", below



L. L. McClintock, general manager, Wright's Automatic Machinery Co., Durham, N. C., accepts "E", right

Firth-Sterling Steel Co., McKeesport, Pa., is presented "E" pennant, below. Left to right: L. Gerald Firth, president; Lieut. Col. R. C. Downie, Army; W. B. Best, veteran employe



Army-Navy Cite More Firms for War Output

Joint Army-Navy "E" awards for outstanding production of war materials were announced last week for the following metalworking and metal producing companies:

American Brass Co., Kenosha Brass Co., Kenosha, Mich.

Borg-Warner Corp., Rockford Drilling Machine Division, plants 1, 2, and 3, Rockford, Ill.

E. I. du Pont de Nemours & Co. Inc., Perth Amboy Electro-chemical plant, Perth Amboy, N. J.; Belin plant, Moosic, Pa.

Merritt, Chapman & Scott Corp., Escanaba By-Pass Project, Escanaba, Mich.

Minneapolis-Moline Power Implement Co., Como Ordnance plant, Minneapolis, Minn.

D. W. Onan & Sons, Arrowhead, Madison, Royalston and University plants, Minneapolis, Minn.

United States Metals Refinery Co., Carteret plant, Carteret, N. J.

United States Rubber Co., Shelbyville Mills, Shelbyville, Tenn.

Buffalo Arms Corp., Buffalo, N. Y.

Arthur A. Crafts Co., Boston, Mass.

General Motors Corp., Fisher Body Division, Aircraft Unit, Plant No. 21; Fleetwood Unit; Research Laboratories Division, Detroit.

Perry-Fay Co., Elyria, O.

Skilsaw Inc., Chicago.

Eisenhower Congratulates American Industry

Gen. Dwight D. Eisenhower sent a message last week from his African headquarters to the men and women of American industry, citing them for their help in winning the Battle of Africa and saying:

"Our fighting men, standing shoulder to shoulder with our gallant Allies have driven the enemy out of North Africa. In this victory the munitions made by American industry, labor and management, played a very important role in this achievement."

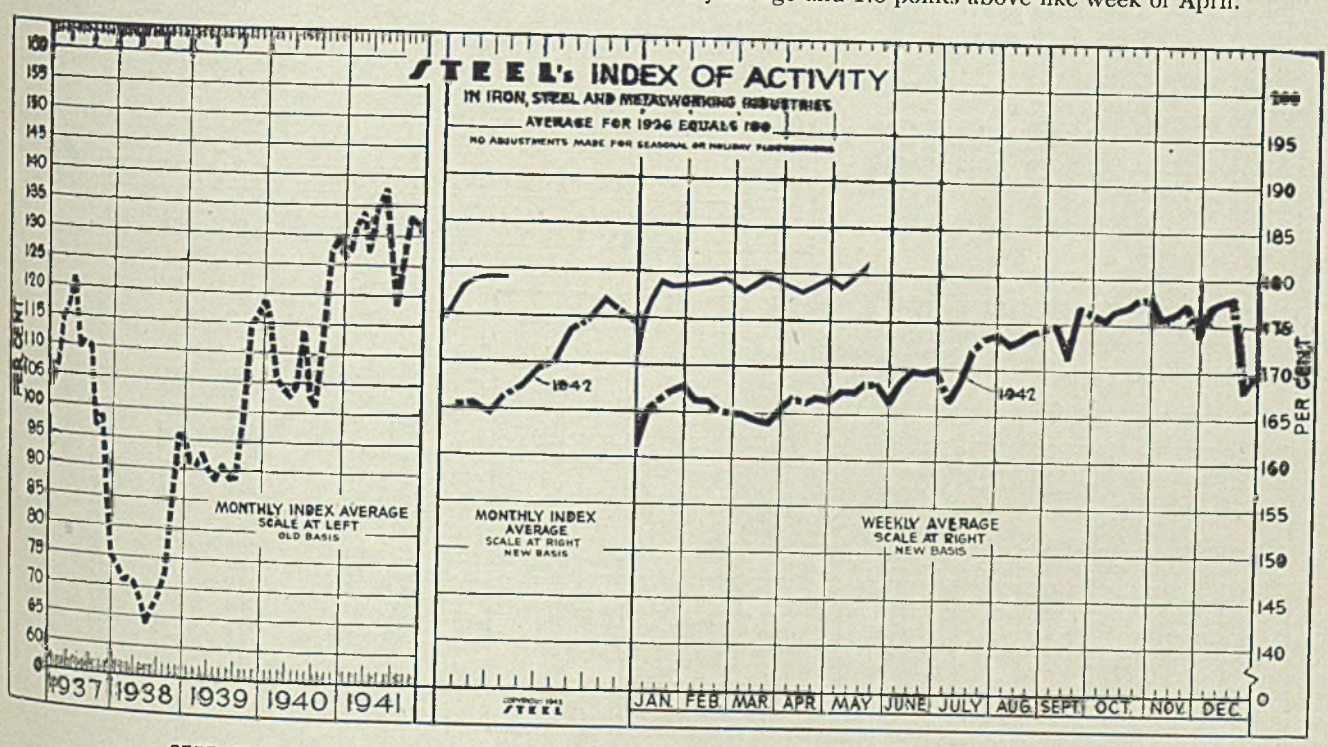
War Plant Cutback Starts Reconversion Speculation

WPB's move to scale down the war plant and machinery programs is expected to release substantial amounts of material and many men for production of goods going directly into the war. One estimate places the saving of steel at one time diverted to the construction field as high as 24 per cent of the industry's total output. Chief benefits may come from redirection of the activities of machine tool builders and employment of construction workers at new trades in war plants.

One interpretation of the proposed cutback is the anticipation of some civilian goods manufacturers, now on war work, that early reconversion to former lines may be possible. Many appliance firms are reported to be well ahead of schedules on work for the armed services. Rumor persists that Washington is planning to make available some materials for development of civilian products this fall. It was pointed out by one official that where an organization had surmounted all production difficulties and was currently moving in high gear toward its war goals, its engineering talents would be wholly utilized on research and development for peacetime products.

Adherents to the cause of early reconversion are ready to explain how long it will take them to convert, the extent to which they will be affected by such changeover and the advantages inherent in a more gradual shift. It is said that if a war of attrition prevails, production of peacetime goods may come earlier than otherwise and without much trouble. Some think that reconversion now of the plants that can be spared from war work will act as a hedge against the inflationary effect at the war's end of a consumer goods deficiency when people having plenty of money are unable to buy.

STEEL's index of activity moved up 1.5 points in the latest week to 180.6, 15.8 points above the level reached a year ago and 1.8 points above like week of April.



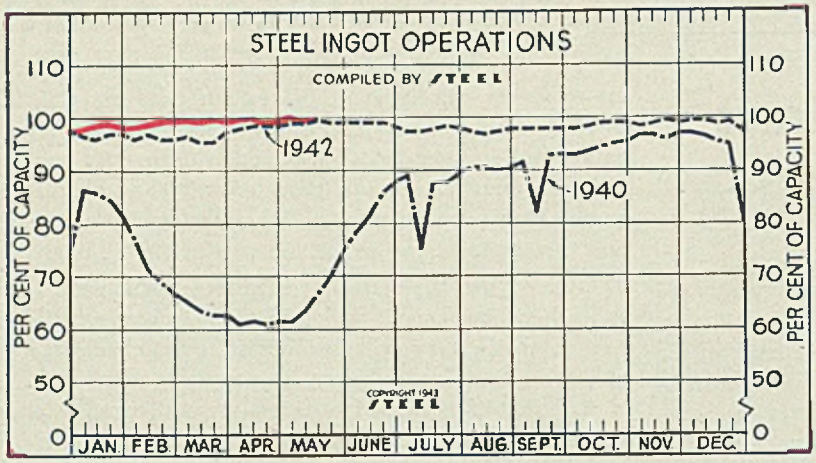
STEEL'S index of activity moved up 1.5 points in the week ending May 15:

Week Ended	1943	1942
May 15	180.6†	168.4
May 8	179.1	167.4
May 1	178.5	167.4
April 24	179.3	166.4
April 17	178.8	166.7
April 10	178.8	166.2
April 3	178.5	166.7
Mar. 27	179.2	165.5
Mar. 20	179.6	163.9
Mar. 13	179.0	164.1
Mar. 6	178.2	164.8

†Preliminary.

Mo. Data	1943	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932
Jan.	178.1	165.7	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6
Feb.	178.8	165.6	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3
March	179.0	164.6	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2
April	178.8	166.7	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8
May	.....	167.7	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8
June	.....	169.4	138.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4
July	.....	171.0	128.7	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1
Aug.	.....	173.5	118.1	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0
Sept.	.....	174.8	126.4	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5
Oct.	.....	176.9	133.1	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4
Nov.	.....	175.8	132.2	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5
Dec.	.....	174.1	130.2	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2

Note: Weekly and monthly indexes for 1942 and 1943 have been adjusted to offset the forced curtailment in automobile production and to more accurately reflect expanding steel production



Steel Ingot Operations

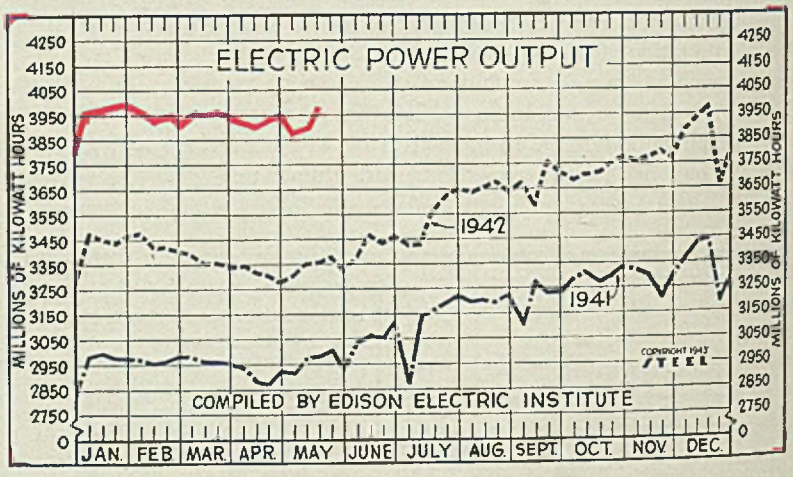
(Per Cent)

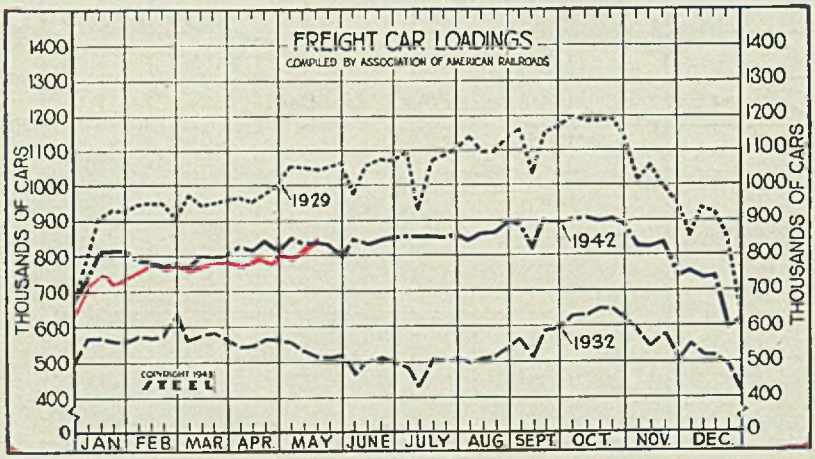
Week ended	1943	1942	1941	1940
May 15	98.5	99.5	99.5	70.0
May 8	98.5	99.0	97.5	66.5
May 1	99.5	99.0	95.0	63.5
April 24	99.0	98.5	96.0	61.5
April 17	99.0	98.5	98.0	61.5
April 10	99.5	98.5	98.0	61.0
April 3	99.5	98.0	98.0	61.5
Mar. 27	99.0	97.5	99.5	61.0
Mar. 20	99.5	95.5	99.5	62.5
Mar. 13	99.0	95.5	98.5	62.5
Mar. 6	99.5	96.5	97.5	63.5
Feb. 27	99.5	96.0	96.5	65.5
Feb. 20	99.5	96.0	94.5	67.0
Feb. 13	99.0	97.0	96.5	69.0
Feb. 6	98.5	96.0	97.0	71.0
Jan. 30	98.5	97.0	97.0	76.5

Electric Power Output

(Million KWH)

Week ended	1943	1942	1941	1940
May 15	3,969	3,357	2,800	2,422
May 8	3,904	3,351	2,792	2,387
May 1	3,867	3,305	2,734	2,386
April 24	3,925	3,273	2,750	2,398
April 17	3,917	3,308	2,702	2,422
April 10	3,882	3,321	2,721	2,418
April 3	3,890	3,349	2,779	2,381
Mar. 27	3,928	3,345	2,802	2,422
Mar. 20	3,947	3,357	2,809	2,424
Mar. 13	3,945	3,357	2,818	2,460
Mar. 6	3,946	3,392	2,835	2,464
Feb. 27	3,893	3,410	2,825	2,479
Feb. 20	3,949	3,424	2,820	2,455
Feb. 13	3,939	3,422	2,810	2,476
Feb. 6	3,960	3,475	2,824	2,523
Jan. 30	3,977	3,468	2,830	2,541
Jan. 23	3,974	3,440	2,980	2,661





Freight Car Loadings

(1000 Cars)

Week ended	1943	1942	1941	1940
May 15	830†	839	861	679
May 8	816	839	837	681
May 1	789	859	794	665
April 24	794	816	722	644
April 17	781	847	709	628
April 10	789	814	680	619
April 3	772	829	683	603
Mar. 27	787	805	792	628
Mar. 20	768	797	768	620
Mar. 13	769	799	758	619
Mar. 6	748	771	742	621
Feb. 27	783	781	757	634
Feb. 20	752	775	678	595
Feb. 13	765	783	721	608

†Preliminary.

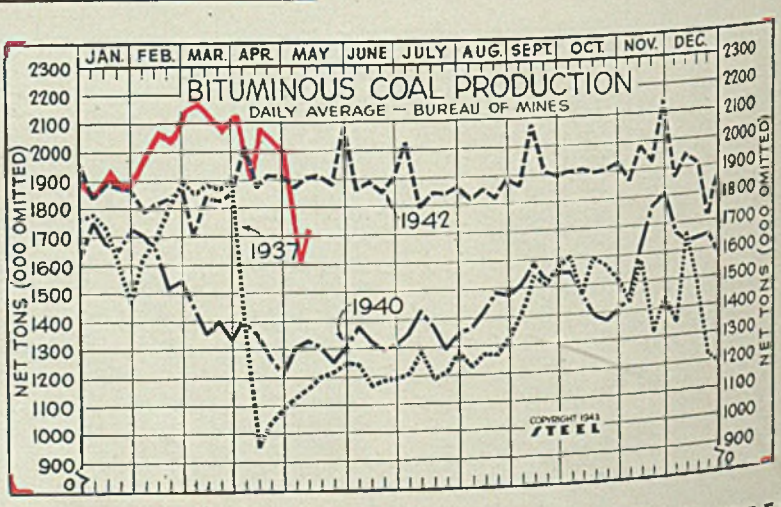
Bituminous Coal Production

Daily Average

Net Tons (000 omitted)

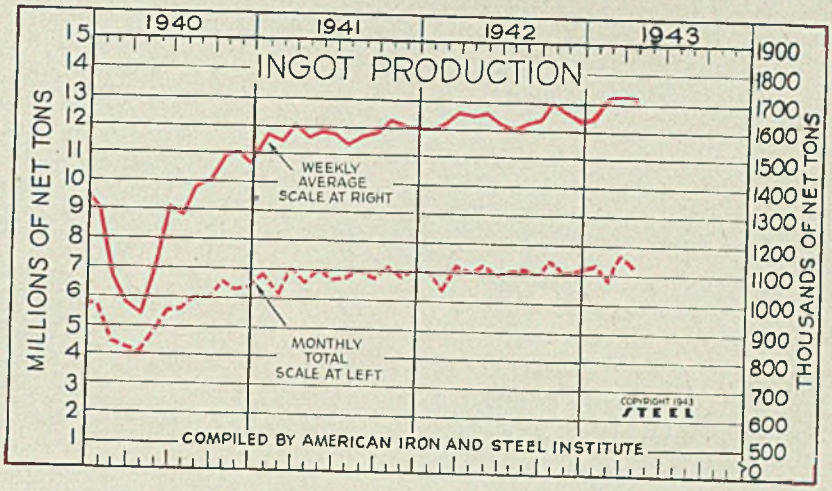
Week ended	1943	1942	1941	1937
May 8	1,697†	1,903	1,567	1,163
May 1	1,584	1,877	867	1,126
April 24	1,963	1,916	267	1,092
April 17	2,017	1,919	233	1,041
April 10	2,067	1,875	200	953
April 3	1,858	2,019	665	1,381
Mar. 27	2,108	1,858	1,950	1,895
Mar. 20	2,060	1,825	1,879	1,871
Mar. 13	2,100	1,842	1,844	1,883
Mar. 6	2,125	1,693	1,791	1,851
Feb. 27	2,113	1,878	1,736	1,897
Feb. 20	2,027	1,833	1,736	1,807
Feb. 13	2,033	1,817	1,736	1,696

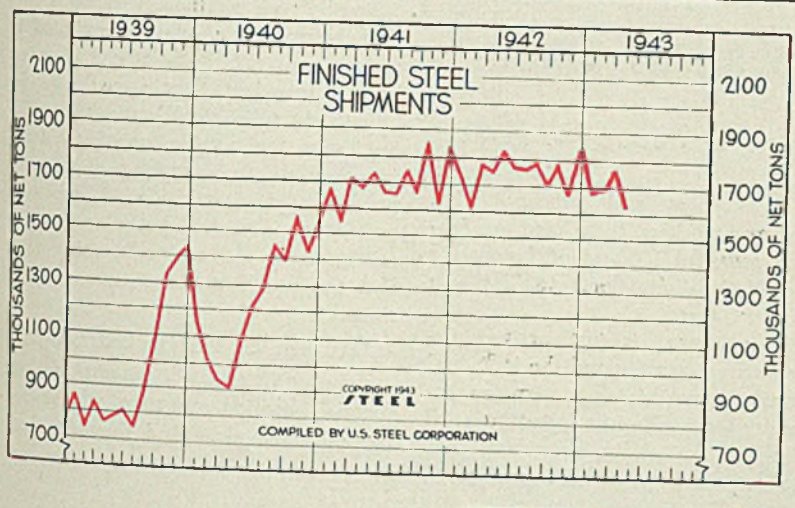
†Preliminary.



Steel Ingot Production
(Unit 100 Net Tons)

	Monthly Total		Weekly Average	
	1943	1942	1943	1942
Jan.	7,424.0	7,124.9	1,675.8	1,608.3
Feb.	6,826.0	6,521.1	1,706.5	1,630.3
Mar.	7,670.2	7,392.9	1,731.4	1,668.8
Apr.	7,374.1	7,122.3	1,718.9	1,660.2
May	.....	7,386.9	.....	1,667.5
June	.....	7,022.2	.....	1,636.9
July	.....	7,148.8	.....	1,617.4
Aug.	.....	7,233.5	.....	1,632.8
Sept.	.....	7,067.1	.....	1,651.2
Oct.	.....	7,584.9	.....	1,712.2
Nov.	.....	7,184.6	.....	1,674.7
Dec.	.....	7,303.2	.....	1,652.3
Total	.....	83,092.2	.....	1,651.2



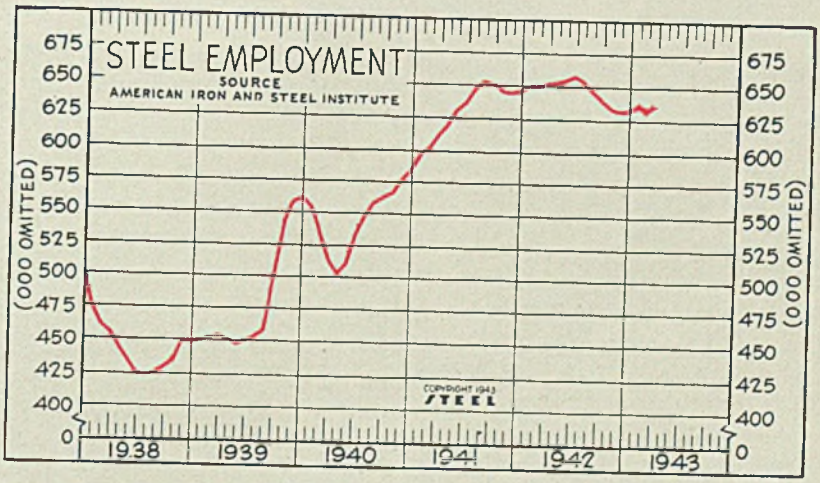


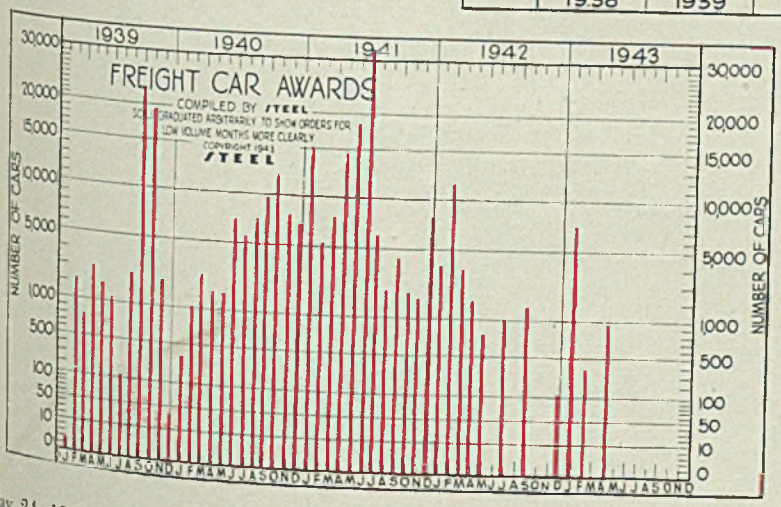
Finished Steel Shipments
U. S. Steel Corp.
(Unit 1000 Net Tons)

	1943	1942	1941	1940	1939
Jan.	1685.9	1738.9	1682.5	1145.6	870.9
Feb.	1691.5	1616.6	1548.5	1009.3	747.4
Mar.	1772.4	1780.9	1720.4	931.9	845.1
Apr.	1,630.8	1758.9	1687.7	907.9	771.8
May	.....	1834.1	1745.3	1084.1	795.7
June	.....	1774.1	1668.6	1209.7	807.6
July	.....	1765.7	1666.7	1296.9	745.4
Aug.	.....	1788.7	1753.7	1455.6	885.6
Sept.	.....	1703.6	1664.2	1392.8	1086.7
Oct.	.....	1787.5	1851.3	1572.4	1345.9
Nov.	.....	1665.5	1624.2	1425.4	1406.2
Dec.	.....	1849.6	1846.0	1544.6	1444.0
Tot.	.....	.....	20,458.9	15,013.7	11707.3

Steel Employment
(000 omitted)

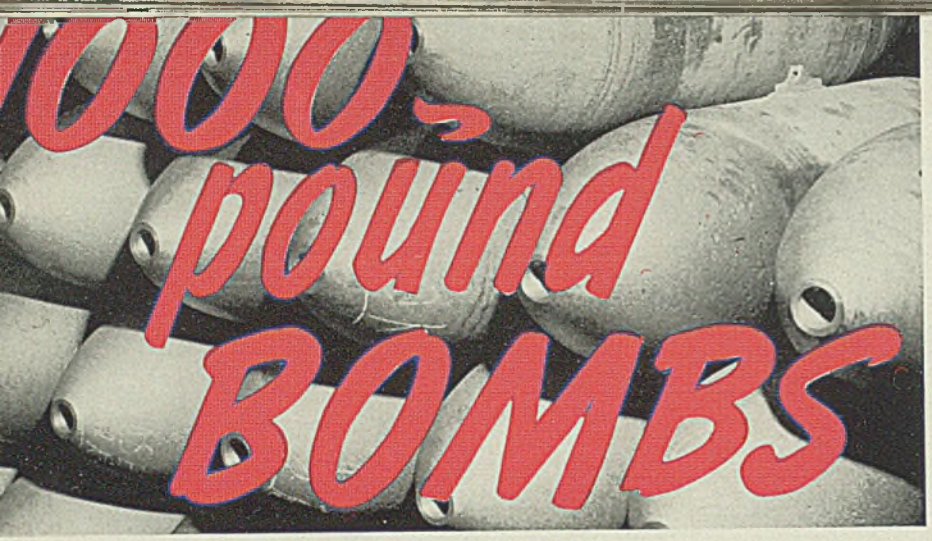
	1943	1942	1941	1940	1939
Jan.	637	651	598	556	451
Feb.	635	651	603	538	453
Mar.	637	653	613	514	455
Apr.	...	654	621	503	452
May	...	656	632	510	448
June	...	659	638	535	451
July	...	655	648	549	453
Aug.	...	647	654	560	458
Sept.	...	641	652	565	502
Oct.	...	685	646	568	545
Nov.	...	632	645	577	561
Dec.	...	633	646	585	563





Freight Car Awards

	1943	1942	1941	1940
Jan.	7,415	4,253	15,169	360
Feb.	350	11,725	5,508	1,147
March	0	4,080	8,074	3,104
April	1,000	2,125	14,645	2,077
May	.....	822	18,630	2,010
June	.....	0	32,749	7,475
July	.....	1,025	6,459	5,848
Aug.	.....	0	2,668	7,525
Sept.	.....	1,863	4,470	9,735
Oct.	.....	0	2,499	12,195
Nov.	.....	0	2,222	8,234
Dec.	.....	135	8,406	7,181
Total	.....	26,028	121,499	66,889



. . . fabricated from seamless pipe

By GEORGE R. REISS

A FABRICATING plant that produced such products as truck bodies, culvert linings and bridge floors and workers who formerly waited table, delivered groceries and sold shoes now are fabricating the "eggs" to break Hitler's and Hirohito's backs.

The plant is that of the Commercial Shearing & Stamping Co., Youngstown, Ohio, and its employes were former steel mill and factory hands, salesmen, waiters, bookkeepers and grocery boys. Turned war workers, these men are fabricating powerful 1000-pound bombs for United Nations' air fleets to "lay" on the Axis powers.

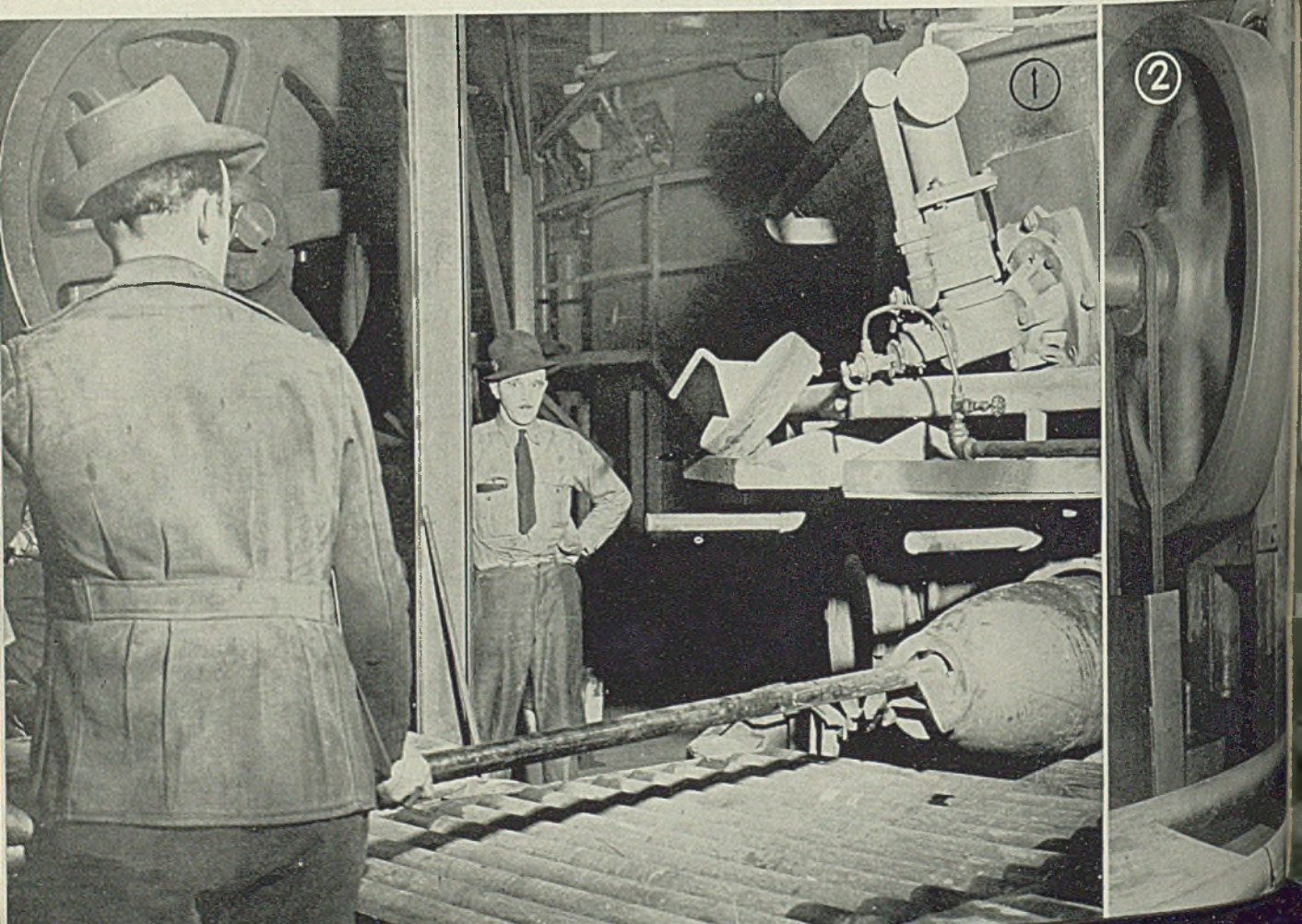
This conversion is just another example of the ingenuity and the industrial might that is combining in America today under the capitalistic system to spell the doom of the totalitarian powers.

The bombs produced at this plant are some of the most efficient and most deadly "eggs" ever known—missiles so tough they will tear through the hardened alloy steel deck of a giant aircraft carrier as if it were covered with waxed paper, powerful enough to rip open the seams of any cargo vessels near which one chances to fall, or big enough to leave gaping holes where once were big fine factories.

Though unaccustomed to making war products, these workers who only recently learned to run machines, operate furnaces, handle a welding rod or paint spray gun are making them faster, cheaper and more deadly than bombs ever were made before.

Bombs such as these used to be extremely expensive, very complicated to make, and not always too effective. That was when they were made by taking big solid steel castings, machining down the outside, gouging out the inside and then stuffing them with good solid charges of TNT. They were pretty good bombs—but they cost too much, took too much machine work and too much machine time to make them.

"We can do the job better, cheaper and faster than that", commented Commercial Shearing executives who studied the old methods. And they set about to do it by simplifying the processes.



They're now using short lengths of thick walled large-diameter seamless pipe, the same kind of pipe that is produced by the steel mills for the oil industry in peacetime. So it was easy to change over these pipe mills to the war work. Soon carload lots of the seamless pipe rolled into the plant, ready to be made into bombs.

Here's a simple explanation of how this inoffensive pipe becomes a deadly bomb:

First, a length goes into a circular heating furnace with openings just large enough to admit the end of the pipe.

The end becomes white hot. It then goes into a spinning machine which twirls the pipe at high speed, forcing the heated end into dies of a forging press. Incidentally bombs in some bomb-making plants are whirled by hand.

But Commercial designed and made its own spinning machine which saves much war-scarce labor and makes better bombs more quickly too. The forging press quickly shapes the pipe to form the bomb tail.

Next the other end of the pipe goes into the open furnace mouth to be brought to white heat. Then the spinning machine manipulates it in the forging press while the nose is formed.

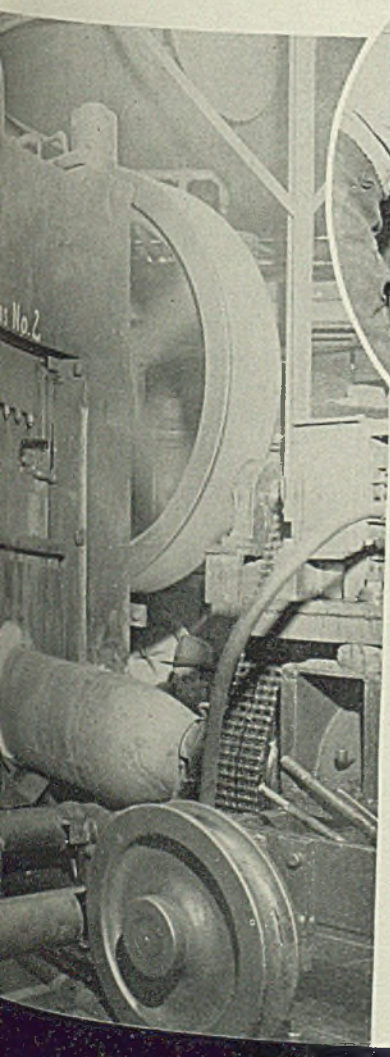
Other steps in the process include sand-blasting to remove all scale, cutting off the nose and threading the opening. The bomb's tail is also machined. Then the bombs, in groups of four, are set upright on a table and are charged into a huge revolving heat-treating furnace where they are "soaked" at a

(*Please turn to Page* 112)

Fig. 1—Pipe end formed to shape desired. Other end is being heated in revolving circular furnace preparatory to forming nose end of bomb

Fig. 2—Here a piece of thick-walled seamless pipe is being spun by the special machine at the right while the dies of the forging machine quickly form the heated end of the shape desired. Spinning machine supports and revolves work, also carries it into and out of dies

Fig. 3—When formed, bomb casings have lifting lugs welded on in this fixture. Women do this job as well as many others



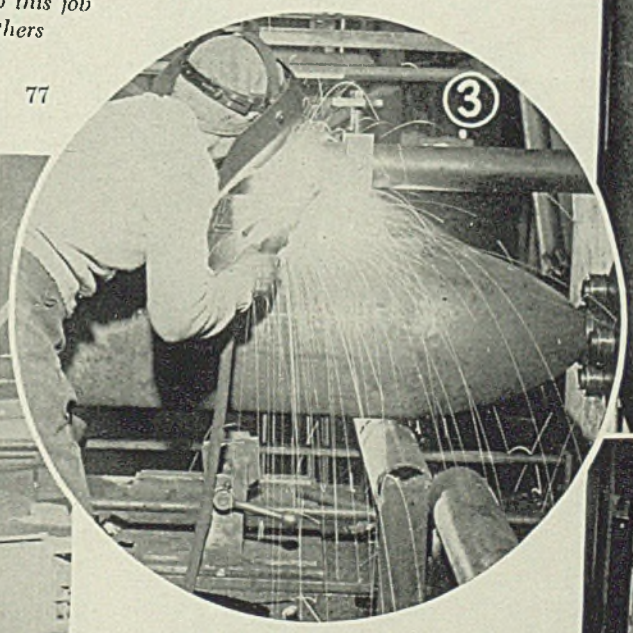
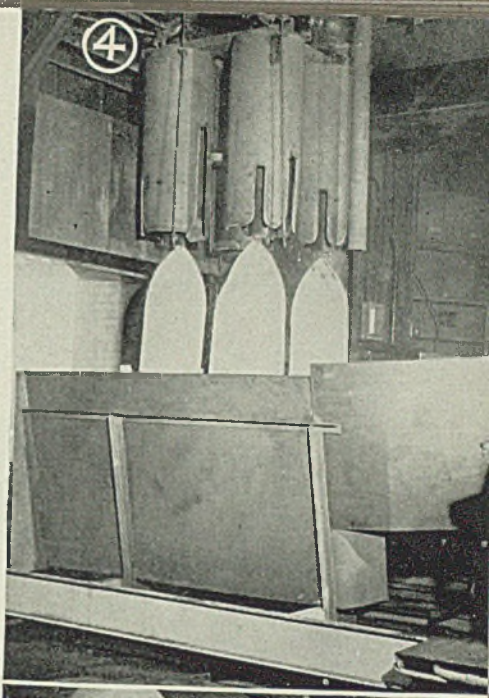
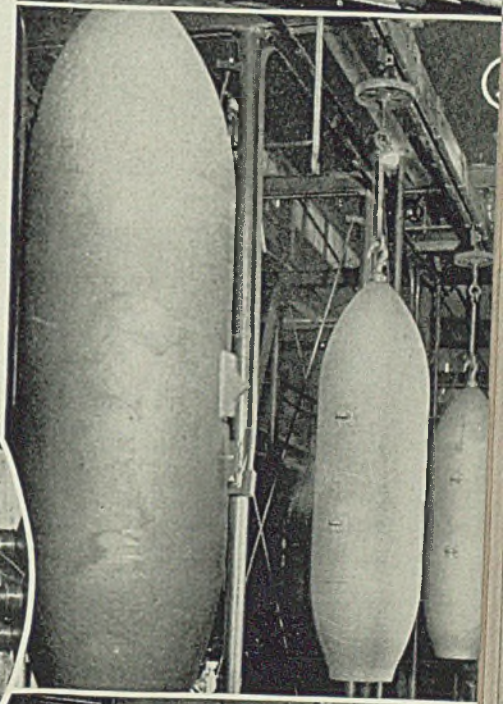


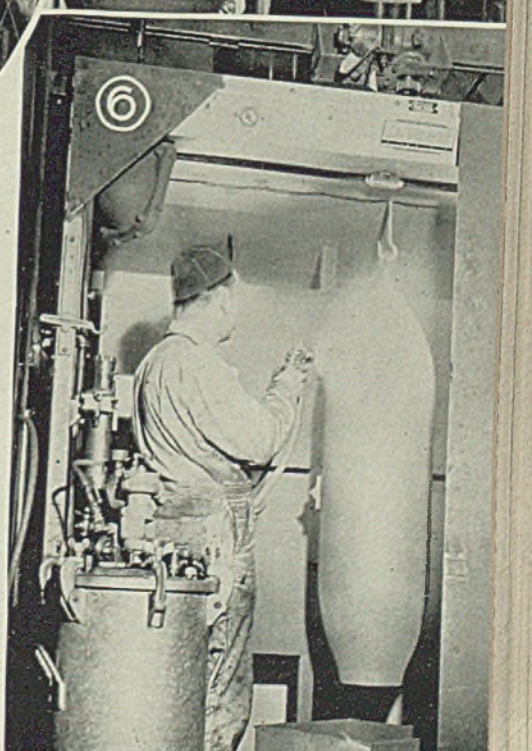
Fig. 4—After forming, bomb cases go to furnace for heat treating. Coming out, they are quenched in groups setting in this container with the caps lowered in place to confine the quenching medium

Fig. 5—Enclosed chain conveyor carries bomb casings through cleaning and painting cycle. Note gear wheels in suspension. These engage with a drive in paint booth, revolving case

Fig. 6—As conveyor carries casing through spray booth, electric motor drive engages gear on suspension to revolve casing



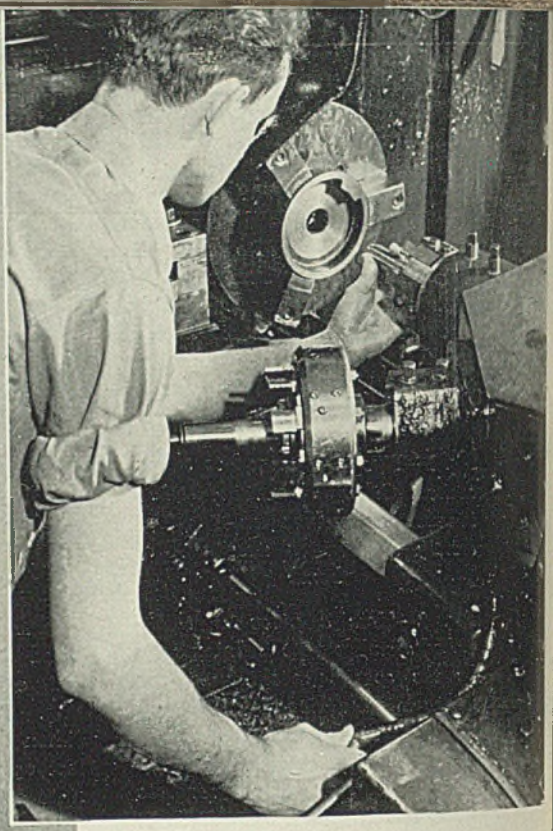


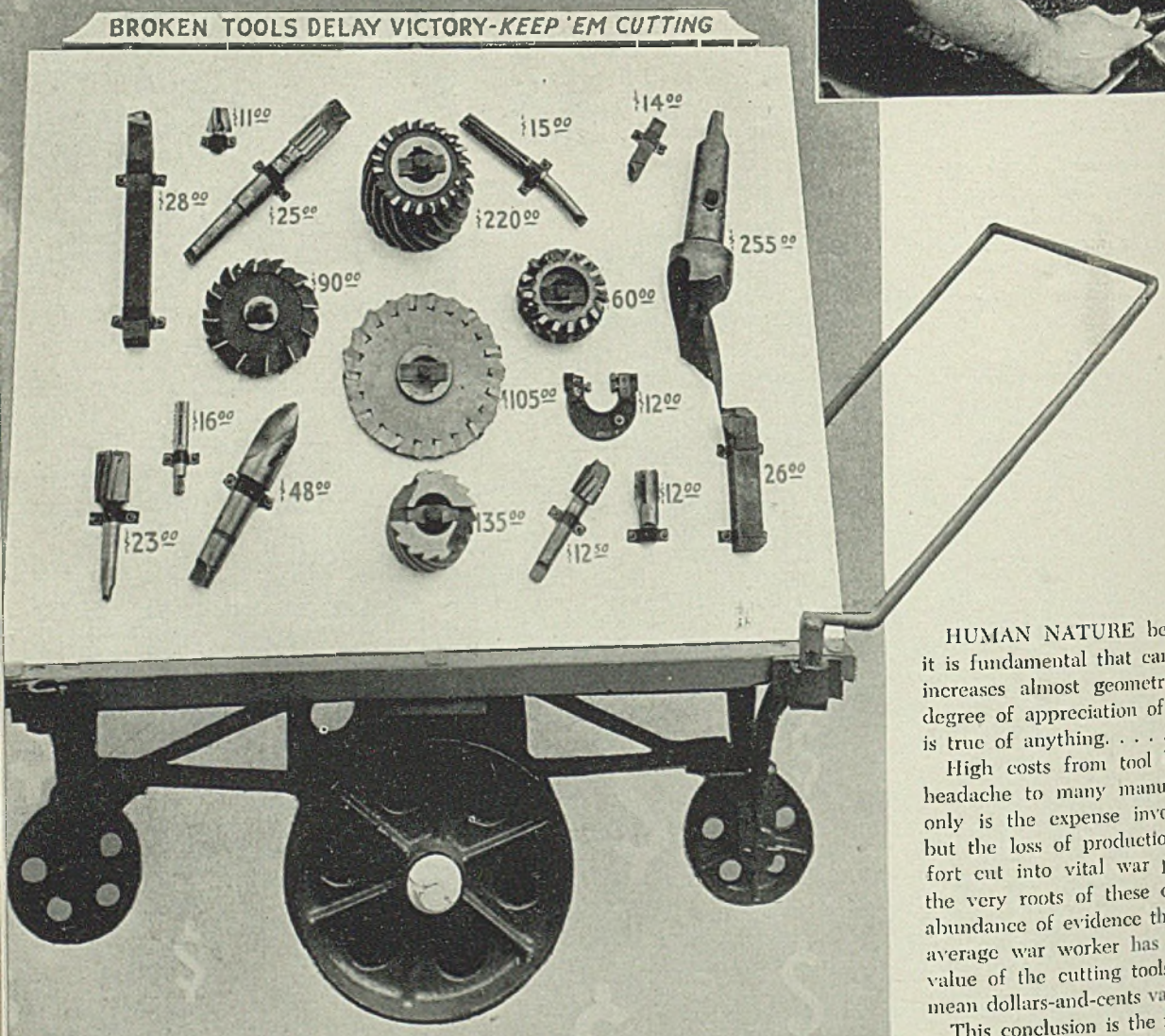


Cut Tool Costs

By teaching workers to appreciate.....

Tool Values





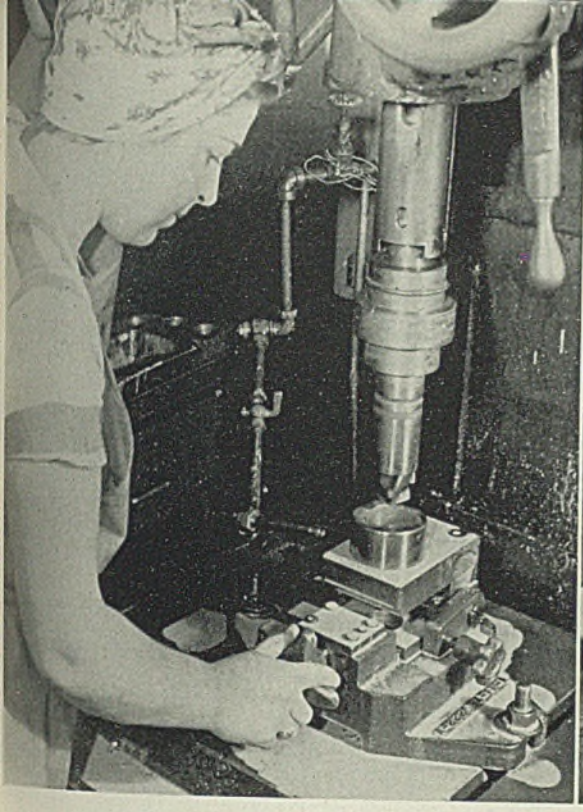
By G. ELDRIDGE STEDMAN

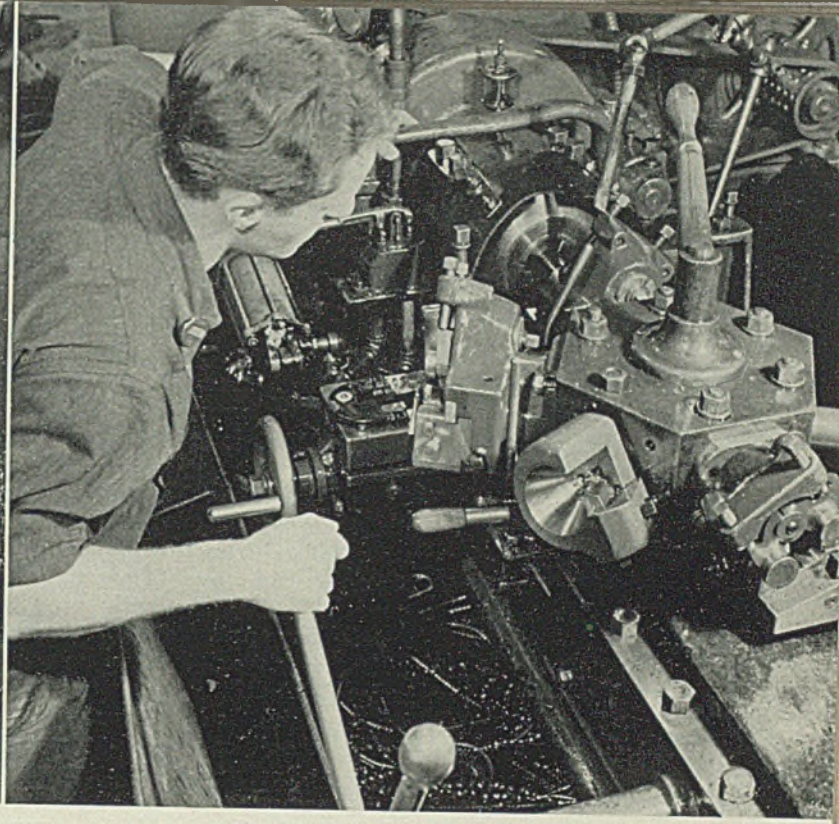
HUMAN NATURE being what it is, it is fundamental that care for an object increases almost geometrically with the degree of appreciation of its value. This is true of anything. . . . .wives, or tools.

High costs from tool breakage are a headache to many manufacturers. Not only is the expense involved important but the loss of production time and effort cut into vital war production. At the very roots of these conditions is an abundance of evidence that indicates the average war worker has no idea of the value of the cutting tools he uses. . . I mean dollars-and-cents value.

This conclusion is the result of talking

Left—Chrysler Corp. uses this display mounted on a hand truck in its Dodge-Detroit plant to build dollar-value appreciation of tools which workers use





Left to right, above—Special tooling setup on Warner & Swasey turret lathe; combination drill and counterbore. Women are particularly appreciative of tool values; multiple tool setup showing specially designed tool holders on the turret

with about 100 machine operators in three different plants. They underestimated the dollar-value of exhibited cutting tools an average of 70 per cent. Many estimates were only a fifth or less of actual value. Viewing a spiral taper reamer, one worker said he believed it could be bought in a dime-quarter store. Its true cost was $15. Such ignorance is startling. That it can seriously damage vital war production is obvious.

Greater appreciation of the dollar value of machine tools and the cutting tools used in them is an urgent requirement. It is a matter of industrial education, and few are doing a better job at it than John M. Amiss, director of industrial education, Chrysler Corp.

"You are right in stating that care increases geometrically with appreciation of values," Amiss agreed as I talked with him. "At Chrysler Corp. we constantly focus attention on this point in bulletins, in foremanship meetings and by exhibits that show the dollar-value of perishable tools."

A traveling display board on a truck is being used with fine effect throughout the main apprenticeship department. See Fig. 1. Actual, damaged cutting tools are mounted on this board, and their dollar-cost is shown. This display covers such items as:

	Cost
Special spiral milling cutter	$220
Tool bit	28
Stagger tooth milling cutter	90
Straight tooth reamer	25
Taper shank reamer	15
Tool bit	14
Special drill bit	255
Multiple tooth milling cutter	60
Standard snap gage	12
Carboloy tool bit	26
Pipe tap	12
End mill	12
Vertical face mill	135
Special drill	48
Interrupted tap	16
End mill	23

Total cost of cutting tools displayed is $1,107. No one seeing that exhibit could help but gain a very vivid dollar-value appreciation of those tools. That explains, perhaps, why tool costs among novices in Chrysler Corp.'s apprenticeship department are low.

It is most interesting to observe practices in various plants I visit. During the past month, I recall seeing such typical mistakes as cutter runout from bending of the arbors and by spacing collars that were not parallel on the sides; hand sharpening of drills; scored taper shanks being chucked; reamers stored with no protection to the cutting edges; too much relief behind cutting edges of reamers causing chatter; loose bearings causing milling cutters not to run true; end play in drilling spindles causing the drill to break through suddenly; a large round broach tumbling off a platform truck; and a score of other instances of poor practice which indicate that many war workers apparently have no dollar-value appreciation of the penalties of their carelessness. . .penalties to machine tools, idle man-hours, to the obligation every machinist has toward winning the war.

On the other side of the picture, it is a pleasure to notice the respect that Chrysler machinists show for their tools, and I am sure that the comments of Mr. Amiss have widespread value on this important problem:

"War production," Mr. Amiss emphasizes, "has presented all of us with new responsibilities. The changeover of Chrysler plants, for example, was a task many times more difficult than anything we had ever tackled before. Among other things, we have had to adjust ourselves rapidly to new, and in some cases, entirely different machinery, cutting tools, feeds and speeds, government tolerances, untrained workers. In all this, we realized that nothing was more important than our ability to procure, properly care for and maintain our perishable tools—those gages, drills, reamers, milling cutters, broaches that help to make mass production possible."

And to a very large extent, this is a matter of proper industrial education. Too, dramatic exhibit helps drive home the dollar-value of these cutting tools and so helps the worker obtain a realization importance of proper care.

Some war production parts being built by Chrysler are several times larger than those formerly made. Tools are corre-

spondingly larger and more expensive. Some boring tools, for example, run about twice the size used in automobile production. In bomber assembly there are thousands of small fittings, electric switches, specialties and subassemblies which must be carefully conserved. The same applies to small tools such as drills, reamers, cutters and hand tools.

Often the materials to be machined are vastly different in composition and heat treatment. Very large and heavy parts are being machined from especially hard, tough alloy steels. Brass and aluminum parts are of different composition than for automotive work, requiring different cutting angles and tool grinding methods. Many tools must be carbide tipped. Milling cutters are more frequently used; the number of milling operations being from four to five times greater. Because of different feeds and speeds, the size, design and composition of cutting tools vary widely from former practice. These tools are more complicated, expensive and difficult to procure than single unit cutting tools.

Closer limits, high surface finish requirements, unusual design of parts, and an increase of profiling operations have made perishable tool requirements vault skyward. The proportion of special tools is also far greater. And the matter of procurement from vendors is a serious problem, for delivery that formerly could be expected in two weeks now sometimes is as long as six months, particularly delivery of gearing tools. At the same time permissible tool inventories are restricted, so maximum tool use is vitally important.

On top of these factors, the price of perishable tools has increased enormously. For example, a certain special tool that cost $480 a year ago, today costs more than $3,000. Tool cost per piece on comparable automobile and ordnance parts, *in an average example*, is 25 cents and $18.80 respectively. *Obviously that increase is significant and every supervisor and worker should know of it and appreciate what it means in his work.* Tougher materials and special tools are partial causes. Of course, tool costs come down as less costly ways to machine these parts are found. . .and that is being done all the time.

A definite hazard is "unconscious sabotage", the lack of proper appreciation of the dollar-value of tools, their difficulty of procurement, the importance of their conservation. In training his men, every supervisor should inform machine operators regarding cost of the tools they use, the difficulty and time lost in getting tool replacements, how a broken tool might hold up several days' production, the importance of not using dull tools. *The supervisor must vividly demonstrate how one moment's carelessness or negligence that causes tool or machine breakage produces the same results as deliberate sabotage.*

A system for tool inspection and sharpening at stated intervals has not been as widely adopted as it should be.

Much use has been made by Chrysler Corp. of visual education. No point has been more stressed in the many industrial talking pictures which Chrysler has produced than the care and use of tools. Most commendable is making such films available to classes of vocational education among the high schools of Detroit and Hamstramck. The Chrysler technique in this, as in all of its industrial education, is to use the "preparation-presentation-application-test" method.

Program Follows Manual

To facilitate the basic education program on this subject, Mr. Amiss produced a booklet on "Perishable Tools in War Production" which became the training manual of the educational supervisory staff in its foremanship training meetings. Chrysler Corp.'s 3000 foremen have been so thoroughly coached in caring for tools that the company has an enviable record in consumption of perishable tools.

Duties of supervisors have been broken down into 16 specifics, and careful check is made to assure that not a single one is overlooked, ignored or fumbled. These 16 specific directions are:

—Be sure the right tool is being used on the job.

—Have all tools regularly inspected for proper condition.

—Check proper feeds and speeds.

—On new setup, put machines through their cycles before performing actual production.

—Have cutting tools properly sharpened at suitable intervals.

—Return all tools to crib when they are not in use.

—Avoid rough handling of tools, avoid injuring cutting edges.

—Report immediately any unsatisfactory tool performance.

—Remember how difficult it is to get tool replacement.

—Suggest improvements in design.

—Make careful disposition of all tools scrapped to assure greatest salvage value.

—Constantly check and instruct operators concerning proper lubrication of tools and also use of proper coolants.

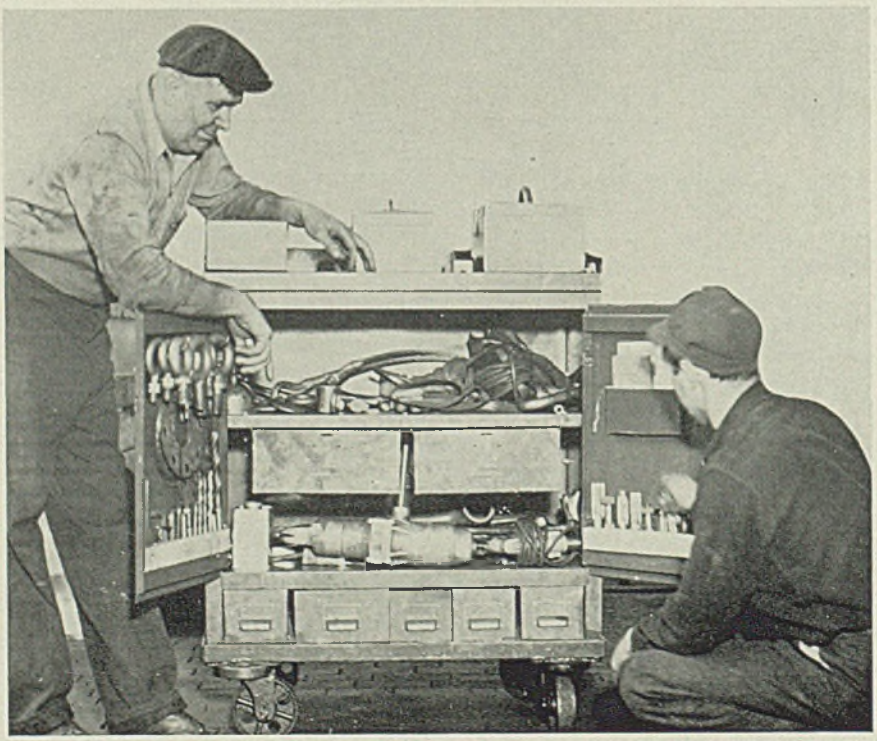
—Thoroughly investigate causes of excessive tool breakage.

—Carefully instruct operators concerning the proper use of gages.

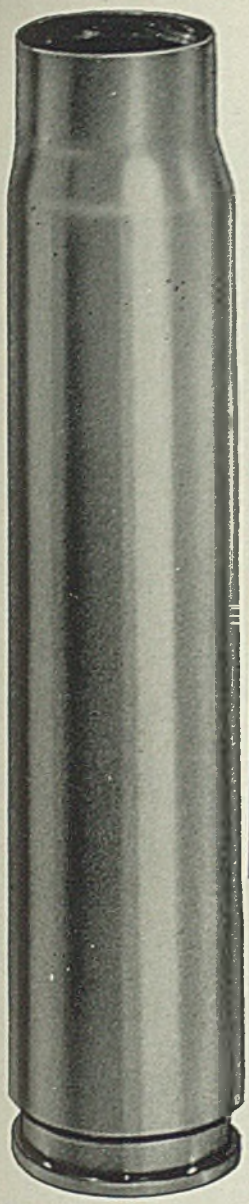
—Do not withdraw from crib any more tools than are actually needed.

—Memorize and practice the four steps

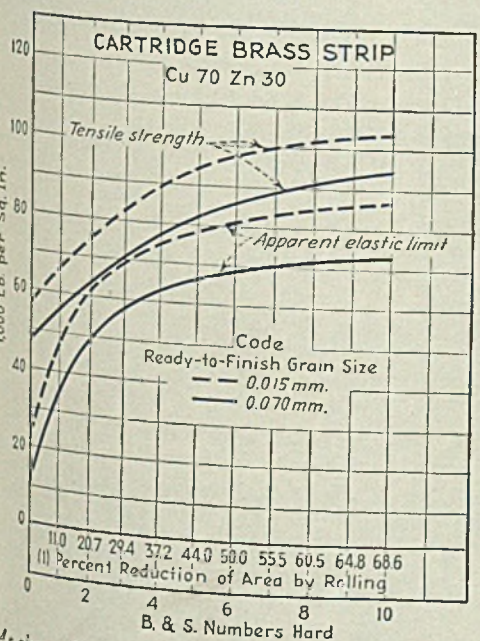
SALVAGE METAL HELPS SALVAGE TIME



SPARE minutes plus salvaged metal transformed into this portable tool crib above, save time and hundreds of steps per day at General Electric's Erie works for Joe Macaluso and William Gross. In building the crib, these men included shelves, trays and doors arranged to accommodate all of the tools needed in their work



It pays to know the "personality" of CARTRIDGE BRASS



As shown by this chart, control of the ready-to-finish grain size is necessary if uniform physical properties are required in the finished metal.

Most users of cartridge brass know that it has the most favorable combination of ductility and strength of all the brasses, that it can be readily spun, drawn, forged and upset. But many have discovered that even a metal so obliging can have a distinct "personality" of its own which has a bearing on methods of fabrication.

For example, its mechanical properties are markedly influenced by the ready-to-finish grain size — the crystal size obtained by the anneal before the final cold working operation. The chart shown here helps to illustrate the extent of this influence, and the effect of cold working, on the tensile strength and apparent elastic limit of cartridge brass strip, for the smallest and largest grain sizes commonly met in commercial annealing.

This is but a single example of the kind of information with which Revere is prepared to supply users of metals. It is one reason why persistent fabricating problems seldom trouble Revere customers. For copper-base alloys and practical help in using them, get in touch with Revere today.

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in training of preparation, presentation, application and testing.

Certain it is that there is no more important war production obligation than the care of cutting tools. *Care demand upon respect which, in turn, is based upon appreciation of value. Obviously workers must be taught the dollar-value of their tools.*

The average machine operator has extremely little if any understanding of the dollar-value to his tools, it has been observed. Yet he should be actually conscious of their cost because that is the quickest way to assure proper appreciation of them. Therefore it is suggested that this point be dramatically exhibited in a manner that will help build full appreciation of dollar-value.

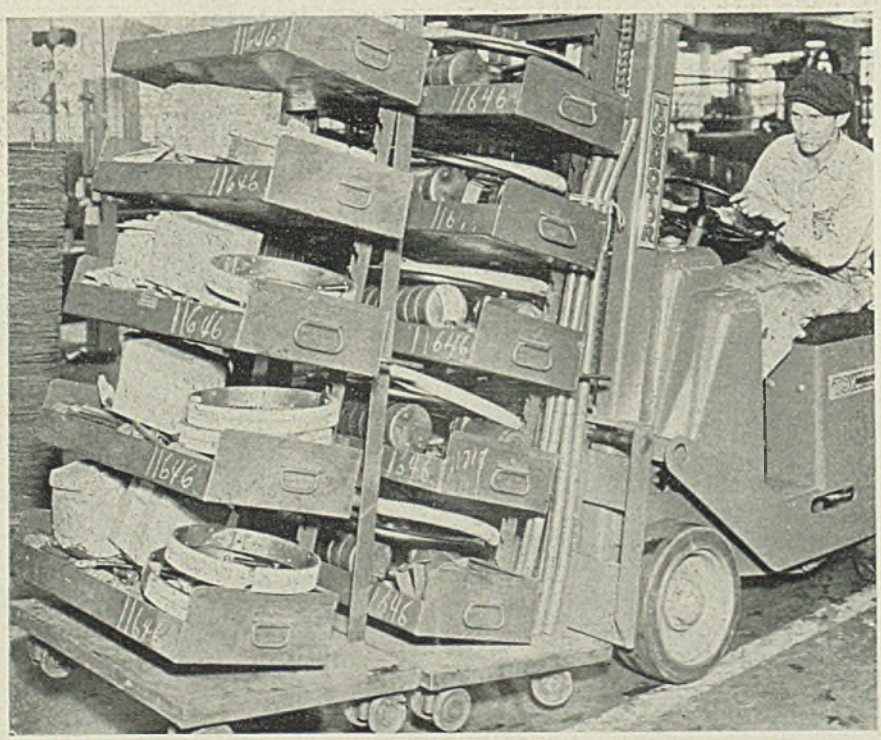
To do this, collect a representative group of damaged tools together, perhaps at the tool crib or some similar point in each productive department. Show the tool's name and number. Then supply guessing blanks to each machine operator with a place to record his employment number and place his guess of the dollar-value of each particular tool by number. Prizes of war bonds or stamps might be offered. The appeal of a guessing contest is irresistible. It will create discussion among workers who, because of dramatic interest, will pay more attention to actual values when they are finally announced.

These guesses should be carefully analyzed. The data can be effectively used in many ways. It will give supervisors a definite key as to who needs education. It will provide a basis of comparison to ascertain whether high tool costs are the result of ignorance. Obviously if a worker's guess is ridiculously low and he has an excessively high breakage record, the connection will be apparent.

The data can be averaged by departments to provide a rivalry index for departments to improve their knowledge on care and use of tools. It can provide a measure of the amount of training which each department requires on this vital subject. Finally, it can furnish ammunition for foremanship training meetings of pointed merit.

Too, the contest can be repeated at a later date with another set of broken tools to determine how much improvement has occured in the worker's knowledge of dollar-value of the tools he uses. Thus this idea has a number of possibilities. It has certainly proved its value at Chrysler.

ORGANIZED "MASS-MOVEMENT"



"MASS-MOVEMENT" of small parts can be effected easily and efficiently by this fork lift truck—rolling rack combination. According to Towmotor Corp., Cleveland, racks are readily removable, can be adjusted on standards to accommodate different type loads. Two loaded racks can be handled by a standard truck, rapidly moved to proper department and spotted for temporary storage. Caster-equipped racks are then easily rolled short distances for exact positioning of work

Practice on Range Boilers in Print

Copies of simplified practice recommendation R8-42, "Range Boilers and Expansion Tanks", are now available according to the Division of Simplified Practice, National Bureau of Standards, Washington.

Approved by the industry in 1923, the first edition of this recommendation retained 13 sizes of range boilers in two working pressures and six sizes of expansion tanks. The recommendation remained in effect until 1929, when it was reissued to provide a standard for special tappings.

No further changes were made in the recommendation until the advent of the present war when the War Production Board suggested the need for further simplification as a conservation measure. The present revision reduces the number of sizes of range boilers from 13 to 6, and the number of expansion tanks from 6 to 4. The supplemental list has been incorporated in Limitations Order L-199 issued by WPB.

In addition to the revised simplified schedule itself, which is effective from December, 1942, the new publication includes a brief history of the development of the project.

Formrite Process Speeds Up Manufacture of Tools

Production tools such as drill jigs, assembly fixtures, stretch dies, hammer blocks, mandrels for plywood—Keller masters, etc. now may be made in one-tenth the time by using a new cold plaster-like process called Formrite, according to the Specialty Division, Machine & Tool Designing Co., Philadelphia.

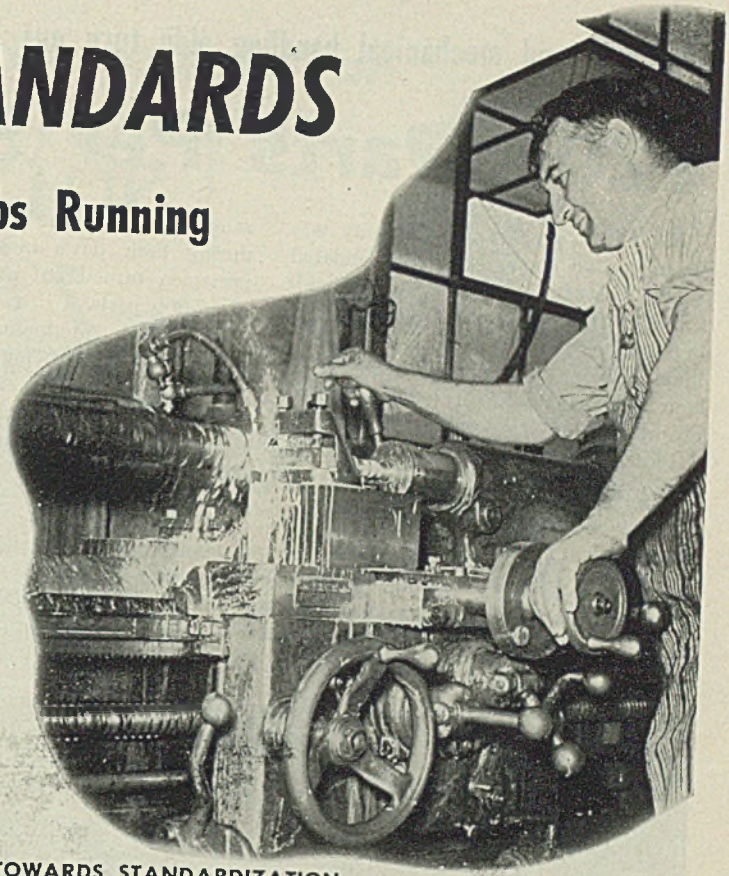
With this new method, the company reports, intricate drill jigs running into several hundred holes, large stretch dies weighing several tons may be manufactured without need of heat or pressures or highly critical materials or highly skilled labor.

Formrite solidifies at room temperature. It is a composition of organic and inorganic materials mixed into a liquid. When poured into the required mold, no allowance has to be made for shrinkage or expansion, it is said, as the material solidifies to the exact dimensions.

The technique in the manufacture of drill jigs, dies, fixtures and other tools is so simple with Formrite that inexperienced girl operators can be taught quickly to make up these tools, the company states. Also, duplication of tooling programs may be made quickly to insure interchangeability of parts and to enable prime contractors to get subcontractors under way.

"Switch" to STANDARDS

—and Keep MORE Carbide Jobs Running With LESS Reserve Stocks!



The planned use of *standard* styles of carbide tools and blanks, in place of made-to-order "specials", can bring these important benefits to your plant:

With *standards* you can meet your carbide tool demands more promptly.

With *standards* you can reduce your carbide tool inventory (and still maintain normal tool crib service—even with an increasing use of carbides).

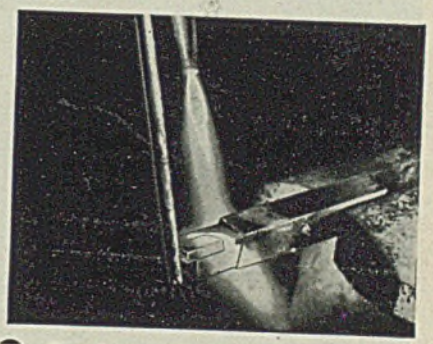
With *standards* you can fill most emergency requirements usually the *same day* the need arises.

Here is the way to obtain the benefits of carbide tool standardization in your plant:

TAKE THESE THREE STEPS TOWARDS STANDARDIZATION

1 Check your made-to-order carbide tools against *standard* carbide styles. You'll find that just 10 *standard* styles—used either "as is" or quickly adapted by grinding to special shapes—can be used for 50% to 75% of your jobs.

2 Check your carbide tool stocks. With *standards*, you'll no longer need individual reserves for each of hundreds of special styles. Instead, you'll have a flexible master stock based upon not more than 10 *standard* styles.



3 Check your carbide tools that MUST be "specials." Although the tool is special, the blank can often be *standard*. Keep a small master stock of those *standards;* braze them on your tools or cutters the same day the need arises. No "delivery" delays.

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Two men and mechanical handling aids turn out . . . .

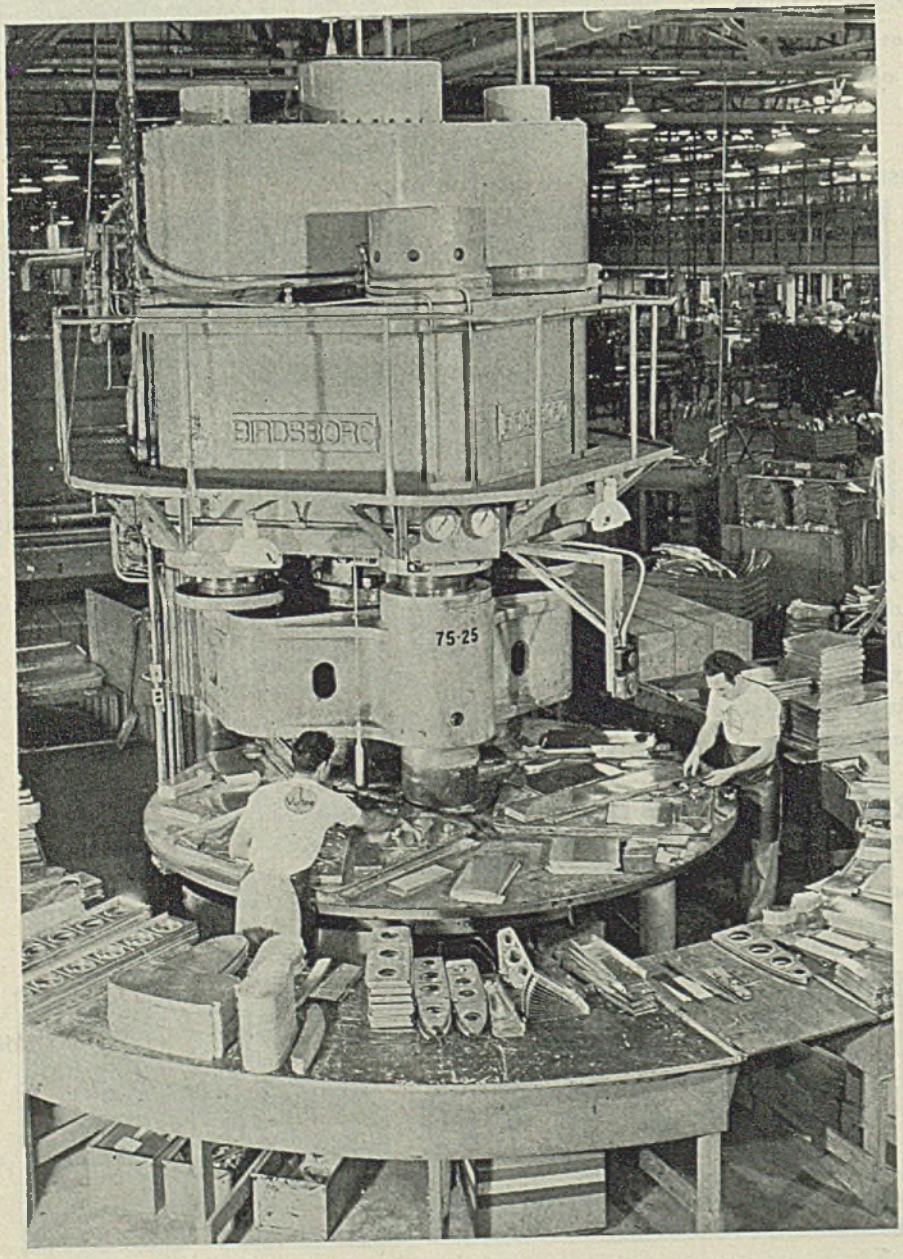
1200 Parts Per Shift

SEVERAL months ago publicity was given to two employes of Consolidated Vultee Aircraft Corp. at the Vultee Field, Calif., division who turned out the amazing total of 10,000 miscellaneous aluminum alloy sheet metal parts in an 8-hour shift on a single, revolving table Hydropress.

Industrial engineers at a nearby airframe plant, doubting the record, arranged to watch the press at work and during their day's inspection the two pressmen turned out a new high total of 12,666 parts.

This high production was accomplished through the ingenuity of equipment engineers who incorporated the uninterrupted-cycle principle of operation into a conventional rubber-pad press. To the 2000-ton three-column press they added a turret table, with one of the columns as its axis, as shown in the illustration.

Operator at right loads blanks on dies on press platen, trips switch which advances platen under ram and automatically actuates ram. Meanwhile other operator is removing formed parts while first operator is loading up another set. Thus press operates almost continually to reach output of 1200 parts per shift



The revolving table can be indexed to either two or three stations. The two-position plates provide a working area of 68 x 40 inches with pressure of 1500 pounds per square inch. One position then can be loaded while the other is under the press. The three-position plates are 45 inches square, which boosts available pressure to 2000 pounds per square inch. With this arrangement, one station can be used for unloading, a second for loading and the third for pressing. Under pressure, the rubber platen on the ram of the press flows evenly into all dies, male or female, and parts are formed to size and shape quickly.

Three Strokes Every 70 Seconds

Average operating speed of the press with its "merry-go-'round" fixture is three strokes every 70 seconds. As the loader pushes a button, the table revolves counter-clockwise, bringing the loaded plate to pressing position, and the stroke is made. The next actuation of the push-button repeats the cycle. The automatic positioning of the table combined with the automatic ram operation is the key to the amazing output obtained. Division of the work also aids materially for one operator does all loading and starts press, other handles the unloading. See illustration.

Some stock blanks are stacked between the plates for quick positioning. The main supply is handy to the loader, being carried on a semicircular bench outside the turret table.

Thus workmen move pieces only a short distance from bench to press platen, can unload—load quickly, keep press in almost continuous operation.

Standard on Enameled Tanks Out for Approval

The recommended commercial standard for Porcelain Enameled tanks for domestic use, TS-3488, which was recently adopted at the general conference of April 22 in Pittsburgh, is now being circulated to the industry for written acceptance, the National Bureau of Standards, Washington, reports.

The standard covers porcelain enameled tanks for domestic use in sizes 15 to 80 gallons inclusive for 300 pounds per square inch maximum hydrostatic test pressure.

Purpose of the standard is to establish standard specifications and methods of test as a line of demarcation between satisfactory and unsatisfactory porcelain enameled tanks for domestic water service, for the guidance of manufacturers, distributors, retailers, and users.

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Industry has learned a new reason for depending on Exide Ironclad Batteries. New workers, many from offices and many of them women, are entering the industrial picture . . . calling for extensive training programs to prevent equipment damage. Exide Ironclad Batteries, by their rugged construction and ease of maintenance, simplify training and deliver surging power for our *war of movement* on the Home Front!

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- Record water additions, voltage, and gravity readings. Don't trust your memory. Write down a complete record of your battery's life history. Compare readings.

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Exide Batteries of Canada, Limited, Toronto

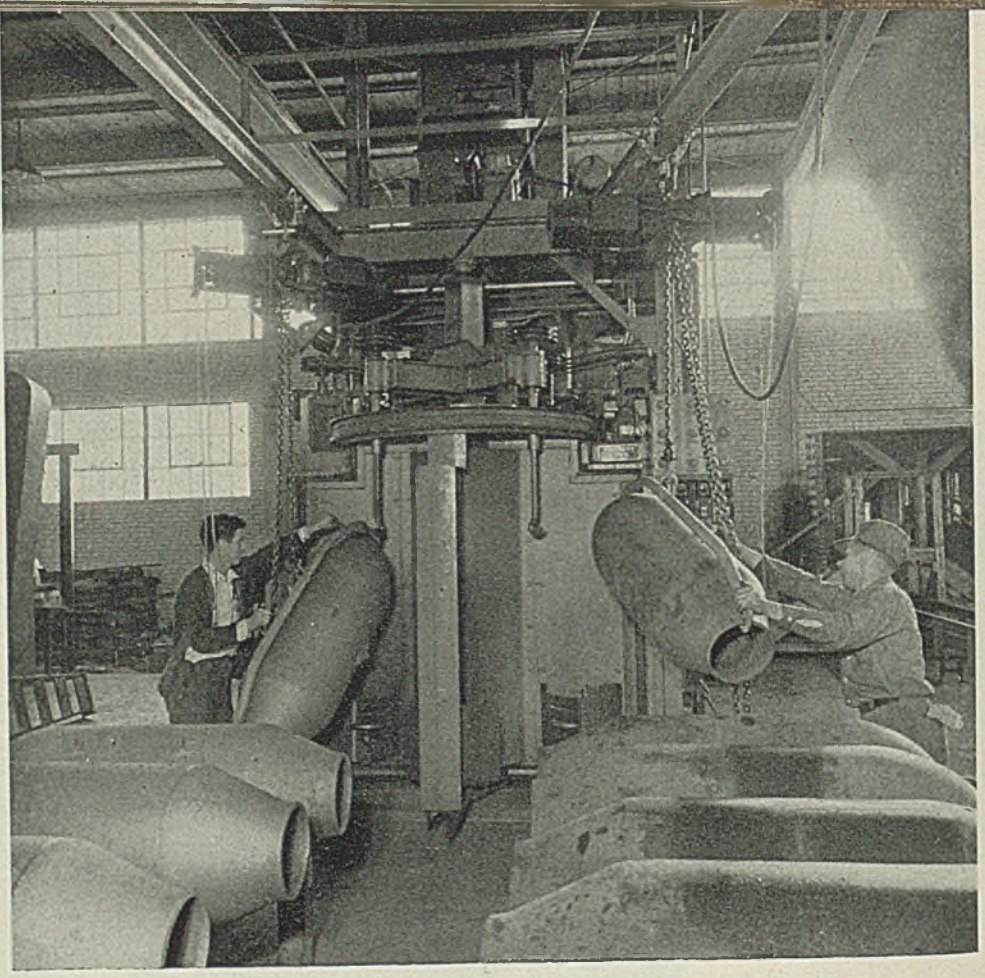


Fig. 1—Front view of blast cleaning machine. Loading station is at right, unloading station at left. Note monorail hoist for loading revolving frame of cleaning machine

Blast Cleaning

. . . . greatly facilitates inspection of bomb casings

AS BOMBS and aerial torpedoes grow larger and larger, it becomes more important to employ every possible facility to aid production and inspection. It has been found that inspectors can detect flaws and fissures in bomb castings more easily immediately after blast cleaning than at any other stage in the production process.

Immediately after blasting, the metal surfaces are thoroughly cleaned of all scale and dirt. Also the "etched" surface resulting from the blasting operation is of such a nature as to readily reveal any cracks or other flaws in the casing. This also helps the inspectors in their work.

Accompanying illustrations show a typical blast cleaning setup for handling large size bomb casings. It also is suitable for large shell cases and similar items.

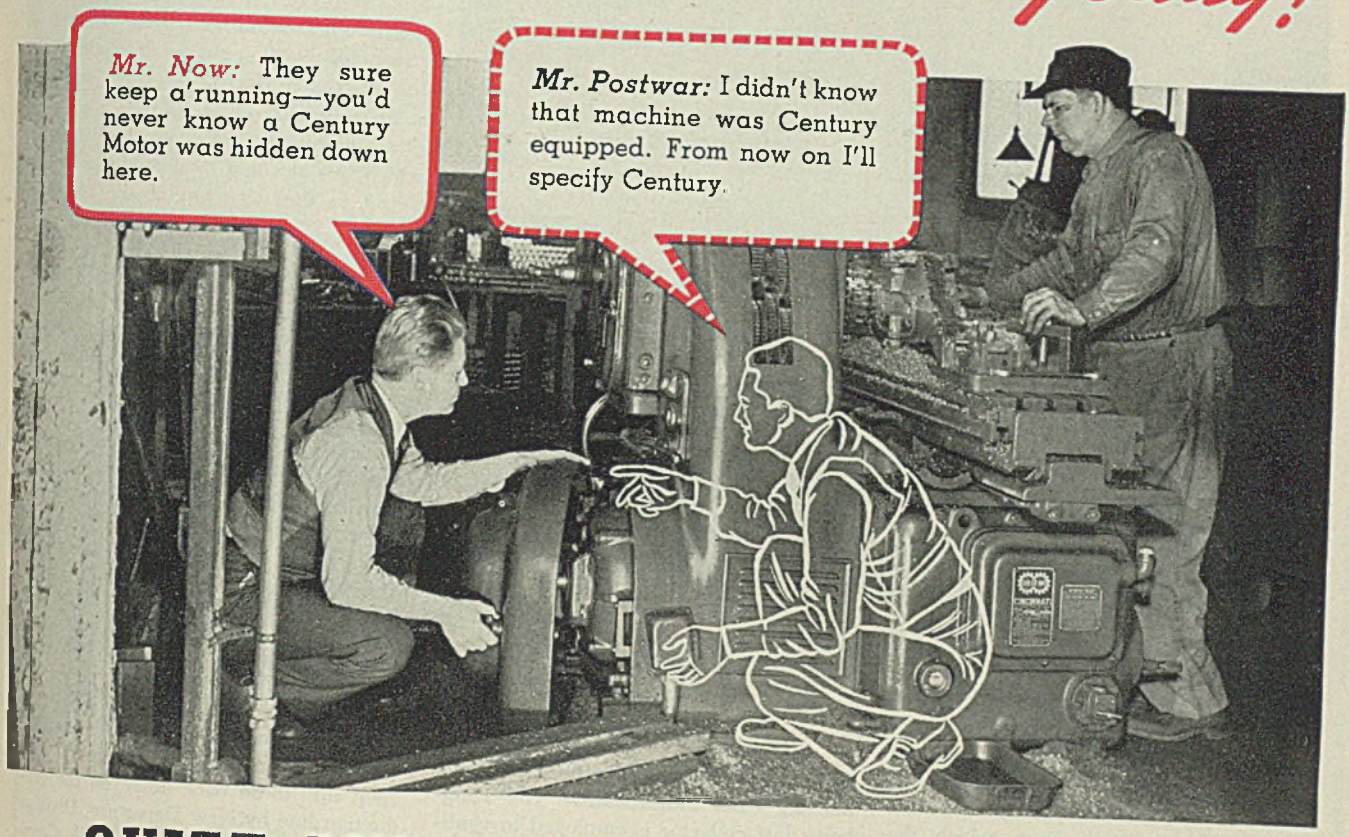
Bomb cases are delivered to the cleaning department with the tail end open and with the nose end closed by a fitting having a large hook eye. To load the casings into the cleaning machine, the operator engages a special lifting hook around the eye on the nose and extending into the rim on the tail as shown at the right in Fig. 1. Then by means of a power hoist the casing is lifted from the bed. A monorail section extends over the bed and leads to the blast cleaning machine. The hoist rides on this rail, allowing easy transfer of the casing to the cleaning machine.

There the operator engages the eye on the nose of the bomb casing into the hook on the blast cleaning machine and removes the lifting fixture, leaving the casing suspended from the hook in the cleaning machine.

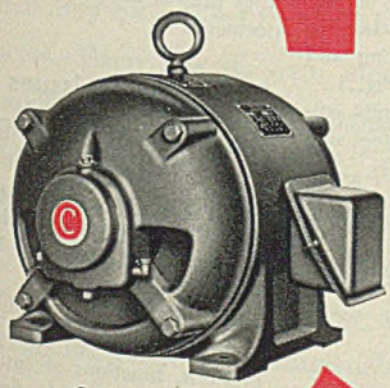
As shown in the plan view Fig. 3, the cleaning machine has four of these hooks arranged on a frame giving two working stations in addition to unloading and loading stations. Between each of the four hooks on this revolving frame is a partition which also revolves with the frame. Thus the two working stations are at all times sealed against the adjoining loading and unloading stations, preventing any dust or blasting material from escaping into the room.

This special Pangborn cleaning machine employs a battery of Rotoblast units which uniformly clean the outside surfaces of the casing while an airblast nozzle extending up from the pit, shown

Take a Look at TOMORROW—*Today!*



QUIET AND OFTEN UNSEEN
BUT ALWAYS VITAL!



Century Form J Motor

Not only on machine tools, but on many widely varied applications, the electric motor may be hidden from sight. Yet, because the machine performance depends to such a large extent upon the motor and its characteristics, it is one of the most vital parts.

In thousands of applications, particularly on machine tools, Century Motors are the unseen, dependable servants of the machine operators. They'll run quietly, continuously, and with an unusual freedom from vibration that contributes much to precision workmanship.

Today, under the rigid demands of Wartime production, Century is developing even finer motors than we have made in over forty years of manufacturing—motors that correctly match the demands of the machine and which are properly protected against surrounding conditions as well.

Remember the importance of the motor, even though unseen — and it will pay you to think of Century in *your* postwar planning.

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Century MOTORS

1/6 to 600 horsepower.

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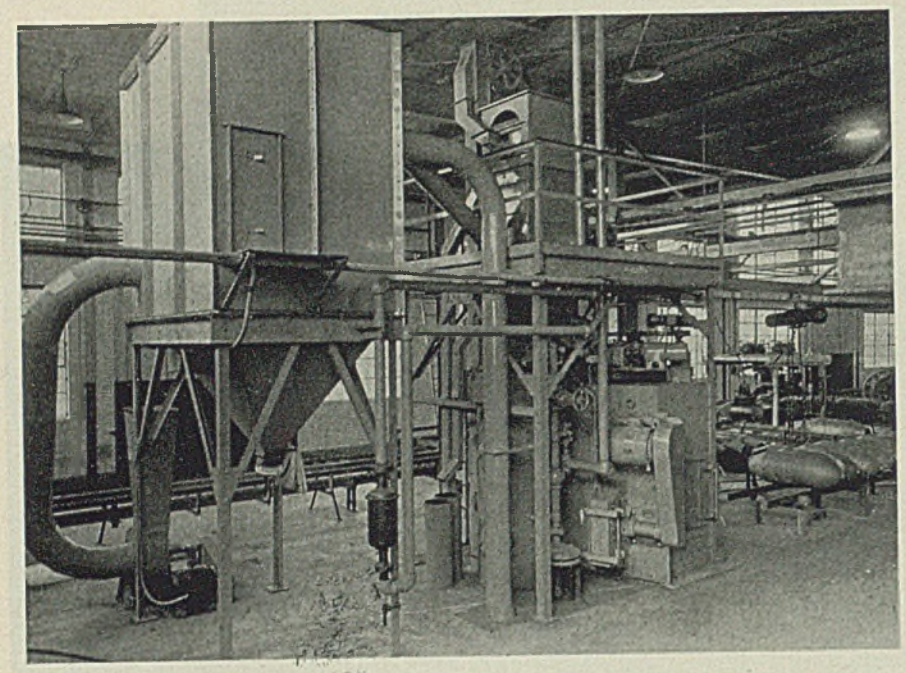


Fig. 2—Oblique rear view of blast cleaning machine showing ventilating system

in Fig. 4, cleans the inside surfaces.

Fig. 4 shows front and side elevation diagrams of the blast cleaning unit and also the extension frame carrying the casings into the work chambers. Fig. 3 shows a plan view of the arrangement. The suspension hooks from which the casings hang are connected to V-belt pulleys at the top of the frame which engage a V-belt drive at the two working stations as can be seen in the plan diagram Fig. 3. The pulleys and belts can also be seen upon close examination of Fig. 1. By means of this arrangement the casings are rotated continuously at the two working stations, thus exposing the entire surface to a uniform cleaning action.

This same type of equipment is also adaptable to the blast cleaning of large shell cases and other similar work. Cages may be used for support of the work instead of hooks.

Note in the front and side elevations, Fig. 4, the bin for collection of the blasting material which is returned to the blasting units and reused. The Pangborn dust collector is employed to ventilate the entire operation, being connected by large ducts to the two working stations. Since these are sealed from the room during the blasting operation and since the dust collector completely ventilates the working stations after the blasting stream has been shut off, no dust is introduced into the room when the suspension frame is indexed from one position to another.

Fig. 2 shows the dust collector system and ductwork. It will be noted that this equipment is located at the rear of the cleaning machine leaving the front entirely free for loading and unloading operations shown in Fig. 1.

In operation, the Rotoblast units employ centrifugal force to throw steel shot or grit at high speed against the outside of the casing, completely removing all scale and dirt. At the same time an air nozzle injected in the inside directs a stream of blasting material to clean all the interior surfaces.

Blasting material along with scale and dirt subsequently falls into the pit, from which it is elevated by a conveyor mechanism to the very top of the cleaning unit.

Here it is discharged into a separator with screens which remove the coarse scale and dirt. Also an air current is employed to remove the fines, consisting of small pieces of broken blasting material and small dirt particles. These are discharged into separate containers for removal while the good blasting material is returned into the storage chamber above the machine ready for reuse.

The elevating conveyor and the separating units can be seen in the rear upper center of Fig. 2.

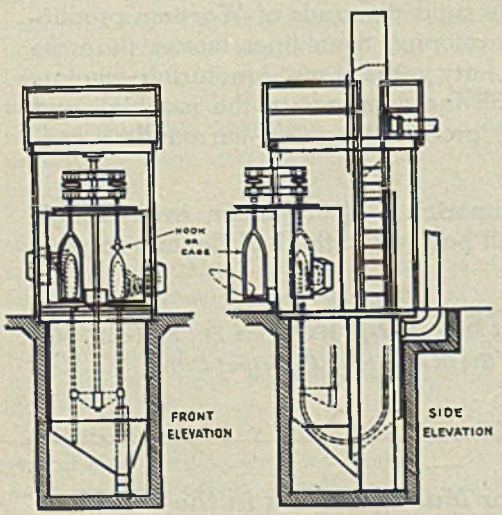


Fig. 4. (Left)—Front and side elevations of blast cleaning setup

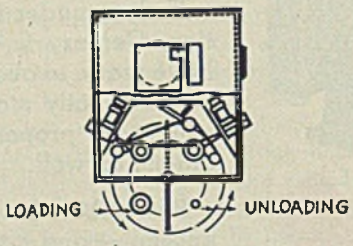


Fig. 3. (Above)—Plan view of blast cleaning machine. Note four stations, two work stations plus loading and unloading stations

Servicemen's Letters Used To "Pep-Up" Workers

Letters from the "boys in the services" in form of posters are being used to "pep up" those back home on the production line by New Departure, Division of General Motors Corp., Bristol, Conn. These are reported to be a powerful force and are inspiring workers to greater efforts.

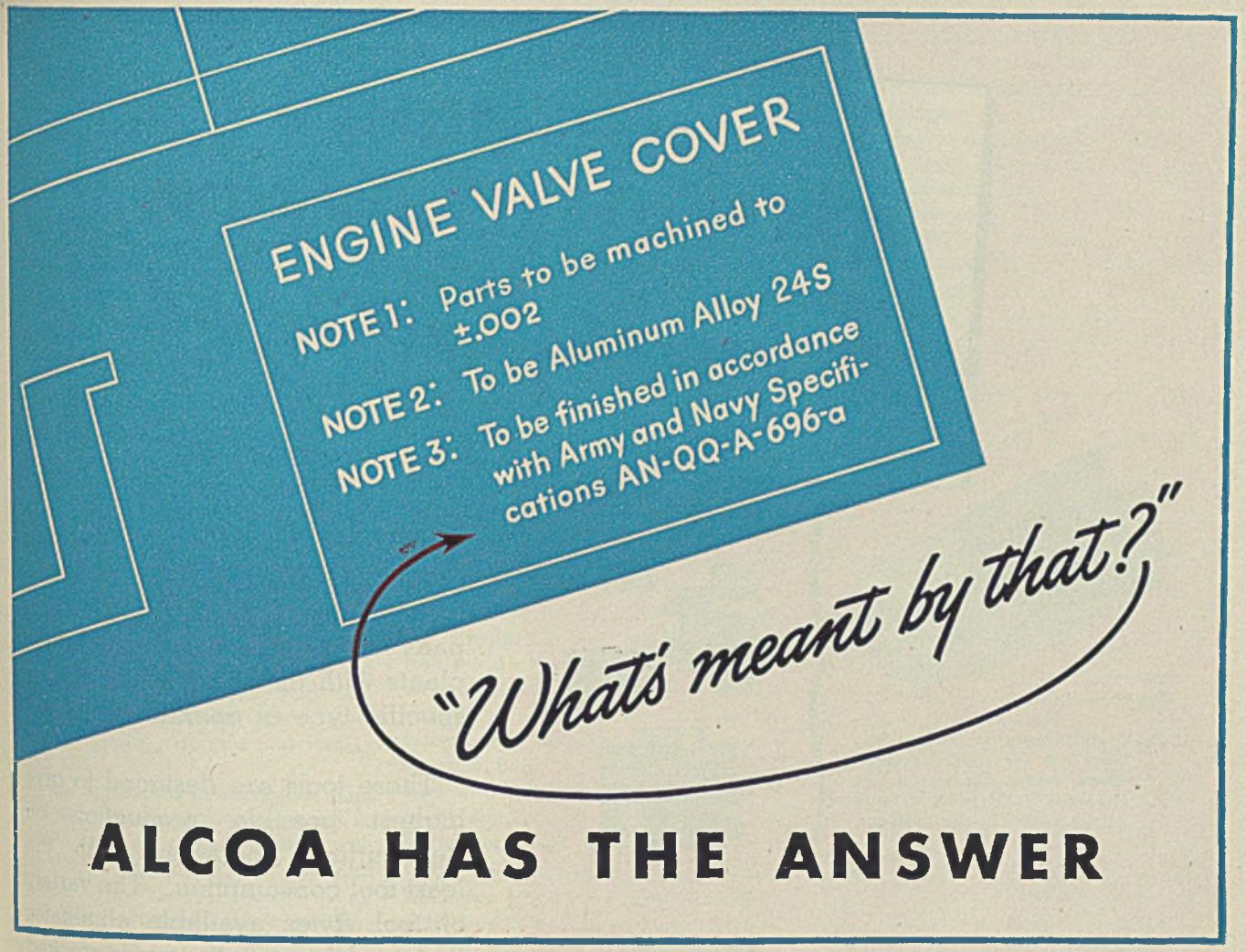
Letters which these servicemen have taken time to write—from camps, combat areas and amid mud, sweat and blood—are worked into posters, in most cases, using the men's own words for the copy. The posters, New Departure says, are providing "magnificent inspiration." Besides the written messages, they present life-size pictures of the servicemen.

Tide Water Issues Booklet on Cutting Fluids

A new 20-page booklet on cutting fluids of special use to the metal working industry is announced by Tide Water Associated Oil Co., 17 Battery place, New York.

Entitled "Cutting Fluids," it embodies sections devoted to types of cutting operations, functions of cutting fluids, selection and application of cutting oils and soluble oil emulsions. Cutting tools are illustrated with photographs and drawings.

Another section of the publication describes the various cutting oils and recommendations of their use on various operations. SAE steel numbering system, chemical compositions, charts and machinability index also are included in the publication.



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Some of these finishes serve as base coatings for paint, providing surfaces to which the paint is highly adherent. All offer increased resistance to corrosion. Some look like uncoated aluminum. Some are colored or black.

If you are stymied by lack of information on Alumilite finishes—what their symbols and names mean, where the finishes should be used, how they are applied—get in touch with us.

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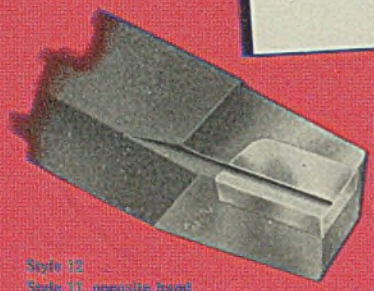
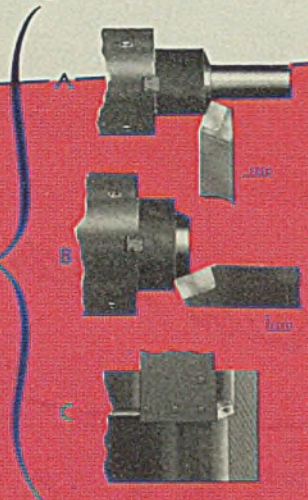
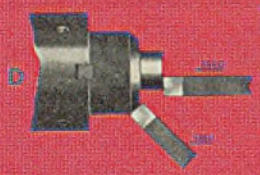
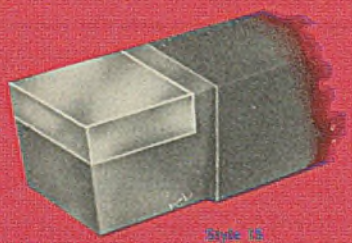


Style 12
Style 11, opposite hand



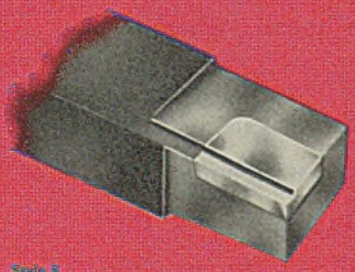
A—Style 11 for rough turning. B—Style 12 for rough facing—where square shoulder is not required. C—Style 12 for large boring, not to a square shoulder.



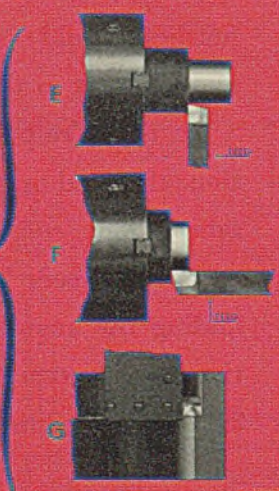


Style 15

D—Style 15 for facing and chamfering. May be used for turning or facing.



Style 6
Style 3, opposite hand



E—Style 3 for turning. F—Style 6 for facing—to a square shoulder. G—Style 6 for large boring, to a square shoulder.

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VENTILATION

for Steel Mill Buildings

By G. E. WALLIN
DeBothezat Ventilating Equipment Division
American Machine & Metals, Inc.
Chicago

(Concluded from Last Week)

WHEN corrosive fume removal is the problem, special materials must be incorporated into the bifurcator housing and fan wheel. Monel metal housing and fan wheel may be used for sulphuric acid, or a sheet-lead lined steel housing may be used successfully with a monel wheel or acid-resisting lacquer covered wheel. Rubber lining and hard rubber covering for the fan wheel gives excellent results with this and weaker acids also.

Fume applications ordinarily are handled with duct connections and hoods or slotted openings, carried parallel with the edge of the tank where the acid is held.

Etching tanks, used by the metallurgical departments of steel companies, usually employ hot hydrochloric acid to bring out the grain structure of steel samples. The most satisfactory material for bifurcator housings handling hydrochloric acid is a phenol-formaldehyde plastic called Haveg. The entire housing is molded of solid Haveg (about ⅝-inch thick) using acid-washed long fiber asbestos as a binder; and forms a strong unit. The material does not have sufficient tensile strength for fan-wheel construction, however, and a rubber covered steel wheel is used. Haveg is unaffected by any concentration of hot or cold hydrochloric acid.

The most efficient and compact installation for etch tank exhaust includes a slotted exhaust duct along the back of the acid tank as shown in Fig. 11.

The air velocity at the slot may be as low as 1200 and up to 2000 feet per minute. Such velocities are used only for the purpose of maintaining uniform air distribution over the entire length of the slot. Many installations of this type are in the Chicago area.

For satisfactory exhaust 200 cubic feet per minute per square foot of exposed acid surface is used. If the acid is cold, 150 may be used. The ductwork should be of material similar to the housing, although substitutes occasionally are employed.

Several years ago, one of the local steel mills installed a pickling tank exhaust system including three tanks each 11 x 9 x 1½ feet high and having an acid surface of 99 square feet. On the basis of 200 cubic feet per minute per square foot of area, a 19,800 cubic foot per minute exhaust for each tank should have been required. Each tank appeared as in Fig. 12.

Inasmuch as the area between the sinker bars had to be open only when a break occurred in the wire netting being pickled, Haveg covers were specified for the entire tank from sinker bar to sinker bar, but leaving the space between the sinker bar and ends open. The edge of the covers were spaced about 2 inches above the top surface of the sinker bars, so that a slotted exhaust opening was formed. The covers were made removable with the exception of

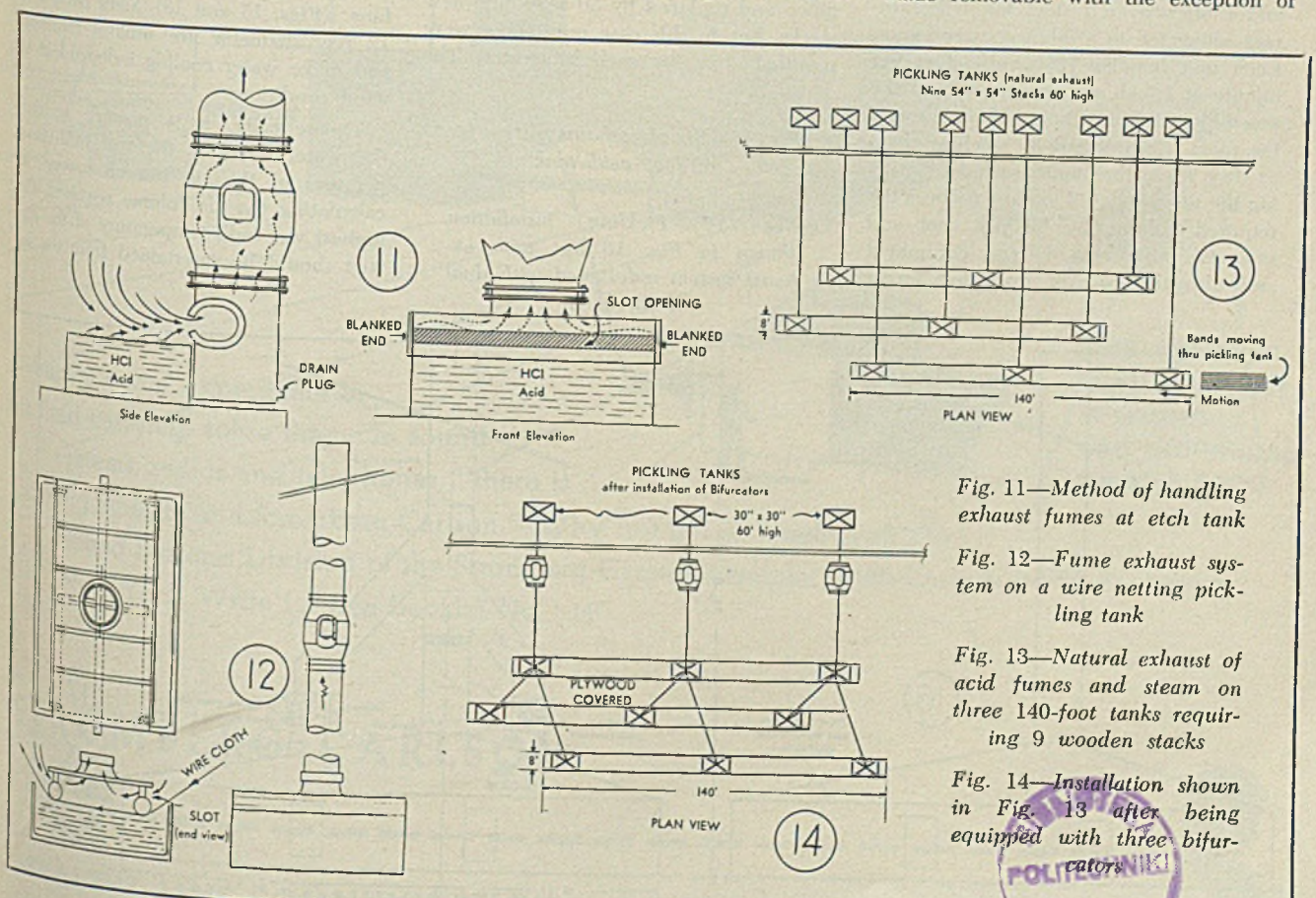


Fig. 11—Method of handling exhaust fumes at etch tank

Fig. 12—Fume exhaust system on a wire netting pickling tank

Fig. 13—Natural exhaust of acid fumes and steam on three 140-foot tanks requiring 9 wooden stacks

Fig. 14—Installation shown in Fig. 13 after being equipped with three bifurcators

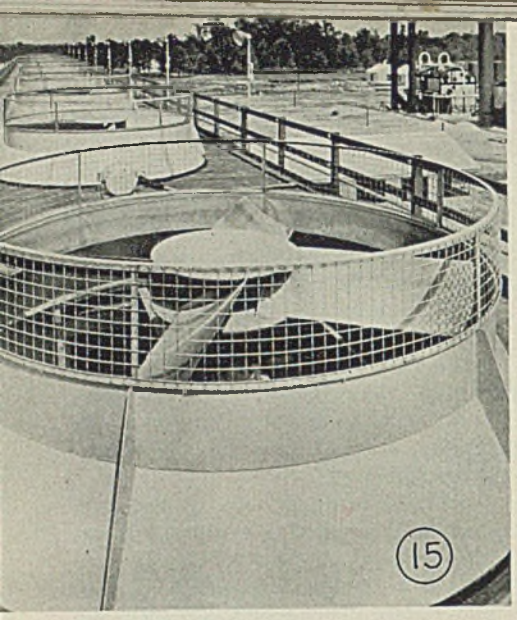


Fig. 15—Induced draft water cooling tower (Payne photo)

the center piece which was permanently connected to the exhaust bifurcator.

The covers thus form an exhaust plenum-chamber consisting of the liquid surface as the bottom, the sinker bars as the ends, and the two walls of the tank as the sides. Although air rushes into this chamber and passes over the acid in the center, surprisingly little liquid is evaporated by the air movement. The plan, however, is to exhaust only the fumes which come off of the exposed surfaces of the pickled stock at each end of the tank.

Each tank is exhausted separately by a bifurcator with solid Haveg housing and rubber-covered steel fan wheel direct connected to a 3-horsepower motor. Each unit handles 7200 cubic feet per minute at 1-inch static pressure, and the possibility of fumes being blown around the room is eliminated by catching them as they leave the liquid surface. Covering the unused liquid surface reduces the required volume by 65 per cent and saves the initial cost of larger equipment and also the cost of operating larger motors. The heating requirements for this building, furthermore, are much reduced.

At another plant, sulphuric acid fumes and large volumes of steam were eliminated from three tanks each approximately 140 feet long and 8 feet wide. Three 7½-horsepower bifurcators with Haveg housings and rubber-covered steel fan wheels did the entire job.

Prior to the installation of these three bifurcators, the unit depicted in Fig. 13 used nine 54 x 54-inch wooden stacks set outside on the ground and extending 60 feet into the air. Each stack was supposed to serve one-third of one tank through a horizontal 54 x 54-inch wooden duct connected to a hood. The nine stacks, nine ducts, and nine hoods, required maintenance, replacement of nails, boards, etc.

The tanks were used to remove rust and scale from steel strip. Six or eight strips of steel were dragged slowly through each tank, and were dried with gas flames at the exit end, and then rewound on reels. The acid was kept hot by injecting steam directly into the acid at intervals all along the length of each of the three tanks.

New ducts were built to connect the 7½-horsepower bifurcators, as shown in Fig. 14. The nine old stacks were torn down and replaced by 30 x 30-inch new stacks, but in this case only three were required—one for each bifurcator. The tanks were loosely covered with 8 x 4-foot lengths of removable plywood to control the rise of steam from the tanks. An exasperating maintenance problem on six of the nine stacks thus was eliminated and the exhaust was controlled at all times regardless of weather conditions.

A simple exhaust application for pickling tanks was made for a steel mill having a 40-foot acid tank over which a housing of wood and concrete had been built. A 48-inch diameter stack penetrated the roof of the main building for natural exhaust, as shown in Fig. 16. Ventilation was unreliable, uncontrolled, and at the mercy of wind and weather.

Two 24-inch bifurcators with Haveg housings were installed, as shown in Fig. 17. The bottom of the old stack was blocked off to prevent short circuiting of the discharge air from the bifurcators. They were installed several years ago and have been giving excellent results regardless of wind or weather.

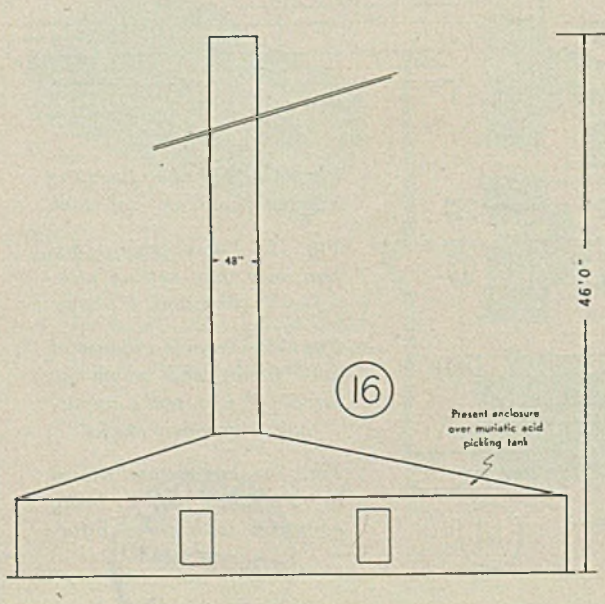
Additional uses of axial flow fans in steel mills include heated and unheated fresh air supply systems. Centrifugal fans may be used also, but require more space for installation. Axial flow fans are obtainable for use with duct work in sizes up to 12 feet in diameter, and handling up to 500,000 cubic feet per minute. (Fig. 19)

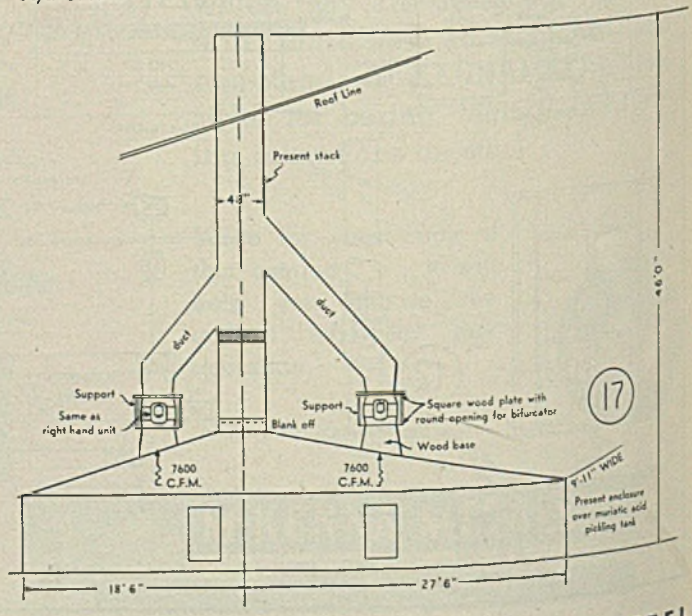
Some plants buy large amounts of water for cooling purposes. Forced draft or induced draft water cooling towers are ideally suited to axial flow fans. (Figs. 15 and 18) Sizes from 6 to 12 feet diameter are usually required, and make water cooling independent of wind conditions.

Theoretically, it is possible to cool the water down to the wet bulb temperature of the air, but no lower. In calculating the air volume required, the highest wet bulb temperature of the district should be ascertained from the lo-

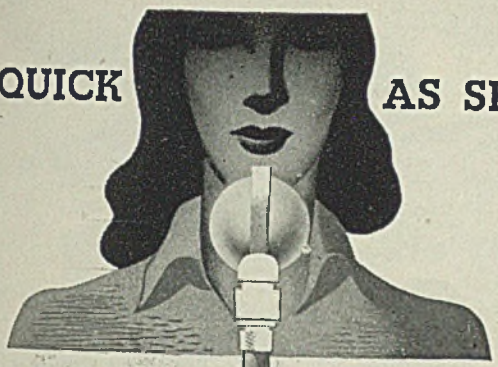
Fig. 16—Simple exhaust system for 40-foot acid tank

Fig. 17 — Pickling installation shown in Fig. 16 but with exhaust system redesigned with dual bifurcators





AS QUICK AS SHE CAN SAY JACK ROBINSON ....



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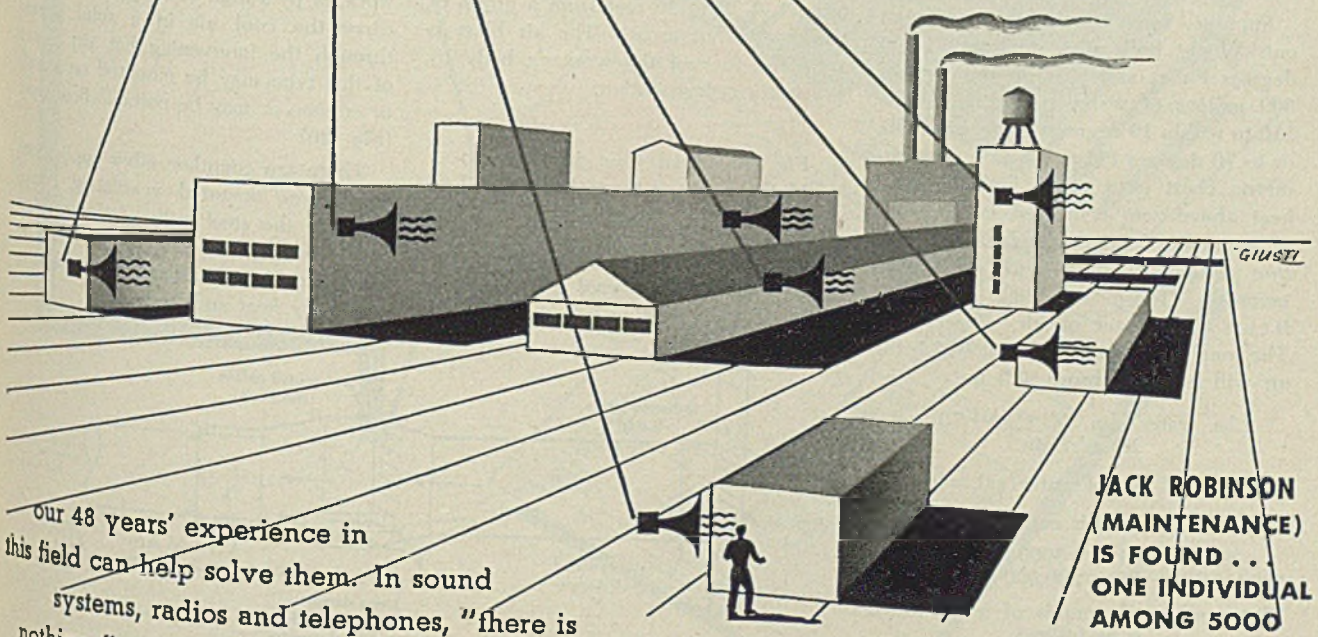

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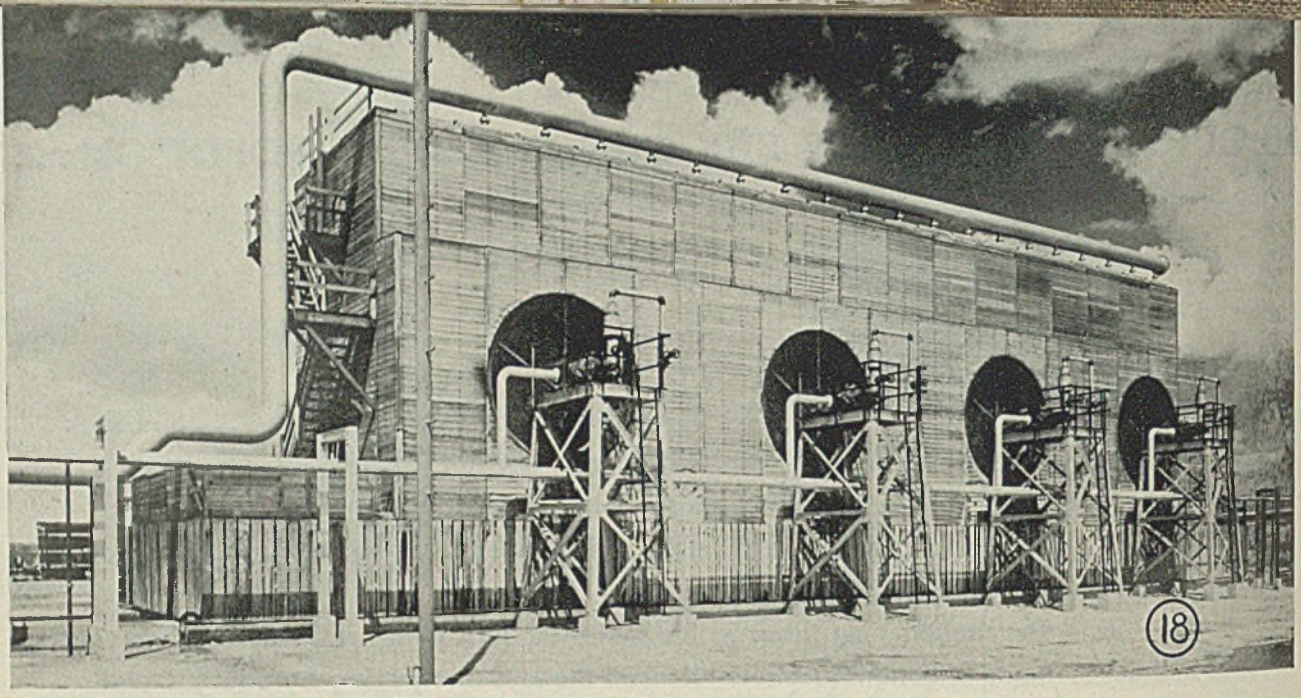


Fig. 18—Forced draft water cooling tower (Payne photo)

cal weather bureau. A few degrees lower usually will be safe to use. For an ordinary forced draft tower, the water usually is cooled to within about 10 degrees of this wet bulb temperature, unless an excessive amount of air and a filled tower are used.

Suppose, for example, the maximum outside wet bulb at a steel mill is 60 degrees Fahr., and it is desired to cool 600 gallons of water per minute from 110 to within 10 degrees of the wet bulb, or to 70 degrees Fahr. From a psychrometric chart or a table, find the total heat above zero contained in 1 pound of air at 60 degrees *wet bulb temperature* and at 70 degrees *wet bulb temperature*. These are 26.2 and 33.3 B.t.u.'s per pound of air, respectively. The number of B.t.u.'s of heat which the air will have to absorb will be:

Lbs. water/min. × (110 − 70) = B.t.u.'s/min.

Gals. × wt. of water/gal. = lbs.

In this case:

600 × 8-1/3 = 5000 lbs./min.
5000 × (110 − 70) = 200,000 B.t.u.'s/min.

The number of pounds of air required is as follows:

$$\frac{200{,}000}{\text{(Total heat 70° w.b.—total heat 60° w.b.)}} = \frac{200{,}000}{33.3 - 26.2} = \frac{200{,}000}{7.1} =$$

28,200 lbs./min.

Using 0.075 as the weight of a cubic foot of air, then the volume of air required is:

28,200 ÷ 0.075 = 365,000 Cfm.

This figure is somewhat high for the usual heights employed for cooling towers because the air as it leaves comes in contact with the hottest water.

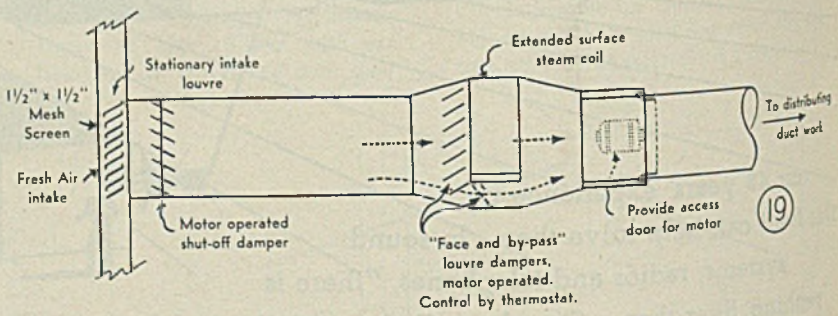
Another extremely important use of axial flow fans in steel mills also uses the principle of evaporative cooling—namely "man-coolers". Practically all mills use one or another manufacturer's fan set at 10 to 15 feet from a group of workers in hot areas. The air blast is supposed to cool the worker's body by evaporating perspiration.

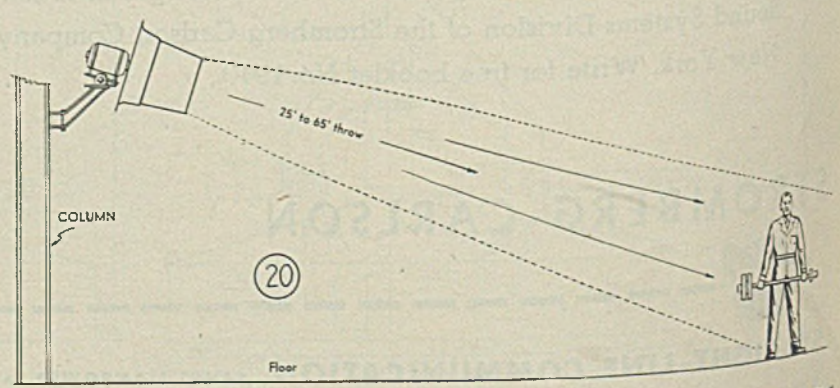
Fig. 19—Axial flow fan for supplying fresh air to steel mill buildings

Fig. 20—Man-cooler fan mounted on column blows cool air through intervening hot air

If the air handled by the fan is very hot, however, (and it usually is since it is blown from the hot area) the man does not produce perspiration as fast as the air blast adds heat to his body. To avoid this dilemma, air should be brought from a relatively cool source by duct-work, or by a high velocity jet which will carry the cool air in a solid stream through the intervening hot air. Units of this type may be mounted on a wall or column or may be portable floor type. (Fig. 20)

There are countless other applications for power operated ventilating equipment in the steel mills of this country. Some means can always be found to eliminate heat and hazardous fumes, or to supply heat and fresh air.





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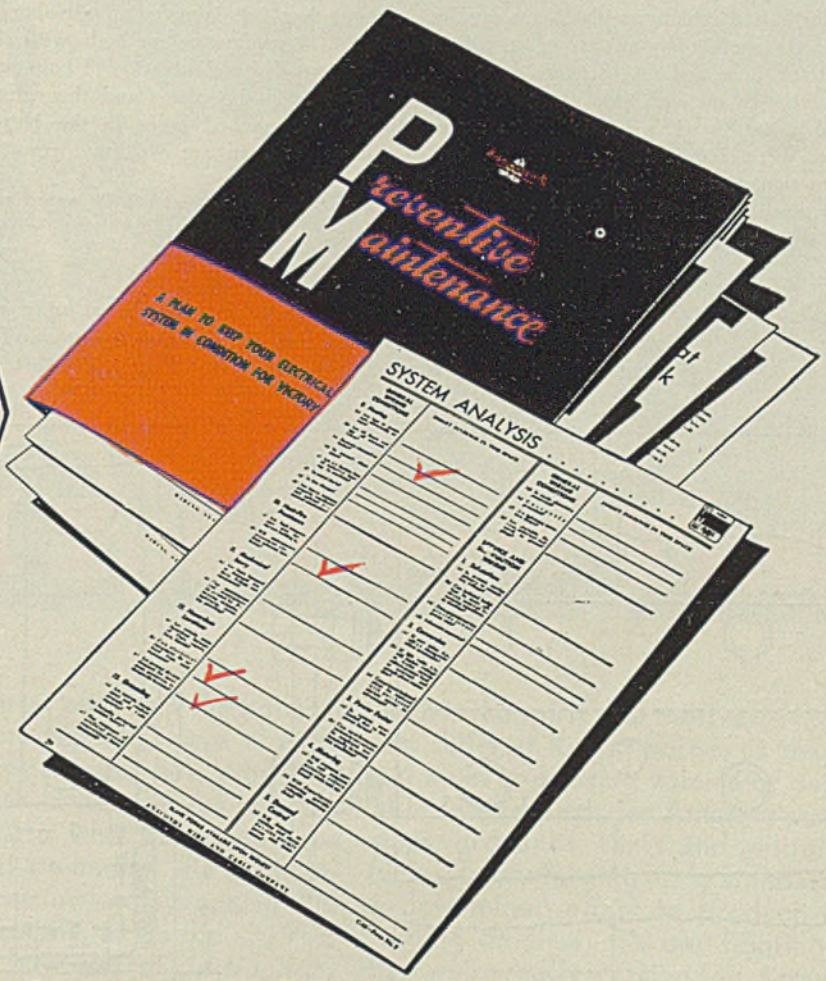
NOTE: Through this Preventive Maintenance Plan you may uncover the evidence necessary to obtain an "emergency repair priority." This is explained fully in the plan book.



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May 24, 1943

Plug Welding

. . . . facilitates changeover from bolted to welded construction

By D. B. TSCHUDY
Diebold Safe & Lock Co.
Canton, O.

OFTEN it is possible to use plug welding as a direct substitute for bolting.

In changing from bolts to plug welding there are many design and manufacturing factors to consider. Among these factors are cost and ease of changeover from bolted construction to plug welded construction, relative cost of tooling, and time to get into production.

When a new design is made and there is a question with regard to the use of bolted or plug welded construction, certain factors become more important. These factors are time and cost required for tooling and time to get into production on the new design. In considering the above mentioned factors let us first examine the ease of changeover.

In bolted structures plates are usually joined together by means of a batten with a line of bolts through the plate and batten on each side of the joint as shown in Fig. 1. If this bolted structure were changed to plug welded construction, then the joint would be made by plug welding through punched holes in the batten at approximately the same spacing as the bolts along the joint as will be seen in Fig. 2.

The ease of changeover is clearly illustrated in the two figures. The changeover is more simple if the product is made up of subassemblies which can be readily positioned for level plug welding, although the job can be done in any position by a skilled operator. The change has not involved any elaborate change in production methods with the exception of the elimination of bolts and bolt holes in the plates and the substitution of punched holes in the batten material and an arc welding operation in the holes.

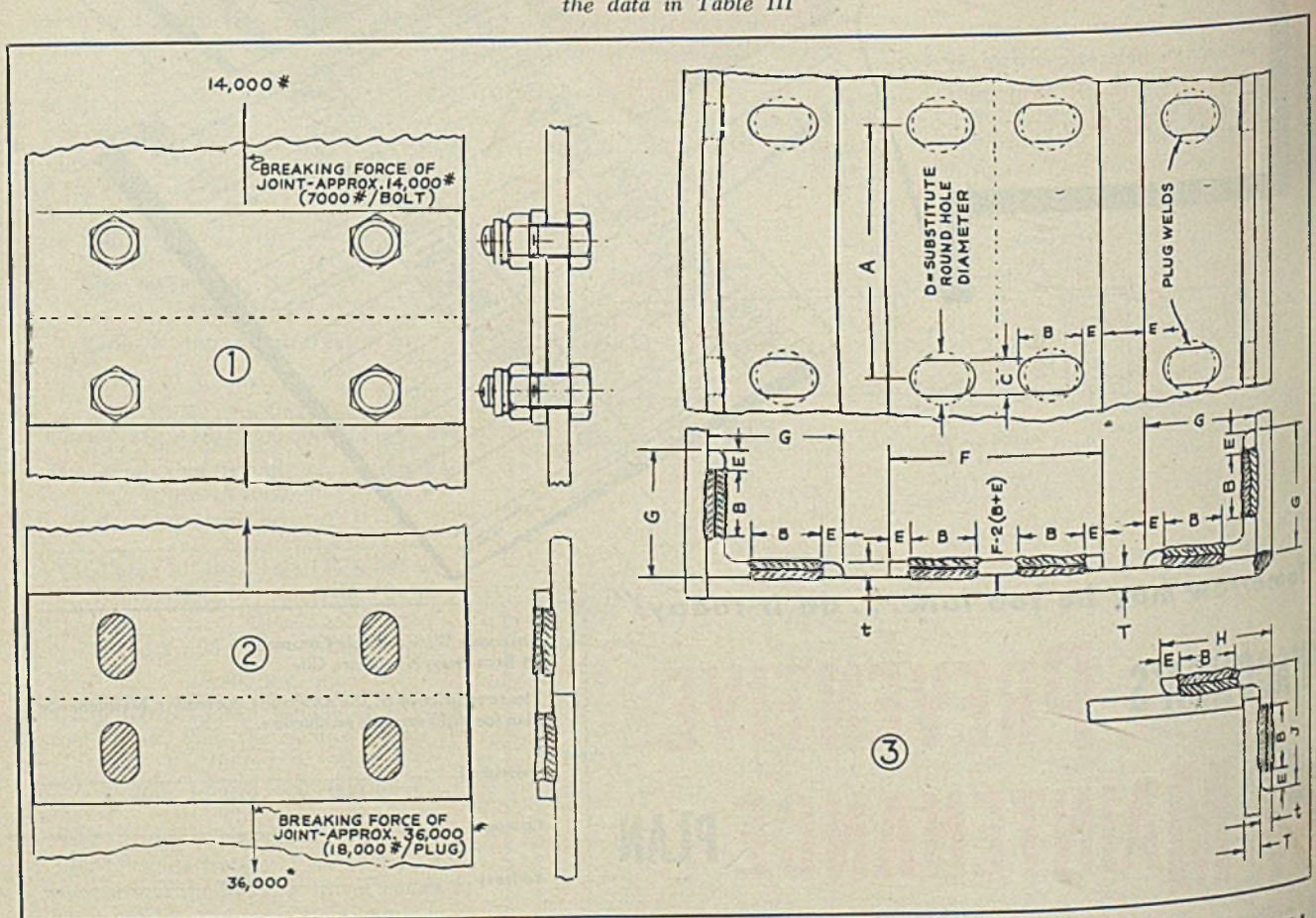
From a paper in the $200,000 award program sponsored by the James F. Lincoln Arc Welding Foundation.

Next to be considered in the change would be the labor cost of fabrication. For example, to make a bolted joint 10 feet long, consisting of two plates ¼-inch thick jointed with a 3/16 x 2½-inch mild steel batten, with 20 bolts along each side of the seam, Table I shows the approximate amounts of time that would be consumed.

To make the same joint using plug welded construction (with plug welding on a level plane or the arc welding in a down-hand position) the time figures applying will also be seen in Table I.

Next to be considered in the change is the quality of the finished product. Assuming the bolted joint to consist of two ¼-inch plates joined together by means of a mild steel batten 3/16 x 2½ inches and ⅜-inch fine thread nickel alloy bolts located ⅞-inch from edge of the plates and ⅜-inch from the edge of batten, then it is fair to assume that the joint would withstand the following forces: 8000-pound force in tension per bolt at breaking, 7000-pound force in shear over each bolt, 7000-pound force

Fig. 1—Typical bolted connection between two plates, using a batten. Fig. 2—Equivalent plug welded connection between two plates, using a batten. Fig. 3—Recommendations for plug welding various types of connections in different plate sizes are given by this chart and the data in Table III



By Their Deeds Shall You Know Them

Our fighting men, on whom the hope of human freedom depends, have already shown what they can do. We know how deadly they are in action. Yet this is a tough war. Those who know the Japs best tell us that we cannot win by maintaining the pressure and breaking the morale of the enemy, as we did in 1918. This is definitely a war of *destruction*. Our fighting men are equal to the job; but they deserve and will need the best armaments that American industry can turn out. We'll give them better fighting equipment than any enemy can produce.

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in shear in the batten at each bolt-hole location.

In comparison let us assume that the corresponding plug welded structure consists of two ¼-inch plates joined together by means of a mild steel batten 3/16 x 2½ inches and 18-8 stainless steel plug welds in 7/16 x ¾-inch oval holes, then this joint would withstand the following forces: 24,000-pound force in tension per plug at breaking, 14,000-pound force in edge shear around each plug; 18,000-pound force in bottom shear on each plug. Comparing further, the bolted joint may be less rigid than the welded joint. With regard to fatigue, the two joints compare favorably if the nuts used are self-locking.

In weight, the welded joint is lighter. Although it is impossible to paint the battens used in plug welding before final assembly (the paint would be burned off at the time of welding) theoretically the corrosion resistance of the joint should compare favorably with the bolted joint, due to the fact that there are no holes in the batten or plates in the finished joint (holes in the bolted structure being the initial points of destructive corrosion).

Next in line to be considered is the relative amount of tooling for bolted construction as compared to tooling for plug welded construction. The tools required for bolted construction are:

—Punch and die sets for making holes in battens

—Punch or drill jigs for making holes in battens

—Hand drills for reaming batten holes to size and location prior to final bolted assembly

—Pneumatic nut runners for tightening bolts in the final assembly.

The tools required for plug welded construction include the following:

—Punch and die sets for making holes in battens

—Jigs for locating battens and plates

—Arc welding units (standard equipment)

Another factor to consider is time to get into production. With bolted construction it is necessary to design and construct relatively expensive jigs for punching or drilling the plates. It is also necessary to purchase needed equipment, such as wrenches, drift-pins, drills, nut-runners, etc., before production can start.

With plug welded construction it is only necessary to determine the size and spacing of the holes to be punched in the battens, to make suitable jigs for locating the battens and plates and to arrange for sizing of the plates in the conventional manner. Thus it can be seen that production can start immediately upon completion of the unit design.

In conclusion, plug welding can be used to eliminate bolts or rivets without radically changing a production set-up using battens as the connecting medium. Plug welded designs are relatively easy to tool as well as easy to produce quickly. Plug welded designs are and can be produced with a lower tool cost and a lower manufacturing expense than most corresponding bolted structures. *However, it must be understood that certain structures are so complicated as to eliminate entirely the thought of plug welding.*

It also is well to investigate thoroughly the problem to be encountered before designing any plug welded structure in which the plug welds are to be made in either the vertical or overhead position. In many cases it is well to make the plug welding operation a multi-pass operation so as to stress relieve initial passes by succeeding passes of weld metal.

Table II shows the theoretic strength of recommended plug welds in two different thicknesses of batten material, the cubic inch displacement of each size of

(*Please turn to Page 112*)

TABLE I—Comparison of approximate amounts of time consumed for each type of joining

Bolted Joint		Plug Welding	
Man Minutes	Operation	Man Minutes	Operation
8.00	Drill (40) ⅜" diameter holes in two plates	...	No drilling of plates
.50	Punch (40) holes 5/10" diameter in (1) batten	.50	Punch (40) holes 7/16" x ¾" in (1) batten
5.00	Locate batten on plates, ream out 6 holes and locate bolts to hold batten in place	3.00	Locate batten on plates and tack weld at 6 locations to hold in place
5.00	Ream out remaining holes	19.20	Weld batten to plates (40) plugs at .48 minutes per plug (conservative)
5.00	Insert bolts and start nuts by hand		
16.00	Tighten bolts with air nut runners (2 men)	8.00	Straighten section by stretching batten (hammer plugs and batten)
39.50	Total man minutes to make joint	25.70	Total man minutes to make joint

Labor Saving 13.8 divided by 39.5 equals 35%.

TABLE II—Strength, Rod Weight and Time Figures for Plug Welding

Batten Size	Oval Plug Size (small)	Tensile Strength Kips	Edge Shear Strength Kips	Bottom Shear Strength Kips	Weld Metal cu. in.	Weight of heavily coated weld rod lbs.	Time per plug — Clean min.	Time per plug — Total min.
¼" x 3"	½" x ¾"	27.4	23.3	20.6	.0803	.041	.20	.69
¼" x 3½"	½" x 1"	38.0	29.0	29.0	.1116	.057	.25	.92
¼" x 3"	⅝" x ¾"	32.7	24.9	24.5	.0962	.049	.20	.78
¼" x 3"	¾" round	36.6	26.6	27.4	.1105	.056	.25	.91
3/16" x 2½"	7/16" x ¾"	24.4	16.9	18.3	.054	.028	.15	.48
3/16" x 2½"	½" x ¾"	27.3	17.5	20.5	.060	.031	.15	.52
3/16" x 2¼"	⅝" round	26.1	16.6	19.5	.058	.030	.15	.51

TABLE III—Dimensions in Fig. 3

(See Fig. 3 for sketch showing dimensions)

Plate Thickness T (inch)	Mild Steel Batten Thickness t (inch)	A Min. (inch)	A Max.	B (inch)	C (inch)	Hole Diameter (if used) D Min. (inch)	E Min. (inch)	F Min. (inch)	G Min. (inch)	H Min. (inch)	J Min. (inch)
¼	7/16	3	..	¾	7/16	⅝	¼	2½	1⅞	1⅞	1½
⅜	¼	3	..	1⅛	½	¾	⅜	3¼	1⅞	2¼	2⅛
½	⅜	3	..	1¼	⅝	1⅛	⅜	3½	2⅛	2⅝	2⅝
⅝	⅜	3	..	1½	⅝	1⅛	⅜	3½	2⅛	2¾	

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Electronic Motor Control Has Excellent Characteristics for . . .

NEW Machine-tool drive

By S. D. FENDLEY
Electronic Section
Industrial Control Division
General Electric Co.
Schenectady, N. Y.

AN EARLY application of electronic control was to operate automatic lighting, installed about 1928. Here thyratron tubes were used to supply both the field and armature of a small motor to control its speed over a range of approximately 100 to 3600 revolutions per minute.

Soon following this, thyratron speed-control equipment were furnished for motors of various sizes on many different applications.

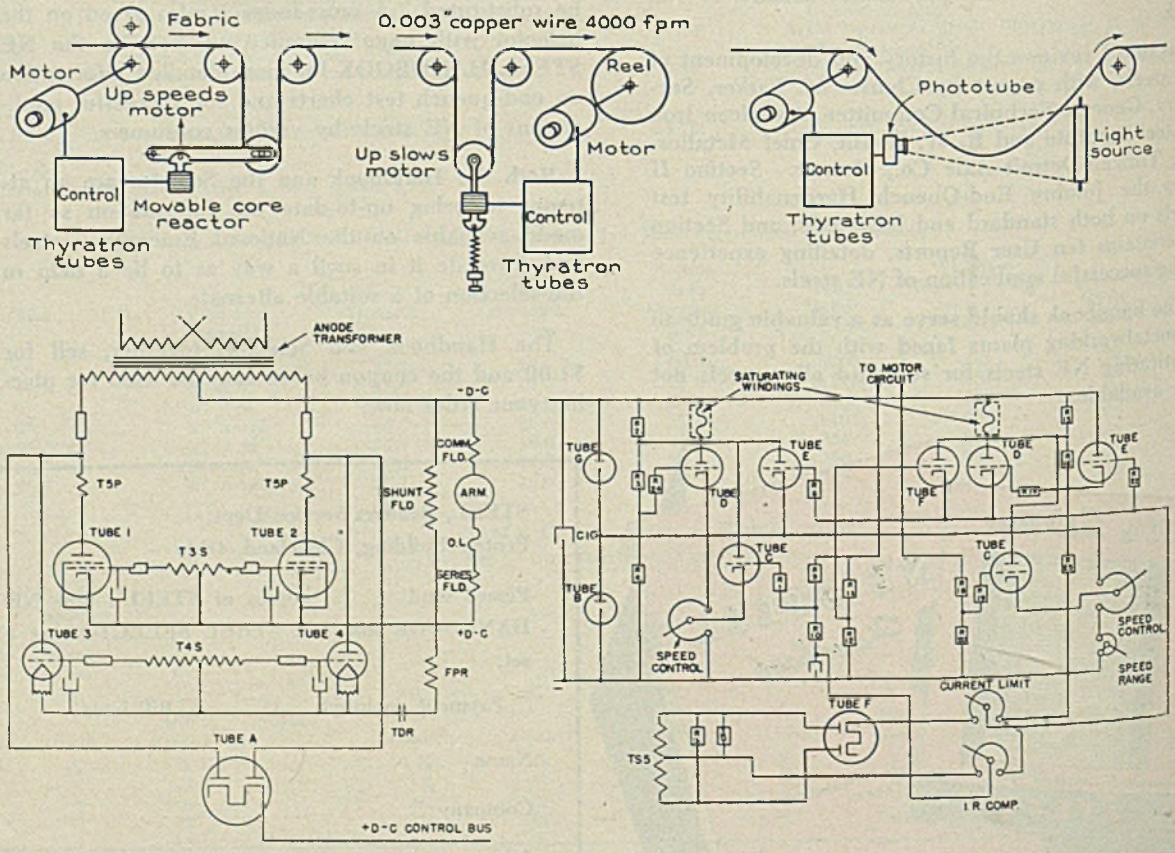
The primary function of practically all of the original motor controls has been to adjust the speed of the motor. The new Thy-mo-trol system is a fully automatic control that not only gives wide speed variation and close regulation at the speed selected but also provides for automatic control of acceleration and starting current.

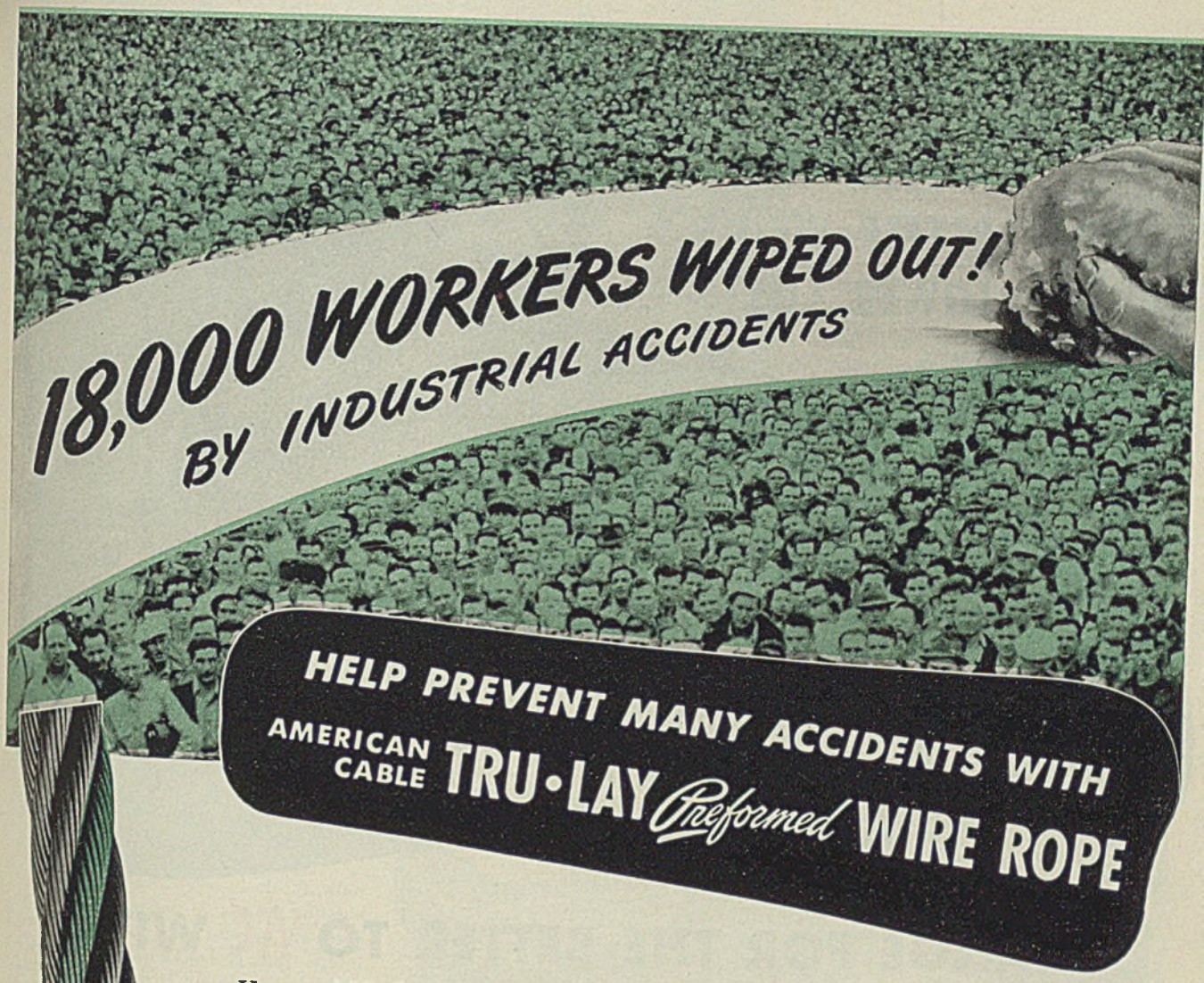
Typical Applications: Many interesting applications of the Thy-mo-trol drive have been made—most of them to machine tools because of the present limitations in size. Among the types of machines to which drives have been successfully applied are grinders, milling machines, tool-room lathes, turret lathes and thread mills. In addition, they have been supplied for automatic welding machines and for various special equipments for testing magnetos, airplane propeller governors, and instrument tachometers. Fig. 4 shows a standard Thy-mo-trol panel applied to a milling machine.

A particularly interesting application has been made for driving the headstock on grinders. The wide speed range obtainable and the constant torque characteristics provided at low speed make it possible to provide the right speed for every type of grind. In several instances the new control has made possible a simplification in the headstock itself through the elimination of gears and pulleys formerly required.

Another important factor in this application is that the equipment can be mounted on the grinder without fear of introducing any undesirable vibration such as might be produced with high-speed rotating apparatus. The machine can be made entirely self-contained, and it can be moved at will without wor-

Fig. 1. (Above)—Sketches illustrating various mechanical feedback arrangements as employed with early electronic motor control schemes
Fig. 2. (Left, below)—Circuit diagram showing Thyratron power rectifiers connected to motor
Fig. 3. (Right, below)—Simplified diagram of control circuits





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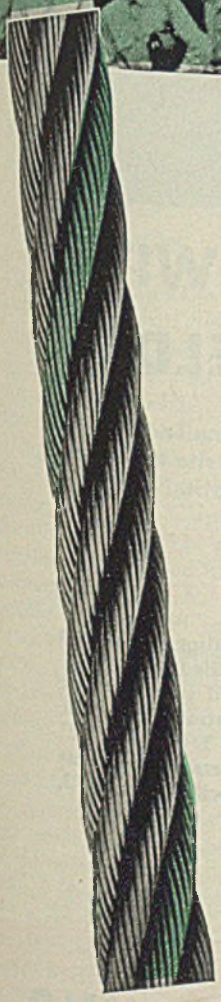

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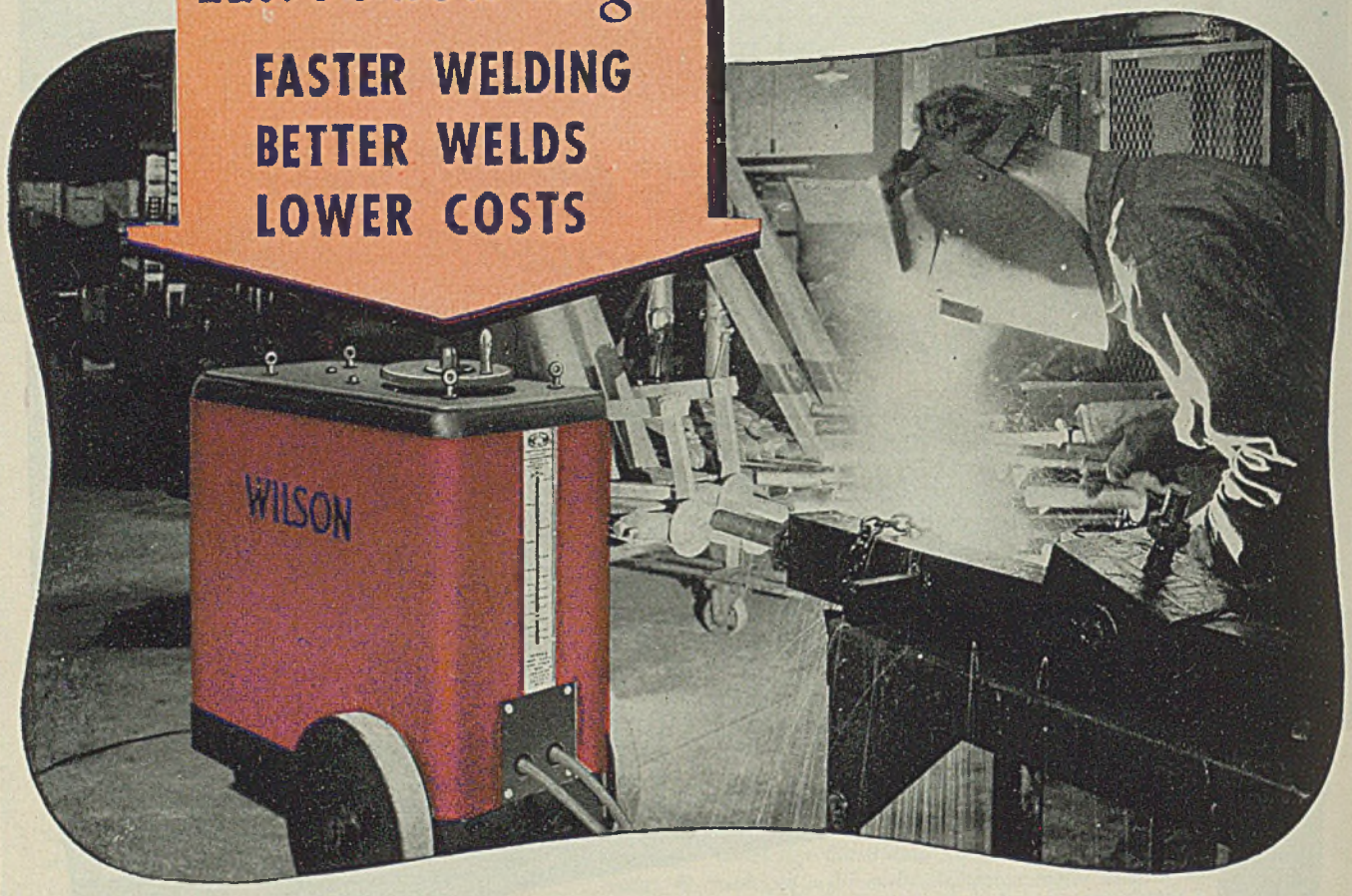

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The "Bumble Bee" is made in 300 and 500 ampere sizes and can be supplied with running gear for increased portability at small additional cost. For complete information write to Wilson Welder & Metals Co., Inc., 60 E. 42d St., New York.

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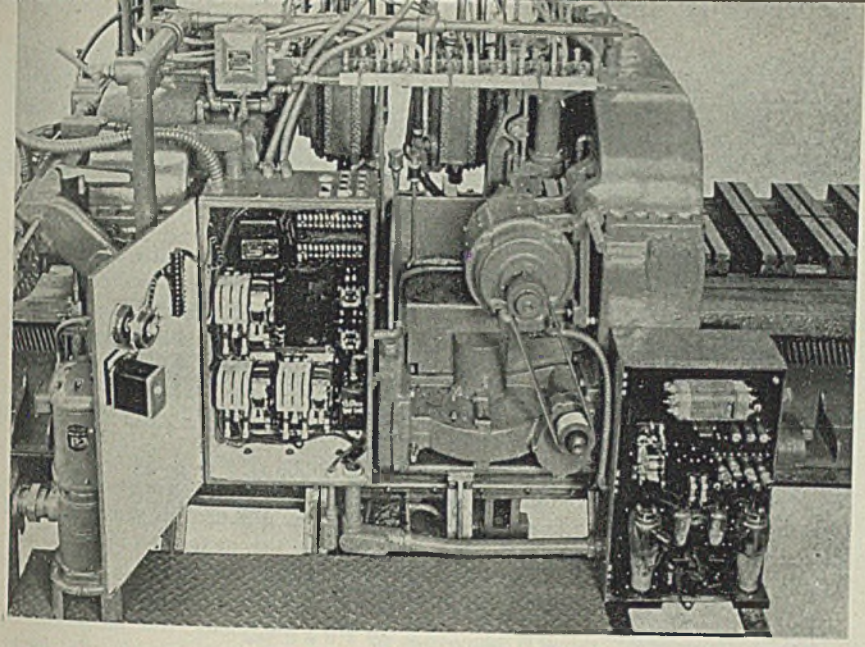
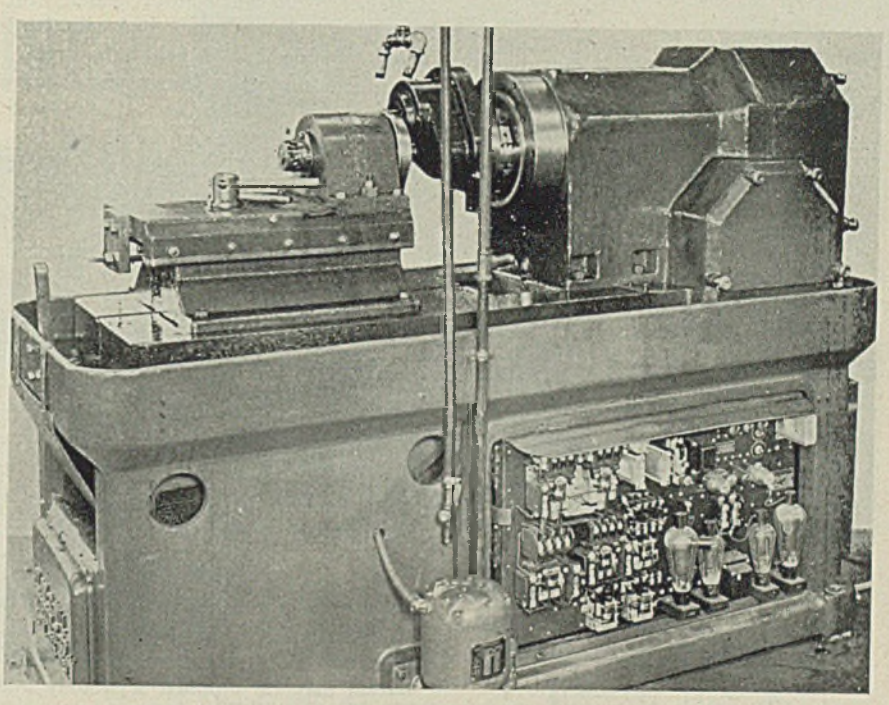


Fig. 4. (Left)—Standard Thy-Mo-Trol panel (lower right) mounted on machine for milling airplane spars. Electronic control on this machine operates direct-current "feed" motor. Alternating-current control panel at left center handles other operations

Fig. 5. (Below)—Form and thread milling machine equipped with the control



ry as to the availability of a direct-current power supply.

For reversing table drives, the use of two independent speed-adjusting potentiometers makes it possible to provide full-range, independently adjustable speed for both directions of travel. A simple relay for selection between the potentiometers and a standard double-throw limit switch are all the additional material needed.

Built-in Control: The electronic control can be supplied in a form suitable for building into a machine in the same manner as conventional control equipment. An interesting application of this type is shown in Fig. 5 which shows a panel of this type built into a form and thread milling machine. In this instance, the electronic equipment is combined on a single panel with standard magnetic switches used for starting the coolant pumps, etc. The features provided by the Thy-mo-trol system used on the work spindles have helped to increase production materially by increasing the amount of work that can be done between grinds, lengthening the life of the cutter, and by eliminating the necessity for changing gears and sheaves to obtain the necessary range of speed.

Most thyratron motor-speed controls consist of an adjustable-voltage rectifier using thyratron tubes to supply the direct current for the field and armature of the motor. By varying the output voltage of the tubes the speed of the motor can be changed. A mechanical or electrical feed-back system is employed to do this.

The phase-shift method is one of the most common ways to vary the output voltage of a thyratron tube. This employs a resistance-reactance bridge which permits the phase relation of the grid voltage to be varied with respect to the anode voltage. By varying one of the elements in the bridge circuit, either mechanically or electrically, it is possible to change the phase displacement of the grid voltage with respect to the anode voltage from a condition where the two are completely in phase to the point where they are 180 degrees out of phase. When the two voltages are completely in phase, the tubes will be turned full-on. When they are completely out of phase, the tubes will be turned off completely and will not conduct any current. By varying the voltage relation between these limits, the tubes can be turned on to any desirable degree.

Mechanical Feed-Back Arrangement: In this system, one of the elements in the phase-shifting bridge—usually the reactor—is varied mechanically to change the output of the tubes and thus regulate the speed of the controlled motor. Several arrangements of this type are shown in Fig. 1. In one of these, a loop of fabric, rubber sheeting, sheet steel, etc. is used to operate the movable core of the reactor which thus varies the speed of the motor in proportion to the rise and fall of the loop.

Where it is not practical to operate a reactor, the motor speed can be controlled through the use of a photoelectric arrangement as shown in Fig. 1. A light beam is directed on the loop of material. As the loop rises and falls, it varies with amount of light falling on the phototube. This causes the motor speed to be increased or decreased through the use of the thyratron tubes in the same manner as with the reactor scheme.

This type of control is used to maintain constant tension in reeling wire, ranging from fine copper wire to large,

heavy cable. A similar application is that of a material in a plastic state as it emerges from an extruding machine, and for maintaining a fixed relationship between two or more conveyors which must handle the same material. Numerous applications of this type may be found in the rubber industry.

Electrical Feed-Back Arrangement: Where speed regulation is an essential factor, the electrical feed-back arrangement, utilizing a pilot generator with a suitable circuit, makes it possible to hold the speed of a motor very nearly constant over a wide range of loads.

As in the mechanical arrangement, a full-wave rectifier is used, but a saturable reactor instead of a movable core reactor varies the output of the voltage on the motor.

The new electronically controlled motor drive (Thy-mo-trol) was not developed with the idea that it can or will supplant the various other types of mechanical and electrical drives in use today, where such drives have the characteristics and provide all the features needed. The idea is rather to provide close speed regulation, smooth acceleration, precise control of speed—all under full automatic control. Thy-mo-trol systems are believed to offer both the user and builder of machinery a drive ideally suited to this application.

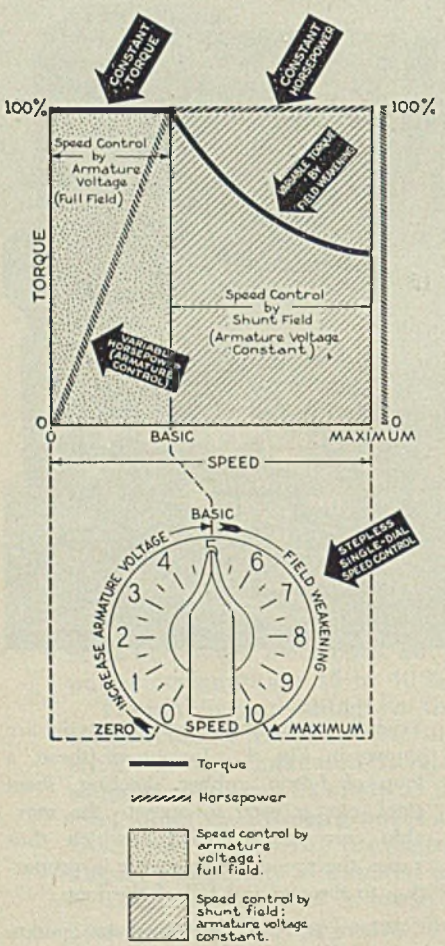


Fig. 6. (Left)—Curve showing how motor torque and horsepower characteristics vary with motor speed. Below this curve is shown drawing of speed control dial showing how speed is controlled in both armature and field ranges by a single dial

Description of Drive: The standard drive of this type consists of an anode transformer, a control and rectifier panel, a push-button station or other control accessory, and a direct-current driving motor. In some instances, a smoothing reactor may also be required, depending upon the size and characteristics of the motor being used.

The anode transformer allows use of motors of standard voltage. Designing a special motor would eliminate this item but it is felt that the use of a motor of standard design has some definite advantages to the user. The transformer is of conventional design and may be either of the insulating or of the autotransformer type.

Fig. 4, lower right, shows a conventional Thy-mo-trol control panel with control and power tubes, line contactor, thermal overload relay, field-failure relay, a cathode-protective timer and accessories. The control tubes and associated parts are mounted on an individual subpanel which can be removed quickly and replaced by another unit with little loss of time.

The control station itself is a standard heavy-duty-type push-button unit with push-buttons and speed-adjusting potentiometer. Both potentiometer and push-button may be supplied separately and mounted in any convenient location.

Motor: A shunt-wound direct-current motor is used. In order to make most economical use of the rectifier tubes, 230-volt machines are ordinarily supplied. Although the motor is of conventional design, its characteristics must be such that it will operate satisfactorily from an unfiltered rectifier supply. This is particularly true when the alternating-current power supply is single-phase.

Acceleration: One of the characteristics of a good drive is that it should be capable of starting its load with a minimum of shock to the machine and under conditions which will permit the motor to commutate satisfactorily. From an engineering point of view, the constant-current limit acceleration employed in this drive approaches this ideal.

By means of an adjustment in the panel, it is possible to vary the accelerating current and thus the accelerating torque to a value which will bring the motor up to operating speed in the quickest time consistent with the nature of the load and the commutating ability of the motor.

From the moment the start button is pressed, the motor will assume a maximum value of current as determined by the adjustment. Under these conditions the motor will pull with smooth, uniform torque until the load is up to speed; then the current will drop off to the value needed to maintain the required torque.

Preset Control: For many applications, it is desirable to preset the speed at which the motor is to operate anywhere within the operating range. This type of equipment provides this feature so that the motor will be accelerated smoothly up to the speed called for by the control setting. The motor is always started under full-field conditions regardless of whether the potentiometer is set for operation below base speed by armature voltage control or above base speed in the field weakening range.

Overload protection is provided by means of a conventional thermal overload relay.

Stopping: Quick stopping of the motor is provided by means of conventional dynamic braking. When the stop button is pressed, the power is disconnected and a resistor is connected across the armature.

Regeneration or Pump-Back: The standard equipment does not provide for regeneration or pump-back. When the speed-adjusting potentiometer is quickly turned from a high setting to a lower one, the motor will coast down to the new setting at a rate which will be determined largely by the friction of the load. This means that it is not suitable for use with overhauling loads.

Another factor is that when motor speed is being reduced with field applied, the motor acts as a generator and generates an excessively high voltage. In the Thy-mo-trol system, a "voltage-snubbing" circuit automatically keeps the voltage down to a safe value.

Where quick slow-down is required, a modification can be furnished which provides a form of automatic dynamic braking to slow down the motor. Except in special instances, this feature has not been found essential. A typical application where it may be necessary is in the case of a turret lathe where the operating speeds must be stepped up or down rapidly so as to synchronize with the speed of the turret and to maintain maximum production.

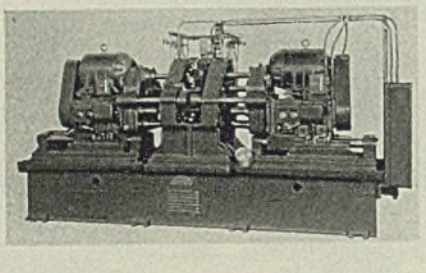
Speed Range: The speed-range obtainable with equipment of this type is

(*Please turn to Page 114*)

Boring Machine

Snyder Tool & Engineering Co., 3400 East LaFayette street, Detroit, recently introduced a hydraulically operated, double-end drilling and semi-finish boring machine which drills, redrills and semi-finish bores the wrist-pin hole in aircraft engine pistons in three successive working stations.

The machine has four fixtures mounted on a 4-station trunnion index unit. Each is designed to take two pistons,



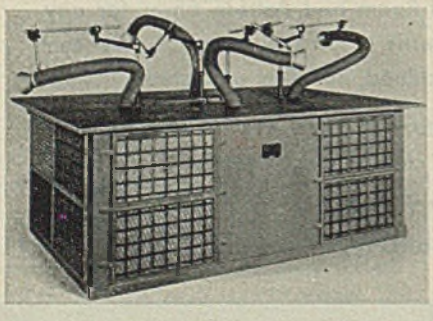
which are located and clamped in place manually. When this is done, the operator pushes the cycle button and the fixture is indexed from station to station by an electrically-driven Geneva index mechanism.

Tools driven by 6-spindle multiple heads feed into the pistons from both sides. Each set of six is operated by a 10-horsepower motor. In the first and second drilling stations, the tools are guided in conventional drill bushings. In the third, the semi-finish boring bars are guided by revolving bushings on the trunnion side members.

To insure efficient work in all stations, coolant from a large tank near the rear of the machine is directed against the drilling tools and pistons. Top of coolant tank serves as a removable chip tray.

Grinding Bench with Integral Dust Collector

Schmieg Industries, 346 Piquette avenue, Detroit, recently developed a new 4-station grinding bench, with integral



dust collector. It is designed for use with portable grinders on non-hazardous materials.

The unit is said to effect full protection against dust hazards incident to grinding operations. Suction is concentrated at the dust source by means of flexible suction hoses, attached to swivel connections. A special double width, double inlet fan assures complete collection of dust.

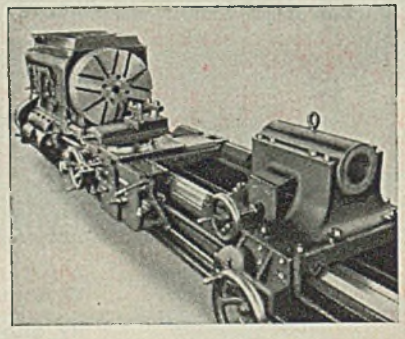
The finer dust particles are removed by filters; while a special plenum chamber is provided for the removal of heavy particles.

Bench is of rugged wood frame construction, permitting attachment of grinding heads and fixtures, and is equipped with a heavy wood top, Masonite covered. Variations in design are available to suit production requirements.

The collector is furnished complete with fan, four suction hoses, and motor with combination starter and push button.

Heavy-Duty Lathes

Sommerfeld Machine Co., Braddock, Pa., announces two new extra heavy-duty lathes of 36-inch and 42-inch capacities for use in producing such items as



medium gun tubes, hollow propeller shafting, etc. as well as solid products of any length.

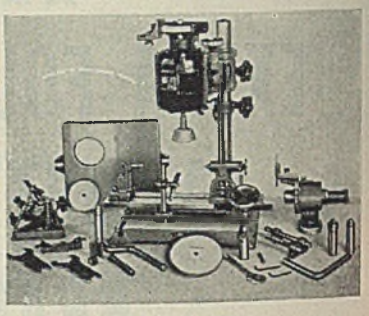
The machines are built for fast roughing and accurate finishing. The unit designated as the type BT bores and turns automatically while the other, the type T, is for turning only.

Tool Grinder

Roan Mfg. Co., 1225 Washington avenue, Racine, Wis., is offering a new tool and cutter grinder equipped to handle the grinding of practically all types of milling cutters. It also can be used for contour grinding, and being easily portable, it makes an ideal bench grinder.

Two features of the machine include a motor grinder head and bracket which can be raised, lowered and swiveled around—accurate vertical adjustment being assured by a vernier feed on motor bracket. Furthermore, motor itself can be swiveled to bring grinding wheels into any position.

To accommodate various tools, complete fixtures and accessories are provided. Among these is a precision slide which can be used independent of the



grinder as a bench center for indicating and inspecting tools. Next, there is the outside diameter grinding fixture which is used for holding end mills and milling cutters, and special form tools which cannot be held on center. This also is used for grinding end of end mills, side cutting teeth of milling cutters and many other facing tools of an almost unlimited range of sizes. Compact, the grinder has a base 18 x 16 inches. Its column is only 25 inches high.

Portable Test Stand

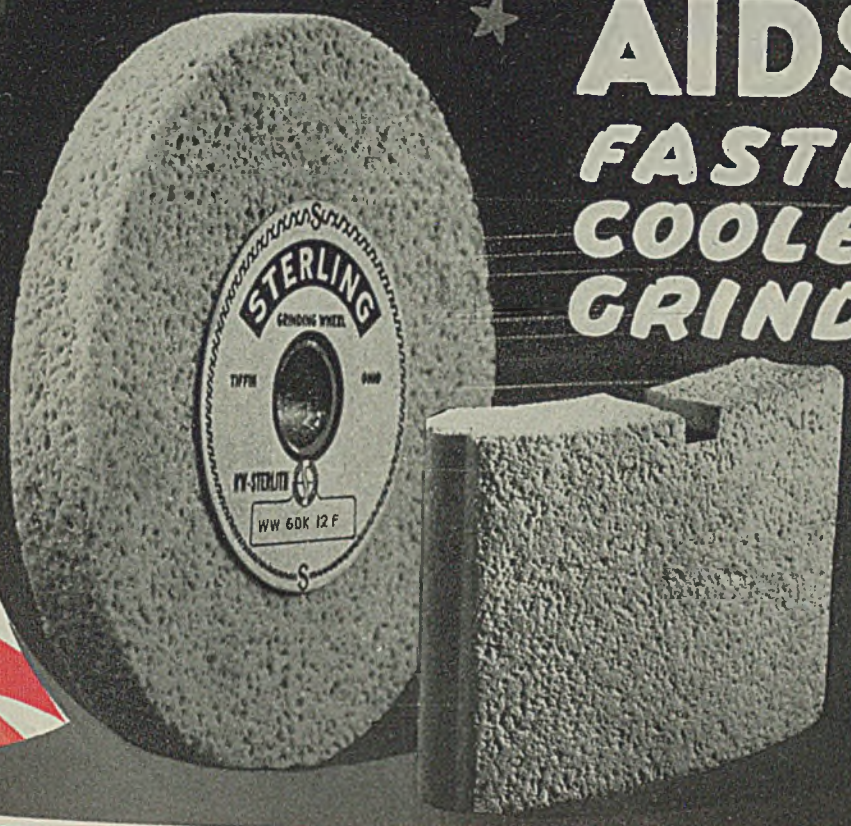
Denison Engineering Co., Columbus, O., announces a new model HTS3EM HydrOilic portable test stand for testing hydraulic systems of airplanes and component parts comprising those systems. It will check the entire hydraulic system, including valves and lines, of aircraft operating on pressures up to and including 3000 pounds per square inch.

The stand is driven by a 7½ horsepower 1200 revolutions per minute 3-

phase 200-volt, constant-speed motor. Suitable motor equipment, however, can be supplied to meet other electric power conditions.

Fluid is supplied from either the air-

Two New STERLING AIDS for FASTER COOLER GRINDING



Sterling's STERFAST Grinding Wheels and Segments are now available for cooler, faster grinding of your hardest steels. Made in various formulae, these new wheels and segments are your positive answer to the problem of obtaining faster stock removal without burning on certain types of metals.

If you are looking for better-than-ordinary grinding results, STERFAST will give them to you. Here is easier, free-cutting without dressing...wheels and segments that remove metal fast ...that provide extra long life and reduction of grinding time.

A full range of grinding possibilities is described in the new Sterling Catalog No. 43, just off the press. Send for it on your letter head and a copy will be mailed at once.

For example do you need to speed up production on tool, cutter and surfacing jobs? If you do, then these two Sterling innovations will do it for you at less cost and without lost time for dressing.

Quicker grinding...better grinding...controlled grinding--these are some of the features of Sterling's STERFAST Grinding Wheels and Segments. Every quality you have previously found to be desirable features of Sterling Wheels and Segments has been incorporated in these new items. Write today for Sterling engineer to call.

• STERLING ABRASIVES •

THE
STERLING GRINDING WHEEL DIVISION
OF THE CLEVELAND QUARRIES COMPANY
TIFFIN, OHIO

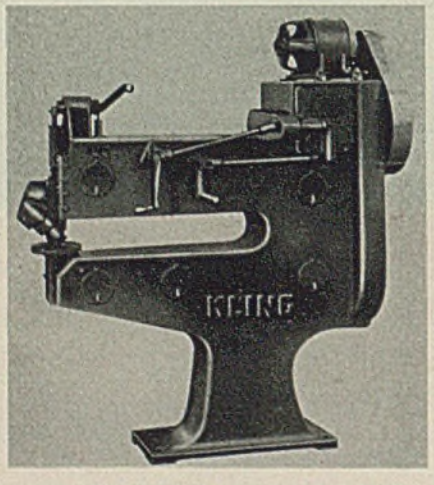
THE WHEELS OF INDUSTRY

plane or tester reservoir. The tester's working pressures are adjustable over a range of 500 to 3000 pounds per square inch. The completely enclosed stand of the unit features a welded steel frame. The tester is mounted on casters and supplied with a pulling tongue. All instruments and control valves are mounted on the front panel.

Shearing Machine

Kling Bros. Engineering Works, 1300 North Kostner avenue, Chicago, is now offering a high-speed rotary shear—an all-purpose machine which, with attachments, performs a wide range of functions. It cuts straight lines, openings, circles, odd shapes, strips, flanges, bevels, and offsets.

The shear also can be equipped with rolls for beading, "U"-ing, wiring and



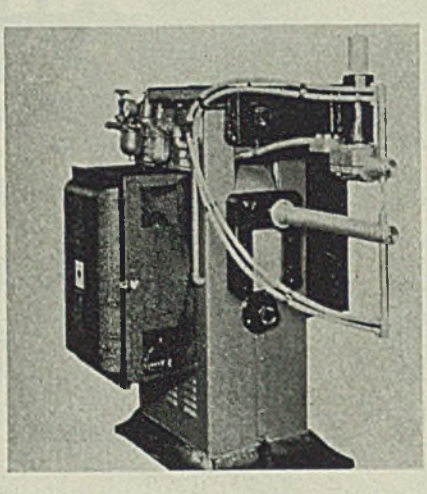
forming operations. All gearing at the back of the machine run in an oil bath. The machine is driven by means of a belt from motor to drive shaft.

Friction clutches of the Pullmore double-end oil types permit shearing speeds to be changed by simply shifting the clutch from one position to another. Cutters of the shear are of oil-hardening tool steel, heat treated to insure maximum service life. A gib key provides for any takeup resulting from natural wear on the cutter heads. Rapid setting of the cutters in the proper shearing relation is provided by an adjustment on the lower cutter shaft.

Spot Welder

Universal Power Corp., 4300 Euclid avenue, Cleveland, recently developed a new projection or spot welding unit which incorporates a sturdy heavy-duty water-cooled transformer in capacities of 10 to 150 kilovolt amperes on either the press type construction or the conventional rocker type.

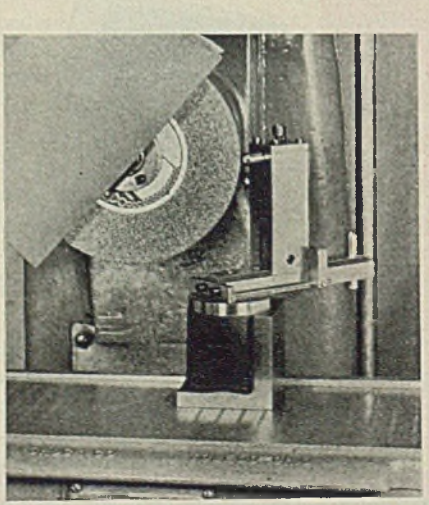
Unit illustrated is unique in that the tube type timer control and the timing



contactor of either the magnetic-air-break type or the water-cooled tube type, if repeat pulsation welding is desired, are assembled integrally mounted on unit so that all inter wiring is complete—ready to connect to the power supply lines immediately on delivery. Timer controls regularly supplied govern pre-squeeze, weld, forge and off timing variable at mill for each type of welding job. A foot switch solenoid controlled air operation permits fast accurate work with little or no fatigue by women or other newly trained workers, it is said.

Wheel Dresser

J & S Tool Co., 477 Main street, East Orange, N. J., is offering a new Form-Master wheel dresser—an all pur-



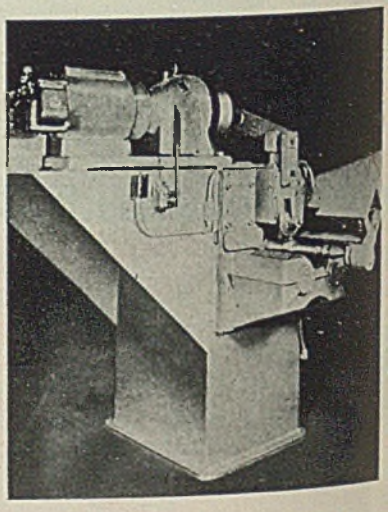
pose unit for dressing both angles and radii. Radii can be accurately set with a micrometer using fixed micrometer stops; angles—with protractor of sine-bar after removing radii upright and tilting fixture forward on angle base.

The unit dresses a diamond point horizontal to center of grinder spindle. The dresser is particularly suited for use on Brown & Sharpe No. 2 universal grinders and similar types. Its cast-iron base permits drilling and tapping of holes when needed for quick setups on cylindrical grinders.

Shell Cropper

Yoder Co., 5500 Walworth road, Cleveland, announces a new shell cropper developed in collaboration with the Dresser Mfg. Co. of Bradford, Pa. It cuts off shell ranging in size from the 60 millimeter trench mortar through the 155 millimeter high explosive shell.

The shell is cropped at forging temperature, the machine being set in the forge line immediately following the final

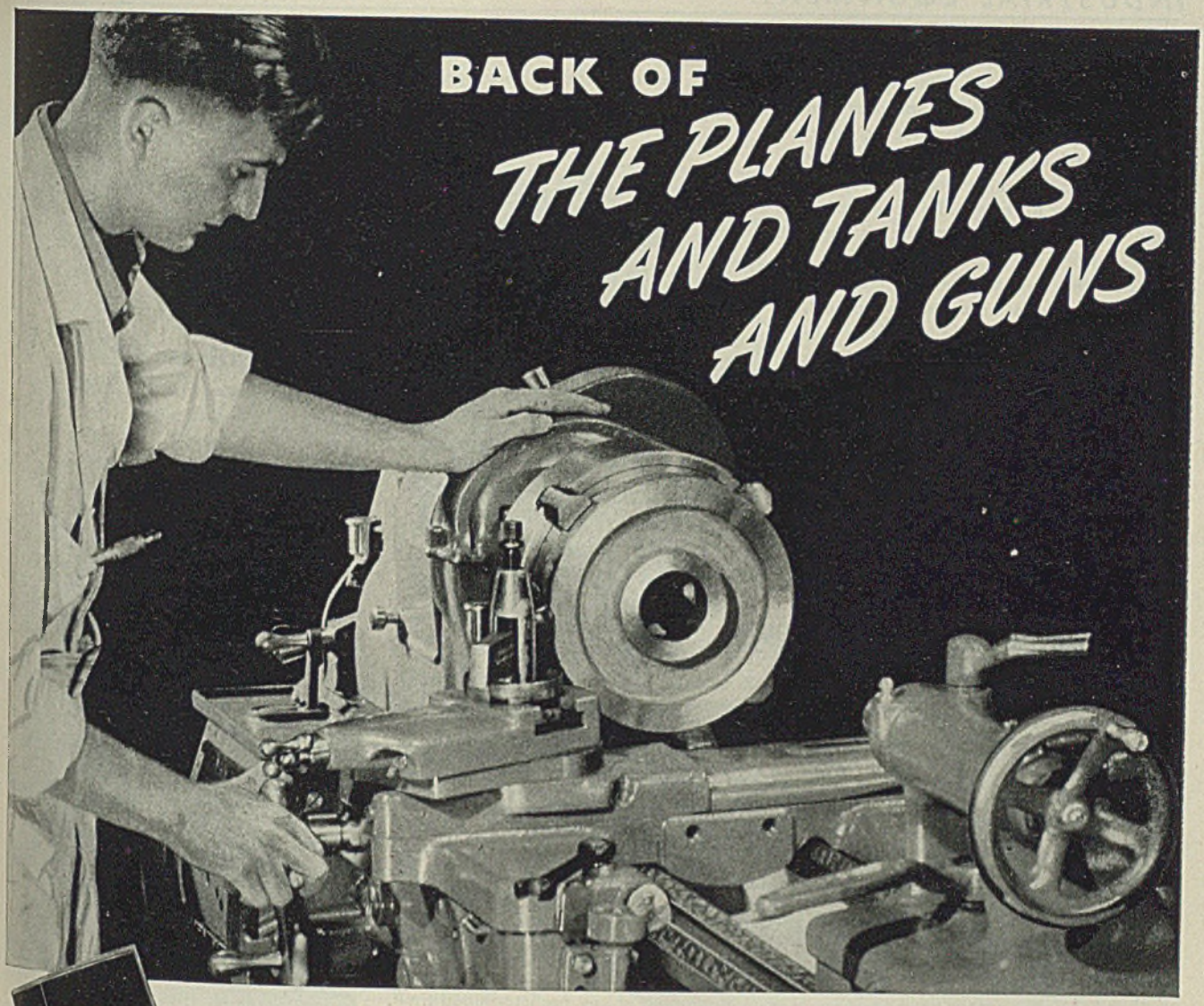


sizing operation. The machine is nearly automatic in operation, the hot forging being slid from the conveyor over the mandrel.

After pressing the start button an air-operated arm, which holds the shell against the locating mandrel, swings into position. This mandrel locating from the cavity bottom gages the shell length. While held in this position, the forging is rotated by the two driven rolls that support it. The disk type cutter is then fed automatically through the forging wall. A roll located on the mandrel prevents the formation of an internal burr. On completion of the cut, the operator ejects the forging along with the cropped end by actuating an air-operated ejector.

Variable-Speed Lathe

Schauer Machine Co., Reading road, Cincinnati, announces a VA3B-C Ideal variable-speed lathe for precise lapping and finishing of metal or plastic parts at



All of the South Bend Toolroom Lathes, Engine Lathes and Turret Lathes are described in Catalog 100C. Write for a copy of this new, 48-page catalog.

Buy War Bonds!

Army-Navy Production Award With Two Stars

Back of the planes and tanks and guns that are flowing in ever-increasing quantities to our fighting forces is a skillfully coordinated plan of men and machines — a combination of skill, ingenuity and mechanical perfection that is going to win.

Accuracy is the key to the success of this great plan. Without the split-thousandth tolerances that assure perfect interchangeability of parts, the production goals could not be attained —and not enough planes and tanks and guns would reach the war fronts.

Capable of fulfilling the demands of urgent war production, South Bend Lathes have the accuracy and speed for the most exacting precision operations, plus ruggedness and power for efficient service.

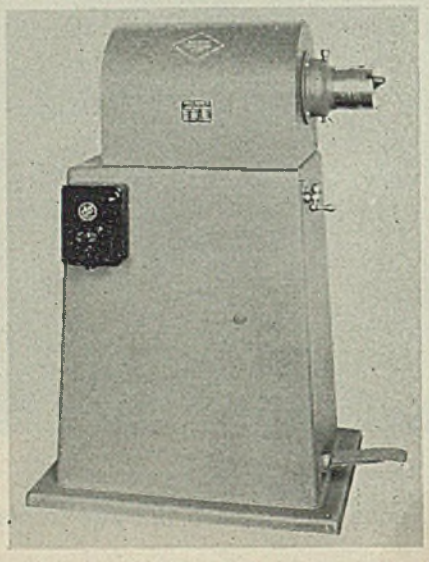
South Bend Lathes are made with 9″, 10″, 13″, 14½″, and 16″ swings in both Quick Change Gear and Toolroom models. Practical attachments are available for special classes of work.

SOUTH BEND LATHE WORKS

SOUTH BEND, INDIANA — LATHE BUILDERS FOR 36 YEARS

a low speed of 100 revolutions per minute to a high speed of 4800 revolutions per minute. The variable speed of the lathe is obtained through a Reeves drive. An improved twin disk clutch assembly transmits the power from a continuously running motor to the spindle of the speed lathe when the foot treadle is held depressed.

When the foot treadle is released, a disk-type brake is automatically applied. Selection of the variable speeds is obtained by the ballcrank handle which is on the side of the machine. Variable-speed ratio is 6 to 1 for 1-speed motor and 12 to 1 for 2-speed motor. Operation of the machine is by a non-slip foot treadle. The spindle and holding devices are contained in a separate welded steel housing which is mounted on a rigid, heavy, welded steel floor-type pedestal. The motor is easily accessible for replacement or removal. There is no vibration of this speed lathe with heavy work at high speeds. Chucks of conventional 3 or 4-jaw type will be furnished as ordered. Chuck end of spindle can be provided with a taper hole or a removable taper socket. Special holding fixtures are available also.

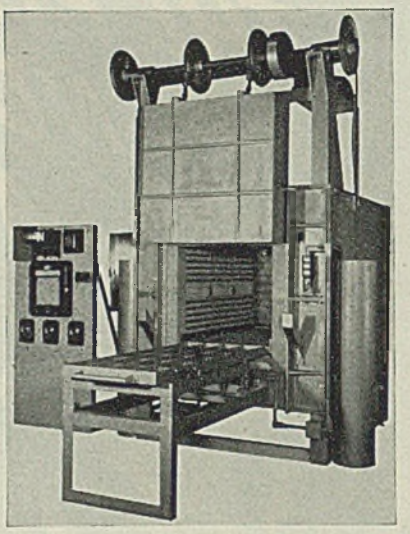


Heat Treating Furnace

H. O. Swoboda Inc., Thirteenth street, New Brighton, Pa., is offering a new type BRP-A Falcon heat treating box-type furnace suitable for continuous operating temperatures up to 2000 degrees Fahr.

Originally designed for stress relieving, the unit is now offered for all general heat treating applications, in chamber dimensions up to 30 inches square by 4½ feet deep.

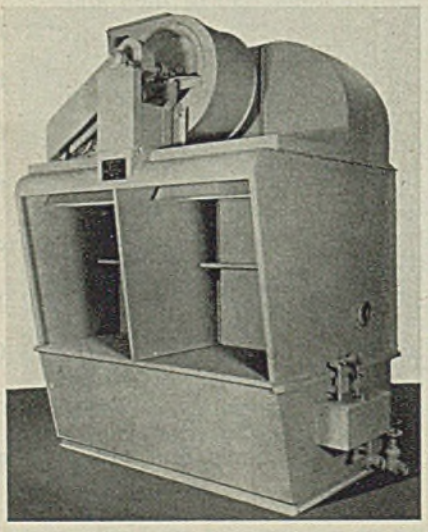
The furnace is equipped with a movable loading platform for charging and discharging. It features a push-button controlled, motor-operated door opening and closing mechanism. A heater cut-out feature automatically connects and disconnects the furnace upon door opening or closing.



The furnace is equipped with precision controls which permit accurate temperature selection and maintenance, latter being aided by the well-placed insulation. Standard equipment includes on-off type pyrometer control with input regulator for varying the input to secure any desired heating, holding and cooling program. An added feature of the furnace is its time clock installation for turning on equipment at any predetermined time, such as overnight or over the weekend.

Dust Collector

Industrial Equipment Corp., Detroit, announces another new dust collector for processing magnesium. It is reported to be efficient even though it has only one mechanical moving part—a fan unit.

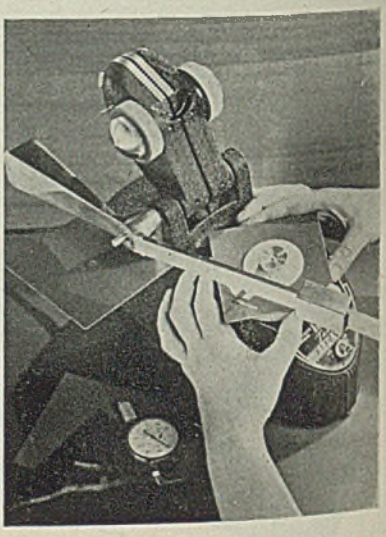


The collector, in action, draws dust-laden air through an orifice causing a violent spray of water. Next the dust is "water-whirled" out of the air and is knocked down into a tank below, where it forms a sludge. Since operation of the Hydro-Whirl permits the cleaned air to be returned to the room, heat loss is slight.

Shear Hardness Unit

Taber Instrument Corp., North Tonawanda, N. Y., announces a new shear-hardness attachment for its Taber Abraser which provides an accurate method to measure the toughness quality of surface finishes and their ability to resist digs, scrapes and similar abuse from actual service not considered normal wear.

In use, a weight slides along the calibrated beam of the unit until it is finally located in the position where the correct load permits the tool point to cut a groove in the surface finish without digging through to the base plate.



Several grooves are made in the surface and the most representative one is selected to measure to the nearest thousandth of an inch. A special micrometer is furnished to make the measurement.

The shear-hardness of the specimen is calculated by taking the reading from calibrated beam at the forward edge of the adjustable weight which together with the width of the groove determines the result by using a mathematical formula.

Only a small 4-inch square sample is required to make this quick test. In addition, the Abraser accurately evaluates resistance of surface finishes to rubbing abrasion.

DOW

Flight of planes always suggests the release of unfettered power. No material used in aircraft construction has done more to free these essential weapons of war from hampering weight than magnesium. An equal amount of *even any comparable light structural metal* would weigh 50 per cent more! Today Dow magnesium production capacity is many times greater than pre-war facilities provided. After Victory, designers will have full access to this vast production to lighten the load of practically everything that moves.

DOWMETAL

BONDS BUILD BOMBERS

THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

MAGNESIUM

PRODUCER SINCE 1916

INGOTS · CASTINGS · FORGINGS · SHEET · STRIP · PLATE · EXTRUSIONS

1000-Pound Bombs

(*Concluded from Page 77*)

high temperature for the required period.

Coming white-hot from the furnace, they are quenched to harden them, so that they can tear through steel or bricks when released from a high-flying aircraft. Then fittings for attaching them to bomb racks are welded on.

An attachment is threaded into the bomb's nose for a grip and by it the bomb is raised on a monorail overhead conveyor where it is carried along like a pig hung from its nose in a slaughterhouse. The conveyor carries the bombs slowly through a paint booth, then through a drying chamber, while inspectors poke their electric lights inside, examining them thoroughly both inside and out.

Now the bombs are nearing the end of the line. Steel stampings are attached to the outside of the bomb, protecting machined and threaded surface on nose and tail in handling and shipping to the loading plant.

The bombs are only a part of the company's war effort, though, for it makes numerous other steel war products—aircraft landing mats now seeing service in all parts of the world, portable steel bridges, tank and truck treadways, tool brackets for military vehicles and scores of other products.

Plug Welding

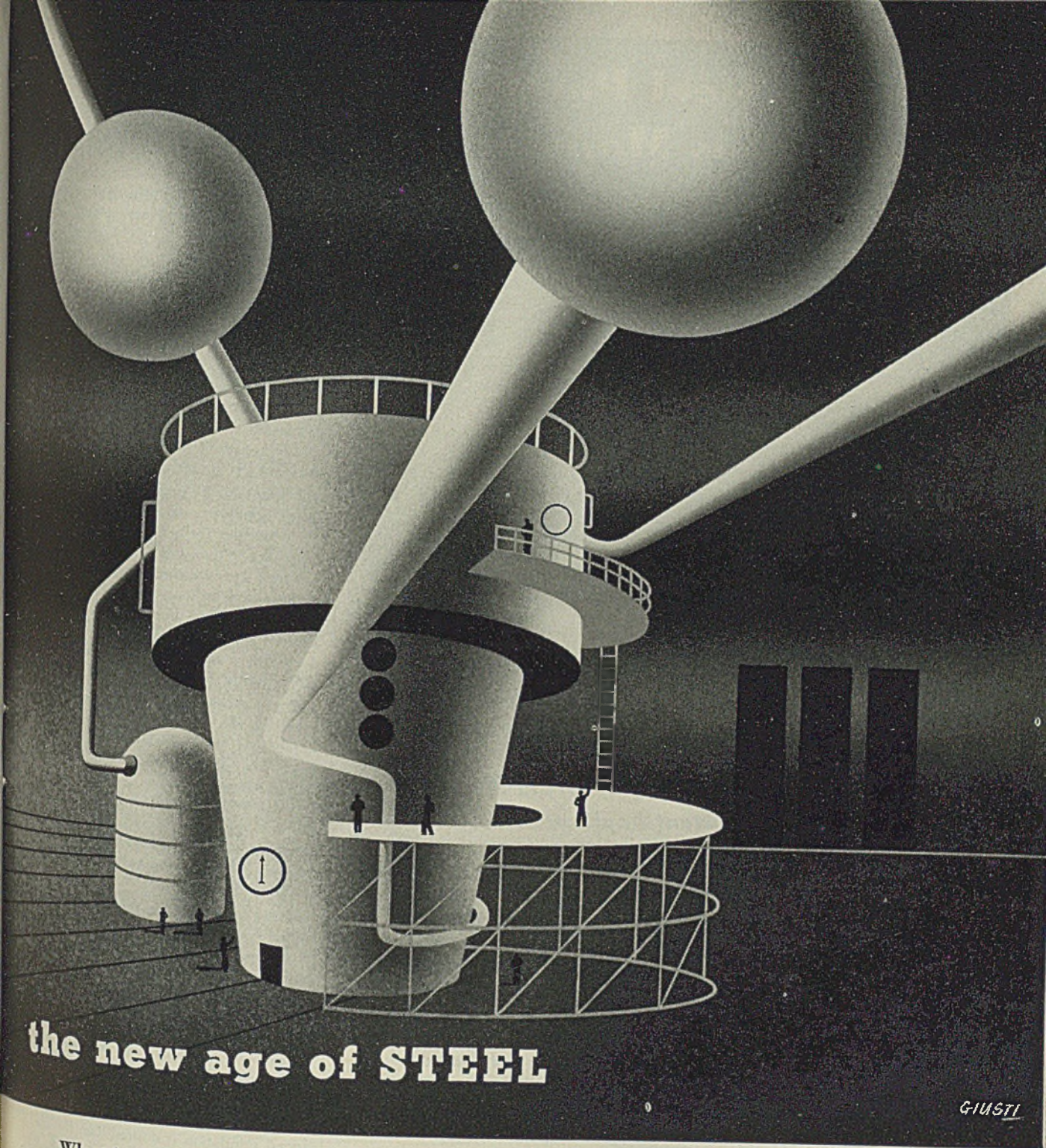
(*Concluded from Page 98*)

plug weld, the approximate amount of heavily coated rod required to fill each plug and the approximate amount of time required to make the plug weld if it is made in two passes with time allowed for chipping the weld flux from the first pass before welding the second pass. Table III includes sketches of the various types of plug welded joint with the recommended sizes of batten or angle for each size of plate joined.

New Type Lubricant Increases Saw Life

Scoring of narrow band saws can be reduced to a minimum with the use of a new lubricant, saw Eez, developed recently by Doall Co., Des Plaines, Ill. The lubricant, which is packaged in a metal tube, is reported to help increase the life of saws as much as four times. It also is stated to provide a smoother cut leaving a clean machined surface on the face of the cut.

Lubricant is applied while saw is in motion to both sides of the blade. A new application is required after each 4 or 5 square inches of contour cutting.



What is this giant of steel? . . . We do not know. It is a creation of tomorrow. . . . It may stamp new forms from a still unknown plastic, perform some Herculean task in post-war chemistry, bend the toughest of modern metals to pliant usefulness. . . . But this we know: that the creative genius of Midvale will give it strength as it has been doing with pioneering steel-making for three-quarters of a century.

MIDVALE

Custom Steel-Makers to Industry

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Machine Tool Drive

(*Continued from page* 104)

largely a function of the size and type of motor employed. The range, theoretically, is something from a value approaching zero up to the maximum for which the motor is designed to operate by field weakening. Practical limits are largely determined by the heating and stability of the motor.

From tests which have been made, it appears that the motors can be operated over a range of up to 20 to 1 below base speed by armature control on an intermittent basis without exceeding a dangerous temperature rise, and as high by field control as the motor is designed to operate. Much, however, depends upon the nature of the load to be handled, the duty cycle, and the like.

Regulation: By providing closely regulated armature voltage and automatic compensation for resistance-current (RI) drop, this system holds the motor speed constant within close limits, independent of load and ordinary line-voltage variations. Control in the panel makes it possible to adjust the regulation to provide a drooping speed characteristic where this is desirable.

For a given speed setting, the equipment can be adjusted to hold the regulation to a value of approximately 2 per cent variation from no load to full load when operating below the basic motor speed. When the motor is operating in the field weakening range, the speed will decrease with load to a value not exceeding 10 per cent depending upon the rating of the drive.

The close regulation provided with the system makes it possible to operate the motor on a constant torque basis below base speed at any speed within the stable operating range. *This means that it is possible to get a motor to operate at some low speed such as* 100 *revolutions per minute, for example, and maintain this within close limits even though the load may vary from no load to full load.*

For applications where a more precise speed regulation is desired than that obtained with the standard equipments, it is possible to use the output voltage of a tachometer generator in the circuit and obtain *a speed regulation on the order of plus or minus ½ per cent from no load to full load.* This arrangement provides exceptionally close regulation regardless of line voltage variation. Certain types of testing equipment often demand regulation of this low magnitude.

The system will operate successfully on line-voltage variations of as much as 10 per cent of rated value. But to obtain maximum tube life, the variation should not exceed plus or minus 5 per cent. Tests within this range have in-

Helpful Literature

1. Thread Grinding

Ex-Cell-O Corp.—44-page illustrated manual No. 481212 is entitled, "Selected Thread Systems, Forms and Measurements." Practical data are given for use in precision thread grinding operations. Theoretical or nominal standard sizes from which tolerances are allowed for machining and fitting purposes are listed.

2. Sharpening Taps

Greenfield Tap & Die Corp.—8-page illustrated folder, "How To Sharpen Taps," is No. 2 in series of folders on taps and tapping. Step-by-step procedure for correct sharpening of taps is explained and shown by sketches.

3. Abrasive Products

Carborundum Co.—16-page illustrated bulletin No. A-1002 describes coated abrasive products which are designed for production grinding, finishing and polishing operations. Among products covered are "MX" wheels which are fabricated from cotton fibers mixed with graded grains of abrasives, coated abrasive discs, abrasive cloth cartridge rolls, multi-slotted discs, abrasive bands, abrasive belts and metal working cloth.

4. Roofs & Siding

American Steel Band Co., Felt-Cote division —26-page illustrated catalog discusses "Felt-Cote" asbestos-protected metal roofs and siding for industrial buildings. Applications of these metals to all types of structures are shown. Large diagram gives details of construction using various types of roofs and siding.

5. Zinc Production

American Zinc Institute Inc.—28-page illustrated bulletin, "Zinc in Wartime," gives pictorial portrayal of military and essential civilian equipment in which zinc is used. The application of zinc alloys and products containing zinc are shown and discussed.

6. Industrial Trailers

Easton Car & Construction Co.—1-page illustrated bulletin No. 192 gives brief descriptions of various models of heavy duty trailers with capacities ranging from 10,000 to 30,000 pounds. Trailers are made in knuckle and fifth-wheel steer types and may be fitted with solid pneumatic rubber tires.

7. Single-Crank Presses

E. W. Bliss Co.—24-page illustrated catalog No. 9 describes "Bliss, Toledo and Consolidated" line of straight side single-crank presses ranging in capacity from 30 to 2500 tons. Except in smaller sizes these machines are built with four-piece tie-rod frames consisting of bed, two uprights and crown. Complete specifications are given on all models.

8. Aluminum Alloys

Aluminum Company of America—16-page illustrated technical paper No. 7, "Identification of Constituents of Aluminum Alloys," contains practical information for determining make up of various alloys. Micrographs of various constituents encountered in aluminum alloys are shown.

9. Conveyors

Alvey Conveyor Manufacturing Co.—8-page illustrated bulletin, "Winning the Battles of Production," shows installations of various types of "Amco" conveyors in shell making, motor assembly, aircraft and similar industries. Specifications are given on standard conveyor rollers.

10. Phillips Screw Drivers

Apex Machine & Tool Co.—8-page illustrated catalog No. 15 covers power bits and hand drivers for Phillips recessed head screws. Specifications are given on tools for wood screws, stove bolts, machine screws and sheet metal screws. Various types of power bits and hand screw drivers are shown.

11. Aluminum Bronze

Ampco Metal Inc.—Engineering data sheets Nos. 105, 106, 107, 109 and 111 contain engineering information related to use of aluminum bronze in various types of applications. These data sheets are published monthly and contain pertinent information on "Ampco Metal."

12. Universal Drill Attachment

Kett Tool Co.—4-page illustrated folder on Model KUFS-5 universal drill attachment describes this device for use with pneumatic or electric drill. Primarily designed for aircraft production, this device is available with or without flexible shaft and is adaptable for drilling operations within restricted areas in all types of work.

13. Testing Machines

Baldwin Southwark, division of Baldwin Locomotive Works—40-page illustrated bulletin No. 161 is descriptive of "Southwark Tate Emery" testing machines and allied equipment. Complete details are given on universal testing, standard testing, cement testing and special machines. Accessories, grips and other testing tools are described.

14. Coated Steel

Apollo Metal Works—1-page data sheet discusses various types of electro coated steels. Both purpose and applications are tabulated for zinc, copper, brass and nickel coated steel which is available in preplated strip form.

15. Air Filters

R. P. Adams Co., Inc.—4-page illustrated bulletin No. 104 shows design and operation of "Poro-Stone" air filters for removing oil, water and pipe scale from compressed air. Various designs and application of this equipment are shown.

16. Compressors & Vacuum Pump

Allis-Chalmers Manufacturing Co.—20-page illustrated bulletin No. B-6211 describes "Ro-Flo" compressors and pumps of slide vane type. These units operate at 1200 or 1800 revolutions per minute, and require simple foundations. Engineering data are supplemented by installation diagrams, pressure curves and sectional views.

17. Polishing & Buffing

Divine Brothers Co.—Illustrated catalog, "Polishing and Buffing", discusses disc buffs, polishing wheels, glue and glue equipment, polishing and buffing lathes, polishing machines and special machinery. Complete specifications are given on all machines and equipment.

18. Fire Extinguishers

Cardox Corp.—4-page illustrated bulletin is descriptive of Cardox fire extinguishing systems for quench tanks. These systems will extinguish tank fires without damaging equipment or contaminating contents of tank. Details of installations are shown.

19. Machine Drives

American Pulley Co.—36-page illustrated bulletin No. ED-42 contains blueprints, drive selection tables and dimensions of various types of "Econ-O-Matic" drives. In addition to covering V-belt and flat-belt drives, data are included on motor base mountings for special applications.

20. Springs

Accurate Spring Co.—16-page illustrated data book contains detailed information for those who specify, inspect and purchase springs. Engineering data are given on spring design, wire diameters, commercial tolerances and wire specifications.

21. Colloidal Graphite

Acheson Colloids Corp.—4-page illustrated bulletin No. 423-AZ discusses use of "dag" colloidal graphite as a high temperature lubricant. Properties of this material which make it suitable for high temperature applications are discussed. Case study information is given on use of colloidal graphite for foundry oven conveyors, kiln cars, hot punches, piercing tools, forging dies and similar equipment.

STEEL *Readers' Service Dept.*

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22. Industrial Ovens

Industrial Oven Engineering Co.—18-page illustrated bulletin, "Blueprint for Industry," contains detailed engineering information on high production convection heated ovens for batch and continuous heating processes for armament production. This equipment is adaptable to processes in temperature field below 1200 degrees Fahr. Various types of ovens are shown in sectional drawings.

23. Copper Alloys

American Brass Co.—32-page illustrated publication No. B-3 is entitled, "Practical Suggestions for Machining Copper, Brass, Bronze and Nickel Silver." Detailed information is given on cutting tool materials, cutting feeds and speeds, tool rakes and clearances. All data are presented in ready usable form.

24. Fire Extinguishers

American-LaFrance-Foamite Corp.—Two fire extinguisher charts show operating characteristics of hand fire extinguishers and wheeled engines. Various types of extinguishers are listed and their ability to handle different fire hazards are covered. Complete data are given on all types of extinguishers.

25. Hard-Facing Rods

Coast Metals, Inc. — 12-page illustrated bulletin tabulates properties of "Coast Metals" hard-facing weld rods, which are available in many compositions to withstand mechanical wear, abrasion, impact, shock and heat. Examples of performance in various applications are shown. Recommended types for different hard-facing applications are tabulated.

26. Protective Coating

Chicago Vitreous Enamel Product Co.—4-page illustrated bulletin on "Armor-Vit" coating discusses this protective material which affords resistance to rust, corrosion, heat, impact, abrasion, acids and alkalies. Coating may be applied to metal parts by spraying or dipping. Finish will withstand 200-hour salt spray tests repeatedly and temperatures up to 1200 degrees Fahr.

27. Abrasive Products

Bay State Abrasive Products Co.—4-page illustrated bulletin entitled, "For Refined Surface Finishing and Internal Honing," gives recommendations on refined surface finishing products, internal honing stones and wheels for superfinishing and micro-finishing operations. Typical products are shown.

28. Pneumatic Equipment

Curtis Pneumatic Machinery Co.—28-page illustrated booklet No. C-60 is entitled, "How Air Is Being Used In Your Industry." Application of air compressors, air hoists, hydraulic cylinders, paint spray units, air hose and fittings in 45 different industries are tabulated.

29. Metal Baskets

Buffalo Wire Works Co., Inc.—4-page illustrated bulletin No. 595 describes typical shapes and sizes of baskets which are fabricated from wire, wire cloth or flat expanded metal. Baskets are available for such operations as annealing, cleaning, dipping, drying, plating, galvanizing, pickling and materials handling. Various compositions are available to withstand specific conditions.

30. Motor Standards

Dumore Co.—28-page illustrated booklet covers "American Electrical Standards for Fractional Horsepower Motors." AIEE, ASME, Nema, Underwriters' Laboratories, Department of Commerce, Bureau of Standards, U. S. Navy and U. S. War Department standards are briefly covered. Definitions of terms and motor parts, speed and duty classifications as well as motor types are included.

31. Purchase Records

Diebold Safe & Lock Co.—12-page illustrated bulletin on "Diebold" record systems discusses "Cardineer," "Reveldex," "Savasort" and records storage files. Use of these business tools for commodity records, delivery records, expediting, follow-up, order sorting, purchase records and sources of supply are discussed.

32. Molded Rubber Goods

B. F. Goodrich Co.—8-page illustrated catalog section No. 7020 is written in question and answer form and is intended to supply practical information for guidance in use, application and development of rubber parts molded to fit specific industrial requirements. Molds, mold cavities, mold costs, materials for molds, tolerance limits, attachment of rubber to other metals in molding and various shapes of molded articles are discussed.

33. High Temperature Fans

Despatch Oven Co.—12-page illustrated bulletin No. 78 is descriptive of heavy duty high temperature fans which are designed for operation in temperatures up to 1600 degrees Fahr. These fans are available in capacities ranging from 400 to 17,000 cubic feet per minute. Design permits mounting in 16 standard outlet positions without special construction.

34. Automatic Machines

Cone Automatic Machine Co., Inc.—112-page illustrated, "Handbook for Operators," contains complete instructions for operation of six spindle "Conomatics." Each operation is explained in detail and pictures are used for emphasizing instructions.

35. Rotary Drum Miller

Davis & Thompson Co.—4-page illustrated bulletin gives specifications and shows design features of No. 1-A continuous rotary drum type miller. This machine is intended for small, high production milling operations.

36. Abrasive Cloth Products

Behr-Manning division of Norton Co.—8-page illustrated booklet, "Blueprint for Fas Better Production," discusses design and ap cation of ready-to-use "Metalite Cloth" pr ucts. Sizes and list prices are given on "Spi bands," "Spirabelts," "Spirapoints," "Spi cords," slotted discs, sanding pads and di and special products. These coated abrasi are adaptable for grinding, finishing, burr and similar operations.

37. Turret Lathes

Gisholt Machine Co.—6-page illustrated fo er No. 1089 is descriptive of Model 3H a Model 4R turret lathes which are available 28½ and 31-inch swing over ways, respectiv Both machines have wide range of spin speeds, longitudinal feeds and cross fee Standard tools are available for many types work.

38. Tool Shanks

Cooper-Bessemer Corp.—12-page illustrat bulletin No. 53T-2 describes broad line "Victory" tool shanks. Shanks, cast to sha from Mechanite metal, are designed for tippi with carbide. Standard sizes, dimensions, a quantity prices are given for both straight a bevel-nosed tools.

39. Low Temperature Welding

Eutectic Welding Alloys, Inc.—36-page lustrated bulletin on "Castolin Eutectic Lo Temperature Welding" discusses this joini process. Low temperature welding alloys a their fluxes are designed for use with ox acetylene, gas torches, metallic arc, carbo induction, resistance and furnace welding met ods. Procedures are discussed for joining ma types of metals.

40. Manufacturing Facilities

Fidelity Machine Co.—44-page illustrate bulletin, "31 Years' Experience," shows facilitie of this company for designing and building i tricate, automatic precision machines for bo light and medium duty applications. Engi neering, design, drafting, testing, machine too and typical machines are illustrated.

41. Wrought Iron Welding

A. M. Byers Co.—20-page illustrated i structive manual is entitled, "The Weldin and Flame Cutting of Wrought Iron." Var ous types of welding procedures as applied t wrought iron are discussed. Physical prop erties of welds are tabulated. In addition flame cutting and flame descaling of wrough iron products are described.

42. Explosive Rivets

E. I. du Pont de Nemours & Co.—8-pag illustrated bulletin is entitled, "How to Use d Pont Explosive Rivets for High-Speed Blin Riveting." Complete information is given o selection of proper size and type of rivet, pre paring rivet holes, handling, storing and expand ing, and use and maintenance of riveting iron

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dicated that when operating over a range of from 5 per cent of base speed up to 2 to 1 by field control, the speed will not vary more than about plus or minus 1 per cent.

Tube Failure: One important consideration with any electronic equipment is the question of what will happen if one or more of the tubes should fail. In this system, the circuits have been so designed that the equipment is entirely safe regardless of which tube or combination of tubes may fail. The equipment will either shut down instantly or will continue to operate, deprived of the function of the tube which fails.

Principle of Operation: From Fig. 2 it can be seen that a pair of tubes (No.'s 1 and 2) constitutes a full-wave rectifier which converts to direct current the alternating current supplied by the anode transformer. The direct current is then fed to the motor armature. Likewise, tubes 3 and 4 make up a full-wave rectifier, which supplies direct current to the shunt field of the motor. By varying the output of these two rectifiers, it is possible to control the operation of the motor. Its speed can be varied from zero, by armature-voltage control, up to maximum for which the particular motor is designed to operate by field weakening.

Electronic Control Circuits: The output of the power rectifiers is varied in a group of radio-type control tubes, whose basic circuit is shown in Fig. 3. Acting as amplifiers of current and voltage signals received from the motor circuit, these tubes supply the necessary direct current to the saturating winding of the saturable-core reactor in the resistance-reactance bridge which is used to vary the output voltage of the power rectifiers by the phase-shift method previously described.

By changing or varying the current in the saturating winding, the power tubes are turned on or off in the amount required to give the desired motor performance.

To provide for the current-limit acceleration of the motor, a current transformer, T5, is used. This has two primary windings connected in the anode circuit of the two power tubes supplying current to the motor armature. The design is such that an alternating-current voltage is produced in the secondary, proportional to the current flowing through the thyratron tubes. The alternating-current voltage is rectified and introduced into the circuit in such a way that when it reaches a value determined by the potentiometer setting, it will have the effect of turning off the armature tubes, thus reducing the voltage on the armature and maintaining the current at a fixed maximum value.

If the control had been set to operate

the motor in the field-weakening range the current-limit control acting through a suitable tube will maintain full field until the armature current starts to reduce.

During acceleration under these conditions, the motor will always accelerate from zero to base speed with full field. At this point, the field will be weakened gradually until the motor reaches the preset field-weakened speed. Then the armature current will drop to the value necessary to drive the load.

The speed is set by two adjustable potentiometers—one controls armature voltage, the other controls field voltage. The potentiometers are operated from a single shaft and are arranged so that approximately half of the rotation of the adjusting knob will vary the armature voltage from approximately zero to maximum. Then the other potentiometer becomes effective, and further turning will tend to reduce the field voltage so that the motor speed can be increased to the value desired, up to the maximum for which the particular motor is designed to operate by field weakening.

Motor Starts Fast, Smoothly

To maintain accurately the preset speed, it is necessary to hold armature counter-electromotive force at a constant value. This can be done by increasing the armature terminal voltage by an amount equal to the current-resistance (IR) drop of the armature circuit. In this system, this is accomplished through the use of the same current transformer that controls the current limit. The circuit functions in such a manner that as armature current increases, the thyratrons in the armature circuit are turned on, thus increasing the armature voltage. If the load increases, the circuit operates to increase the armature voltage proportionally, which thus acts to maintain the speed at its preset level. An adjustable potentiometer used in the circuit makes it possible to maintain essentially constant speed from no load to full load for any given speed setting, or to provide a drooping speed characteristic where desirable.

When the start button is pressed, the motor will be accelerated rapidly and smoothly by current limit as described above until it reaches a speed corresponding to the setting of the speed-adjusting potentiometer. The motor will then maintain this speed closely, irrespective of variations in load, within the limits of the IR-drop-compensation feature.

When the stop button is again pressed, the anode contactor will be dropped out and a resistor will be connected across the armature to bring the motor to a quick stop as full field is applied.

The substitution of a magnetic-revers-

ing switch for the anode contactor makes it possible to reverse quickly the direction of rotation by current-limit regeneration of the motor. This feature is of particular value on certain applications.

Operating Characteristics: When the motor is operating at speeds below basic, during which it has full-field voltage and reduced-armature voltage, it will provide constant torque. The horsepower output will decrease in proportion to the decrease in speed.

When operating at speeds above basic, during which it has full-armature voltage and reduced—field voltage, the motor will provide constant horsepower and reduced torque output. This is illustrated in Fig. 6 which shows the torque and horsepower curves for the full operating range.

Fig. 6 in addition illustrates how the speed is increased by armature voltage as the speed adjusting potentiometer is turned from zero to midposition, and how the motor operates by field weakening from midposition to the point where the knob is turned to the extreme clockwise position.

NAM Urges Foremen Be Given Management's Views

A "check-sheet" of recommended procedures in the supervisory field which management is urged to follow in order to build sound management-supervisory relations was made public recently by National Association of Manufacturers, New York.

Procedures were outlined in a 16-page pamphlet, entitled, "The Foreman, the Key Man in Your Plant." In announcing this pamphlet, C. Donald Dallas, president of Revere Copper & Brass Co., New York, and chairman of NAM's industrial relations policy committee, stated that it was the result of an extensive study by a special subcommittee.

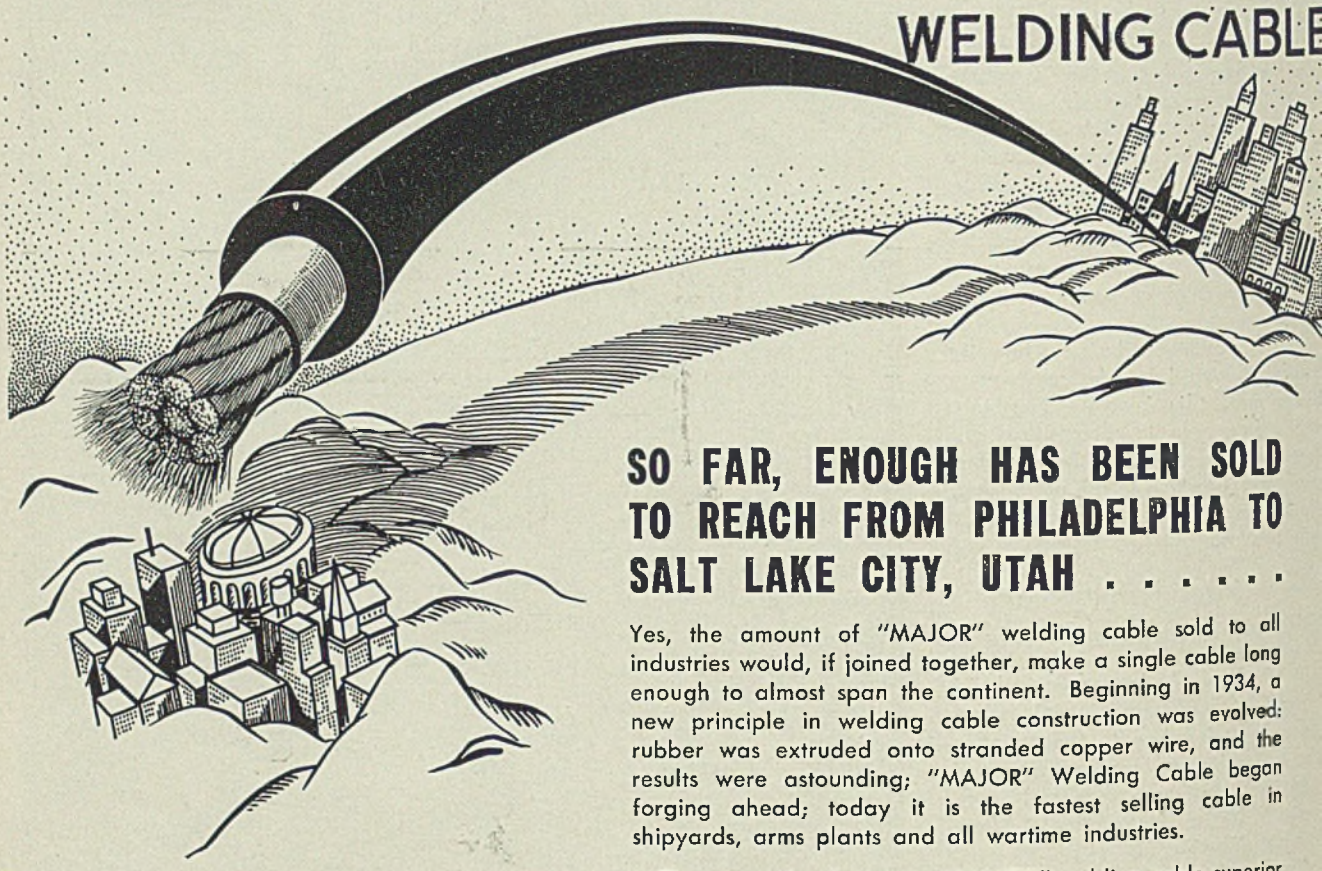
"The supervisor today must exercise leadership under pressure," Mr. Dallas said. "In carrying out their jobs, foremen require authority consistent with their responsibilities.

"As an example, the foreman should have the right to approve applicants for employment whose work he must supervise; he should have the right to advocate discharge of employes; and he should be held responsible for the maintenance of satisfactory employment relations in the group he supervises.

"The foreman should normally be the first contact for workers who have grievances they wish to discuss."

Mr. Dallas said that a canvass of plants where good management-supervisory relations were enjoyed showed that seniority rules and practices should not govern the selection for supervisory positions.

"MAJOR" *rubber covered super-flexible* WELDING CABLE



SO FAR, ENOUGH HAS BEEN SOLD TO REACH FROM PHILADELPHIA TO SALT LAKE CITY, UTAH . . . . . .

Yes, the amount of "MAJOR" welding cable sold to all industries would, if joined together, make a single cable long enough to almost span the continent. Beginning in 1934, a new principle in welding cable construction was evolved: rubber was extruded onto stranded copper wire, and the results were astounding; "MAJOR" Welding Cable began forging ahead; today it is the fastest selling cable in shipyards, arms plants and all wartime industries.

The properties that make "MAJOR" welding cable superior to all other brands, according to a recent study, are: extreme flexibility, durability, resistance to abrasion, toughness and low cost. Repeat orders from Britain, the U. S. Navy, independent shipyards and war industries bear out these statements.

PROMPT SHIPMENTS FROM STOCK!

SPECIFICATIONS

Size	Amps.	Strands	O.D.	I.D.	Wt. in lbs. per M ft.
6	75	950	.400	.210	132
4	125	1029	.495	.275	202
3	150	1323	.500	.305	235
2	200	1666	.560	.335	295
1	250	2156	.625	.400	373
1/0	300	2646	.675	.440	450
2/0	375	3381	.750	.490	570
3/0	450	4284	.815	.545	705
4/0	550	5376	.900	.635	860

Copper conductor consists of fine bare wires, properly stranded to give extreme flexibility.

A separator is applied over the conductor to strip rubber in order to leave bare copper for quick, clean attaching to lugs for electrode holders.

Rubber jacket has high tensile strength, maximum abrasion resistance. It is tough, durable, waterproof and extremely flexible.

WELDING ENGINEERING COMPANY

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Livelier Steel Demand Appears in Some Lines

Month-end flurry in plates developing. . . Long-range contracts carry more certainty under CMP. . . Shipbuilding supports shape and pipe demand. . . Wire backlogs grow

DEMAND
Exceeds production.

PRODUCTION
Up ½-point to 99 per cent.

PRICES
No variation.

STEEL demand is livelier, particularly in sheets, bars and plates and to some extent in seamless and lap weld pipe and wire specialties, while shape and reinforcing bar inquiry continues to lag.

In plates, demand is expected to accelerate as the end of the month approaches. Most plate producers have capacity still available for July rolling, with a number of consumers yet to take action if they desire to get on July schedules. A month-end flurry is expected each month under CMP, as has been the case in the past.

Consumers must keep inventories down to 60 days requirements and will be disposed in many cases to wait until late before actually placing specifications. At the same time some orders are being placed several months in advance with CMP allotment numbers accompanying them. Orders for delivery well into the future have been placed in the past but never with quite the certainty of fulfilment that is now the case. Usually there was the question whether Washington would approve the orders when schedules were set up to accomplish the delivery. The allotment number now definitely indicates WPB approval.

• • •

Demand for shipbuilding continues to dominate the market for structural material, subcontractors working on assemblies and accessories taking a large tonnage. This outlet calls for light sections in the main, lack of building and bridge construction limiting demand for heavy beams.

The pipe and tube market also depends heavily on shipbuilding for support, especially in the East. Deliveries extend into September and October on most sizes of seamless, with smaller diameters slightly easier. Boiler tubes can be promised by most makers not earlier than late third quarter and in some cases beyond. The rubber and high-test gasoline programs are bringing out heavy requirements. Aircraft purchases of tubing are heavy. Some mills can ship butt weld pipe in three weeks but some sizes of lap weld are deferred to August.

Deliveries on steel bars are lengthening and bessemer bars can not be obtained much sooner than open-hearth. At the same time restrictions on semifinished steel results in some bar mill capacity being idle. Some small sizes can be booked for July shipment but large sizes generally are extended into September, with some small lots taken for August rolling. For long-range programs, including shipbuilding, schedules in some cases have been fixed and allotment numbers made definite into February. Orders for floor plates for ships have been entered for first quarter delivery.

Wire backlogs are increasing as demand exceeds production on many items, mainly specialties. On most active products many mills are sold through third quarter. Some CMP tonnage for later delivery is being entered tentatively, as definite details as to sizes and specifications often are lacking. Part of this volume extends into first quarter. Nail demand is irregular but heavy, smaller needs for building being balanced by other requirements. Demand for wire rope in connection with shipbuilding has built up backlogs of as much as four months with some rope mills.

• • •

Steelworks operations last week gained ½-point to 99 per cent of capacity. Changes were slight, four districts gaining, two declining and six holding steady. Cleveland gained 2 points to 96 per cent, Wheeling 5½ points to 93, Youngstown 2 points to 97 and Cincinnati 2 points to 94. Chicago dropped ½-point to 96½ and eastern Pennsylvania 1 point to 95. Unchanged rates were: Buffalo, 90½; St. Louis, 90; Pittsburgh, 99; Birmingham, 100; New England, 95; Detroit, 96.

Pig iron production in April totaled 5,035,178 net tons, compared with the all-time production of 5,314,201 tons in March. Production for four months this year totaled 20,326,130 tons, compared with 19,421,340 tons in the corresponding period last year.

One of the most important factors in the scrap situation is the fact that consumers generally note improved quality of offerings. After a period during which tonnage collected in the household drive was predominant in shipments, much of it light and of inferior quality, the scale has turned and industrial, railroad and agricultural material make most of current offerings. Floods in the Southwest have delayed shipments to the St. Louis district and late opening of navigation on the lakes and barge canal has cut down receipts in the Buffalo district, both temporary difficulties. In most areas supply is ample and reserves are being piled in most cases.

Average composite prices of steel and iron products are unchanged at Office of Price Administration ceilings. Finished steel composite is $56.73, semifinished steel $36, steelmaking pig iron $23.05 and steelmaking scrap $19.17.

COMPOSITE MARKET AVERAGES

	May 22	May 15	May 8	One Month Ago Apr., 1943	Three Months Ago Feb., 1943	One Year Ago May, 1942	Five Years Ago May, 1938
Finished Steel	$56.73	$56.73	$56.73	$56.73	$56.73	$56.73	$62.00
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	40.00
Steelmaking Pig Iron	23.05	23.05	23.05	23.05	23.05	23.05	23.05
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	11.60

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	May 22, 1943	April, 1943	Feb., 1943	May, 1942
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	2.49	2.49	2.49
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.15	2.22	2.22	2.22
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pittsburgh	2.60	2.60	2.60	2.60
Tin plate, per base box, Pittsburgh	$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 ⅝-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron	May 22, 1943	April, 1943	Feb., 1943	May, 1942
Bessemer, del. Pittsburgh	$25.19	$25.19	$25.19	$25.19
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern, del. Philadelphia	25.34	25.39	25.39	25.39
No. 2 fdry., del. Pitts., 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	24.30	24.30	24.30	24.06
No. 2X, del. Phila. (differ. av.)	26.215	26.265	26.265	26.265
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	31.54	31.54	31.54
Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.19
Ferromanganese, del. Pittsburgh	140.33	140.65	140.65	140.65

Scrap				
Heavy melting steel, Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke				
Connellsville, furnace, ovens	$6.50	$6.50	$6.40	$6.00
Connellsville, foundry, ovens	7.75	7.75	7.50	7.25
Chicago, by-product fdry., del.	12.25	12.25	12.25	12.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. All seconds and off-grade products also are covered. Exceptions applying to individual companies are noted in the table. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.

(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill.)

Alloy Steel Ingots: Pittsburgh, uncropped, $45.00.

Rerolling Billets, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $34.00; Detroit, del. $36.25; Duluth (bil.) $36.00.

(Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co. $41, Sterling, Ill.; Laclede Steel Co. $34, Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives.)

Forging Quality Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40.00; Detroit, del. $42.25; Duluth, $42.00.

(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points.)

Open Hearth Shell Steel: Pittsburgh, Chicago, base 1000 tons one size and section: 3-12 in., $52.00; 12-18 in., $54.00; 18 in. and over, $56.00.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54.00.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—9/32 in., inclusive, per 100 lbs., $2.00.

Do., over 9/32—47/64-in., incl., $2.15. Worcester add $0.10; Galveston, $0.27. Pacific Coast $0.50 on water shipment.

Bars

Hot-Rolled Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Detroit, del. 2.27c; New York del. 2.49c; Phila. del. 2.47c; Gulf Ports, dock 2.52c, all-rail 2.59c; Pac. ports, dock 2.80c. (Phoenix Iron Co., Phoenixville, Pa., may quote 2.35c at established basing points. Joslyn Mfg. Co. may quote 2.35c, Chicago base. Calumet Steel Division, Borg Warner Corp., may quote 2.35c, Chicago base, on bars produced in its 8-inch mill.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.

(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.82c.

(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.55
		(.20-.30 Mo)	0.60
2300	1.70	4340	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.70	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.47c.

Turned, Ground Shafting: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c; Detroit 2.72c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, base 2.15c; Detroit, del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.

(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.)

Iron Bars: Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.22c; Phila. del. 2.27c; New York del., 2.34c; Pacific ports 2.65c.

(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.17c; New York del. 3.39c; Phila. del. 3.37c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.74c; Phila. del. 3.67c; Pacific ports 4.05c.

(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c.

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 grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	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. 2.22c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.92c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Worcester base 3.35c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box $4.50.

Tin Mill Black Plate. Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c.

Manufacturing Ternes: (Special Coated) 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; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16.00; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.29c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.47c. (Granite City Steel Co. may quote carbon plates 2.35c, f.o.b. mill. Central Iron & Steel Co. 2.20c, f.o.b. basing points.)

Floor Plates: Pittsburgh, Chicago, 3.35c; Gulf ports, 3.72c; Pacific ports, 4.00c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c.

Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.27c; Phila., del., 2.215c; Gulf ports, 2.47c; Pacific ports, 2.75c. (Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.30c at established basing points and 2.50c, Phoenixville, for export.)

Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester):

Bright basic, bessemer wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c

Wire Products to the Trade:

Standard and Cement-coated wire nails, polished and staples, 100-lb. keg	$2.55
Annealed fence wire, 100 lb.	3.05
Galvanized fence wire, 100 lb.	3.40
Woven fence, 12½ gage and lighter, per base column	.67
Do., 11 gage and heavier	.70
Barbed wire, 80-rod spool, col.	.70
Twisted barbless wire, col.	.70
Single loop bale ties, col.	.59
Fence posts, carloads, col.	.69
Cut nails, Pittsburgh, carloads	$3.85

Pipe, Tubes

Welded Pipe: Base price in carloads to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
⅛	56	33	⅛	24	3½
¼ & ⅜	59	40½	¾	30	10
½	63½	51	1-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
2	61	49½	1¼	23	3½
2½-3	64	52½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-10	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O. D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2¼"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., .f.o.b. mill, gross ton, $40.00.

Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $40.00.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $28-$30.

Supplies: Angle bars, 2.70c; tie plates, 2.15c; track spikes, 3.00c; track bolts, 4.75c; do. heat treated, 5.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

High Speed Tool Steels:

Tung.	Chr.	Van.	Moly.	Pitts. base, per lb.
18.00	4	1	-	67.00c
1.5	4	1	8.5	54.00c
	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

CHROMIUM NICKEL STEEL

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
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
312...	36.00	40.00	49.00	.....	.....
*316...	40.00	44.00	48.00	40.00	48.00
†321...	29.00	34.00	41.00	29.25	38.00
†347...	33.00	38.00	45.00	33.00	42.00
431 ..	19.00	22.00	29.00	17.50	22.50

STRAIGHT CHROMIUM STEEL

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
440A	24.00	28.50	33.50	23.75	36.50
442..	22.50	25.50	32.50	24.00	32.00
443..	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

STAINLESS CLAD STEEL (20%)

304..	.....	§§18.00	19.00	....

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extras mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price, plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price. **Emergency basing point** is the basing point at or near the place of production or origin.

Seconds, maximum prices: flat-rolled rejects 75% of prime prices; wasters 75%, waste-wasters 65%, except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Bolts, 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., ⅝ 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
Step bolts	56 off
Plow bolts	65 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.

Nuts

Semifinished hex.	U.S.S.	S.A.E.
⅞-inch and less	62	64
½-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	..

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless, ¼-in., larger	60 off
No. 10, smaller	70 off

Piling

Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
⅞-inch and under	65-5 off
Wrought washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*6.50
Connellsville, foundry	7.50- 8.00
Connellsville prem. fdry.	7.75- 8.10
New River, foundry	8.50- 8.75
Wise county, foundry	8.00
Wise county, furnace	7.00

By-Product Foundry

Kearny, N. J., ovens	12.15
Chicago, outside delivered	11.50
Chicago, delivered	12.25
Terre Haute, delivered	12.00
Milwaukee, ovens	12.25
New England, delivered	13.75
St. Louis, delivered	†12.25
Birmingham, ovens	8.50
Indianapolis, delivered	12.00
Cincinnati, delivered	11.75
Cleveland, delivered	12.30
Buffalo, delivered	12.50
Detroit, delivered	12.25
Philadelphia, delivered	12.38

*Operators of hand-drawn ovens using trucked coal may charge $7.00, effective Feb. 3, 1943. †$12.75 from other than Ala., Mo., Tenn.

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	$29.20

Pig Iron

PIG IRON .....

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$25.00	$24.50	$26.00	$25.50
Newark, N. J., del.	26.53	26.03	27.53	27.03
Brooklyn, N. Y., del.	27.50	.....	.....	28.00
Birdsboro, Pa., base	25.00	24.50	26.00	25.50
Birmingham, base	†20.38	†19.00	.....	.....
Baltimore, del.	25.61	.....	.....	.....
Boston, del.	25.12	.....	.....	.....
Chicago, del.	24.22	.....	.....	.....
Cincinnati, del.	24.06	22.60	.....	.....
Cleveland, del.	24.12	23.24	.....	.....
Newark, N. J., del.	26.15	.....	.....	.....
Philadelphia, del.	25.46	24.58	.....	.....
St. Louis, del.	24.12	23.24	.....	.....
Buffalo, base	24.00	23.00	25.00	24.50
Boston, del.	25.50	25.00	26.50	26.00
Rochester, del.	25.53	.....	26.53	26.03
Syracuse, del.	26.08	.....	27.08	26.58
Chicago, base	24.00	23.50	24.50	24.00
Milwaukee, del.	25.10	24.60	25.60	25.10
Muskegon, Mich., del.	27.19	.....	.....	27.19
Cleveland, base	24.00	23.50	24.50	24.00
Akron, Canton, O., del.	25.39	24.89	25.89	25.39
Detroit, base	24.00	23.50	24.50	24.00
Saginaw, Mich., del.	26.31	25.81	26.81	26.31
Duluth, base	24.50	24.00	25.00	24.50
St. Paul, del.	26.63	26.13	27.13	26.63
Erie, Pa., base	24.00	23.50	25.00	24.50
Everett, Mass., base	25.00	24.50	26.00	25.50
Boston, del.	25.50	25.00	26.50	26.00
Granite City, Ill., base	24.00	23.50	24.50	24.00
St. Louis, del.	24.50	24.00	.....	24.50
Hamilton, O., base	24.00	23.50	.....	24.00
Cincinnati, del.	24.44	24.61	.....	25.11
Neville Island, Pa., base	24.00	23.50	24.50	24.00
§Pittsburgh, del. No. & So. sides	24.69	24.19	25.19	24.69
Provo, Utah, base	22.00	21.50	.....	.....
Sharpsville, Pa., base	24.00	23.50	24.50	24.00
Sparrows Point, Md., base	25.00	24.50	.....	.....
Baltimore, del.	25.99	.....	.....	.....
Steelton, Pa., base	.....	24.50	.....	25.50
Swedeland, Pa., base	25.00	24.50	26.00	25.50
Philadelphia, del.	25.84	25.34	.....	26.34
Toledo, O., base	24.00	23.50	24.50	24.00
Mansfield, O., del.	25.94	25.44	25.44	25.94
Youngstown, O., base	24.00	23.50	24.50	24.00

*Basic silicon grade (1.75-2.25%), add 50c for each 0.25%. †For phosphorus 0.70 and over deduct 38c. ‡Over 0.70 phos. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

High Silicon, Silvery

6.00-6.50 per cent (base)	$29.50		
6.51-7.00	$30.50	9.01- 9.50	$35.50
7.01-7.50	31.50	9.51-10.00	36.50
7.51-8.00	32.50	10.01-10.50	37.50
8.01-8.50	33.50	10.51-11.00	38.50
8.51-9.00	34.50	11.01-11.50	39.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Northern

Lake Superior Furn. $28.00
Chicago, del. 31.34
(For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn. $28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. 33.00

Gray Forge

Neville Island, Pa. $23.50
Valley, base 23.50

Low Phosphorus

Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.74, delivered, Philadelphia.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

Manganese Differentials: Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and Struthers Iron & Steel Co. may charge 25 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton, effective April 20, 1942. Chester, Pa., furnace of Pittsburgh Coke & Iron Co. may exceed basing point prices by $2.25 per ton, effective July 27, 1942.

Refractories

Per 1000 f.o.b. Works, Net Price

Fire Clay Brick

Super Quality

Pa., Mo., Ky. .....$64.

First Quality

Pa., Ill., Md., Mo., Ky. $5
Alabama, Georgia 5
New Jersey 5
Ohio 4

Second Quality

Pa., Ill., Md., Mo., Ky. 4
Alabama, Georgia 3
New Jersey 4
Ohio 3

Malleable Bung Brick

All bases .....$59.

Silica Brick

Pennsylvania $5
Joliet, E. Chicago 5
Birmingham, Ala. 5

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press $3
Wire cut 2

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk..... 2
net ton, bags 2

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick $5
Chem. bonded chrome 7
Magnesite brick 7
Chem. bonded magnesite 6

Fluorspar

FLUORSPAR .....

Washed gravel, f.o.b. Ill. Ky., net ton, carloads, all rail .....$25.00-28.
Do., barge ..... 25.00-28.
No. 2 lump ..... 25.00-28.

(Prices effective Nov. 23, 1942)

Ferroalloy Prices

Ferromanganese: 78-82%, carlots, gross ton, duty paid, Atlantic ports, $135; Del. Pittsburgh $140.33; f.o.b. Southern furnaces $135; Add $6 per gross ton for packed carloads $10 for ton, $13.50 for less-ton and $18 for less than 200-lb. lots, packed.

Spiegeleisen: 19-21%, carlots per gross ton, Palmerton, Pa. $36

Electrolytic manganese: 99.9% plus, less ton lots, per lb. 42.00c. Ton lots 40.00c. Annual contracts 38.00c.

Chromium Metal: Per lb contained chromium in gross ton lots, contract basis, freight allowed, 98% 80.00c, 88% 79.00c. Spot prices 5 cents per lb. higher.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, f.o.b. Niagara Falls, N. Y. $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: 66-70%; per lb. contained chromium in carloads, freight allowed, 4-6% carbon 13.00c; ton lots 13.75c; less-ton lots 14.00c; less than 200-lb. lots 14.25c. 66-72%, low carbon grades:

	Car loads	Ton lots	Less ton	Less 200 lbs.
2% C.	19.50c	20.25c	20.75c	21.00c
1% C.	20.50c	21.25c	21.75c	22.00c
0.20% C.	21.50c	22.25c	22.75c	23.00c
0.10% C.	22.50c	23.25c	23.75c	24.00c

Spot is ¼c higher

Chromium briquets: Contract basis in carloads per lb., freight allowed 8.25c; packed 8.50c; gross ton lots 8.75c; less-ton lots 9.00c; less 200-lb. lots 9.25c. Spot prices ¼-cent higher.

Ferromolybdenum: 55-75%, per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Calcium Molybdate (Molyte): 40-45%, per lb. contained molybdenum, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, 80.00c.

Molybdic Oxide Briquets: 48-52%, per lb. contained molybdenum, f.o.b. Langeloth, Pa., any quantity 80.00c.

Molybdenum Oxide: 53-63%, per lb. contained molybdenum in 5 and 20 lb. molybdenum contained cans, f.o.b. Langeloth and Washington, Pa., any quantity 80.00c.

Molybdenum Powder: 99% per lb. in 200-lb. kegs, f.o.b. York, Pa. $2.60; 100-200 lb. lots $2.75; under 100-lb. lots $3.00.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrophosphorus: 23-26%, based on 24% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Mt. Pleasant, Tenn.; contract price $75, spot $80.

Ferrosilicon: Contract basis in gross tons per carload, bulk, freight allowed; unitage applies to each 1% silicon above or below base.

	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

Spot prices ¼-cent higher.

Silicon Metal: Contract basis per lb., f.o.b. producers plants, freight ton lots 15.00c, less-ton lots 15.25c, allowed; 1% iron; carlots 14.50c, less 200 lbs. 15.50c.

Silicon Metal: Contract basis per lb.; 2% iron; carlots 13.00c, ton lots 13.50c, less-ton lots 13.75c, less 200 lbs. 14.00c. Spot prices ¼-cent higher.

Silicon Briquets: Contract basis; in 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 per lb. 4.25c. Spot ¼-cent per lb. higher on less-ton lots; $5 per ton higher on ton lots and over.

Silicomanganese: Contract basis freight allowed, 1½% carbon; in carloads per gross ton $135; ton lots $147.50. Spot $5 per ton higher.

Silico-manganese Briquets: contract basis in carloads per pound, bulk freight allowed 5.80c; packed 6.05c; less 200-lb. lots 6.80c. Spot prices ton lots 6.30c; less-ton lots 6.55c; ¼-cent higher.

Ferrotungsten: Carlots, per lb. contained tungsten, $1.90.

Tungsten Metal Powder: 98-99%, per lb. any quantity $2.55-2.65.

Ferrotitanium: 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained titanium; ton lots $1.23; less-ton lots $1.25. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20% contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50, 3-5% carbon $157.50.

Ferrovanadium: 35-40%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80, highly-special grade $2.90.

Vanadium Pentoxide: Technical grade, 88-92 per cent V_2O_5; contracts, any quantity $1.10 per pound V_2O_5 contained; spot 5 cents up.

Zirconium Alloys: 12-15%, contract basis, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot $5 per ton higher.

Zirconium alloy: 35-40%, contract basis, carloads in bulk or packages, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼-cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) contract basis, f.o.b. Niagara Falls, N. Y., per lb. 7.50c; ton lots 8.00c. Spot ¼-cent higher.

Simanal: (Approx. 20% each silicon, manganese, aluminum) Contract basis, freight allowed, per lb. of alloy; carlots 10.00c; ton lots 10.50c, less ton lots, 11.00c.

Borosil: 3 to 4% boron, 40 to 45% Si., $7 lb. cont Bo., f.o.b. Philo, O.

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	AISI hot bars 2300 series	AISI hot bars 3100 series
Boston	4.044[1]	3.912[1]	3.912[1]	5.727[1]	3.774[1]	4.106[1]	5.106[1]	5.224[14]	4.744[11]	4.144[11]	4.715	7.762[23]	6.062[23]
New York	3.853[1]	3.758[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[12]	4.613[14]	4.103[21]	4.774	.....	.....
Jersey City	3.853[1]	3.747[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[12]	4.613[14]	4.103[21]	4.774	.....	.....
Philadelphia	3.822[1]	3.666[1]	3.605[1]	5.272[1]	3.518[1]	3.922[1]	4.272[1]	5.018[15]	4.872[25]	4.072[21]	4.772	7.566[23]	5.866[23]
Baltimore	3.802[1]	3.759[1]	3.594[1]	5.252[1]	3.394[1]	3.902[1]	4.252[1]	4.894[1]	4.852[25]	4.052[21]	.....	.....	.....
Washington	3.941[1]	3.930[1]	3.796[1]	5.341[1]	3.596[1]	4.041[1]	4.391[1]	5.196[17]	4.841[20]	4.041[21]	.....	.....	.....
Norfolk, Va.	4.065[1]	4.002[1]	3.971[1]	5.465[1]	3.771[1]	4.165[1]	4.515[1]	5.371[17]	4.965[24]	4.165[21]	.....	.....	.....
Bethlehem, Pa.*	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claymont, Del.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coatesville, Pa.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (city)	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (country)	3.35[1]	3.40[1]	3.62[1]	5.25[1]	3.25[1]	3.82[1]	3.82[1]	4.75[18]	4.30[10]	3.75[21]	3.52	7.35[23]	5.65[23]
Pittsburgh (city)	3.25[1]	3.30[1]	3.62[1]	5.25[1]	3.15[1]	3.82[1]	3.82[1]	4.65[16]	4.20[10]	3.65[21]	.....	.....	.....
Pittsburgh (country)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[18]	4.00[24]	3.65[21]	.....	7.45[23]	5.75[23]
Cleveland (city)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[13]	4.00[24]	3.65[21]	.....	.....	.....
Cleveland (country)	3.25[1]	3.58[1]	3.40[1]	5.18[1]	3.35[1]	3.50[1]	3.50[1]	4.62[13]	4.05[24]	3.75[21]	3.20	7.55[23]	5.85[23]
Detroit	3.25[1]	3.58[1]	3.30[1]	5.18[1]	3.25[1]	3.50[1]	3.50[1]	4.62[13]	3.95[24]	3.65[21]	.....	.....	.....
Omaha (city)	3.48[1]	3.65[1]	3.60[1]	5.27[1]	3.43[1]	3.43[1]	3.68[1]	4.84[13]	4.30[24]	3.80[21]	3.40	7.67[23]	5.97[23]
Omaha (country)	4.10[1]	4.15[1]	4.15[1]	5.75[1]	3.85[1]	4.20[1]	4.20[1]	5.52[10]	4.77[24]	4.42[21]	.....	.....	.....
Cincinnati	4.00[1]	4.05[1]	4.05[1]	5.65[1]	3.75[1]	4.10[1]	4.10[1]	5.52[10]	4.77[24]	4.42[21]	.....	.....	.....
Youngstown, O.*	3.60[1]	3.68[1]	3.65[1]	5.28[1]	3.42[1]	3.67[1]	3.67[1]	4.92[10]	4.37[24]	4.00[21]	3.45	7.69[23]	5.99[23]
Middletown, O.*	.....	.....	.....	.....	.....	.....	.....	4.40[13]	.....	.....	.....	.....	.....
Chicago (city)	.....	.....	.....	.....	3.25[1]	3.50[1]	3.50[1]	4.40[13]	.....	.....	.....	.....	.....
Chicago (country)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	4.85[10]	4.10[24]	3.75[21]	3.50	7.35[23]	5.65[23]
Milwaukee	3.40[1]	3.45[1]	3.45[1]	5.05[1]	3.15[1]	3.50[1]	3.50[1]	4.75[10]	4.00[24]	3.65[21]	.....	.....	.....
St. Paul	3.63[1]	3.68[1]	3.68[1]	5.28[1]	3.38[1]	3.73[1]	3.73[1]	4.98[10]	4.23[24]	3.88[21]	3.54	7.33[23]	5.88[23]
St. Louis	3.75[2]	3.80[2]	3.80[2]	5.40[2]	3.50[2]	3.85[2]	3.85[2]	5.00[3]	4.35[3]	4.34[21]	3.83	7.70[23]	6.00[23]
Indianapolis (city)	3.64[1]	3.69[1]	3.69[1]	5.29[1]	3.39[1]	3.74[1]	3.74[1]	4.99[10]	4.24[24]	4.02[21]	3.61	7.72[23]	6.02[23]
Indianapolis (country)	3.60[1]	3.70[1]	3.70[1]	5.30[1]	3.45[1]	3.75[1]	3.75[1]	5.01[10]	4.25[24]	3.97[21]	.....	.....	.....
Memphis, Tenn.	3.35[1]	3.45[1]	3.40[1]	5.05[1]	3.20[1]	3.50[1]	3.50[1]	5.01[10]	4.00[24]	3.97[21]	.....	.....	.....
Birmingham (city)	3.90[5]	3.95[5]	3.95[5]	5.71[5]	3.85[5]	4.10[5]	4.10[5]	5.25[11]	4.66[24]	4.31[21]	.....	.....	.....
Birmingham (country)	3.50[1]	3.55[5]	3.55[5]	5.83[5]	3.45[5]	3.70[5]	3.70[5]	4.75[10]	4.78[24]	4.43[21]	.....	.....	.....
New Orleans (city)	3.40[5]	3.45[4]	3.45[5]	5.83[5]	3.35[5]	3.60[5]	3.60[5]	4.75[10]	4.78[24]	4.43[21]	.....	.....	.....
New Orleans (country)	4.10[4]	3.90[4]	3.90[4]	5.85[4]	3.95[4]	4.20[4]	4.20[4]	5.25[26]	4.95[10]	4.60[21]	5.00	.....	.....
Houston, Tex.	4.00[4]	3.80[4]	3.80[4]	5.75[4]	3.85[4]	4.10[4]	4.10[4]	5.15[26]	4.95[10]	4.60[21]	.....	.....	.....
Los Angeles	3.75[3]	4.25[3]	4.25[3]	5.50[3]	3.75[3]	4.30[3]	4.30[3]	5.25[26]	5.43[10]	4.50[22]	.....	.....	.....
San Francisco (city)	4.35[4]	4.60[4]	4.90[4]	7.15[4]	4.95[4]	4.90[4]	6.70[4]	5.95[18]	7.15[6]	5.70[22]	.....	9.55[23]	8.55[23]
San Francisco (country)	3.95[7]	4.35[7]	4.65[7]	6.35[7]	4.55[7]	4.50[7]	4.50[7]	6.60[19]	7.55[19]	5.55[28]	.....	9.80[9]	8.80[9]
Tacoma	3.85[7]	4.25[7]	4.55[7]	6.25[7]	4.45[7]	4.40[7]	4.40[7]	6.50[19]	7.45[19]	5.45[28]	.....	.....	.....
Seattle (city)	4.20[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.70[6]	6.63[24]	5.75[28]	.....	.....	.....
	4.20[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.35[6]	5.45[6]	5.70[6]	6.63[24]	5.75[28]	.....	.....	8.00[8]

*Basing point cities, with quotations representing mill prices, plus warehouse spread.

NOTE—All prices except cold-rolled strip and AISI hot-rolled bars fixed by Office of Price Administration in amendments Nos. 10 and 14 to Revised Price Schedule No. 49.

BASE QUANTITIES

[1]—400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 3999 pounds; [6]—300 to 1999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, any quantity is base.

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, smit, del. E. Pa.

Foundry and basic 56-63%, contract	13.00

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.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00c

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore
(Equivalent OPA schedules):
Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.
(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$41.00
48% 3:1	43.50
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80
Brazilian—nominal	
44% 2.5:1 lump	33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50
Domestic (f.o.b. Columbus, Mont.)	
48% 3:1	43.50

less $7 freight allowance

Manganese Ore
Including war risk but not duty, cents per gross-ton unit, dry, f.o.b. cars, New Orleans and Mobile; 5 cents higher at Norfolk, Baltimore, Philadelphia, New York; adjustments for analysis variations. (Based on OPA schedules.)

Brazilian, 48%	73.8c
Brazilian, 46%	71.8c
Caucasian, 51%	75.3c
Caucasian, 50%	74.8c
Chilean, 48%	73.8c
Indian, 50%	74.8c
Indian, 48%	73.8c
South African, 48%	73.8c
South African, 46%	71.8c
(Duty Free)	
Cuban, 51%	86.5c
Cuban, 48%	85.0c
Cuban, 45%	82.0c
Philippine, 50%	85.0c
Domestic, 48%, f.o.b. mines	96.0c

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Bars per 100 lb.	Basic open-hearth Billets per G T	Electric furnace Bars per 100 lb.	Electric furnace Billets per G T
NE 1330	.28-.33	1.60-1.90	.20-.35	.....	.....	.....	$ .10	$2.00	.....	.....
NE 8020	.18-.23	1.00-1.30	.20-.35	.....	.....	.10-.20	.45	9.00	$.95	$19.00
NE 8442	.40-.45	1.30-1.60	.20-.35	.....	.....	.30-.40	.90	18.00	1.40	28.00
NE 8613	.12-.17	.70- .90	.20-.35	.40-.60	.40-.70	.15-.25	.75	15.00	1.25	25.00
NE 8720	.18-.18	.70- .90	.20-.35	.40-.60	.40-.70	.20-.30	.80	16.00	1.30	26.00
NE 9255	.50-.60	.75-1.00	1.80-2.20	.....	.....	.40	8.00	.....	.....	.....
NE 9262	.55-.65	.75-1.00	1.80-2.20	.20-.40	.....	.65	13.00	.....	.....	.....
NE 9415	.13-.18	.80-1.10	.40-.60	.20-.40	.20-.50	.08-.15	.80	16.00	1.30	26.00
NE 9442	.40-.45	1.00-1.30	.40-.60	.20-.40	.20-.50	.08-.15	.85	17.00	1.35	27.00
NE 9537	.35-.40	1.20-1.50	.40-.60	.40-.60	.40-.70	.15-.25	1.20	24.00	1.70	34.00
NE 9630	.28-.33	1.20-1.50	.40-.60	.40-.60	.....	.....	.80	16.00	1.30	26.00
NE 9642	.40-.45	1.30-1.60	.40-.60	.40-.60	.....	.....	.85	17.00	1.35	27.00

Chemical Composition Limits, Per Cent

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

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, ACID OPEN-HEARTH AND FOUNDRY GRADES													
					Low Phos. Grades									
	OPEN HEARTH GRADES*	Mixed Bor., Turn., Machine Turnings	Cast Iron Borings	Shoveling Turnings	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	Foundry Steel 2 ft. and less	Foundry Steel 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	$15.00	$16.00	$17.00	$25.00	$22.50	$21.50	$22.00	$22.50	$21.50	$22.00	$18.00	$19.50	$21.00
Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Bethlehem	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Buffalo	19.25	14.25	15.25	16.25	24.25	21.75	20.75	21.25	21.75	20.75	21.25	17.25	18.75	20.25
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	19.50	14.50	15.50	16.50	24.50	22.00	21.00	21.50	22.00	21.00	21.50	17.50	19.00	20.50
Detroit	17.85	12.85	13.85	14.85	22.85	20.35	19.35	19.85	20.35	19.35	19.85	15.85	17.35	18.85
Toledo	†15.35	12.85	13.85	14.85	....	....	....	....	....	....	....	....	....	....
Chicago	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Kokomo	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Duluth	18.00	13.00	14.00	15.00	23.00	20.50	19.50	20.00	20.50	19.50	20.00	16.00	17.50	19.00
St. Louis	17.50	12.50	13.50	14.50	22.50	20.00	19.00	19.50	20.00	19.00	19.50	15.50	17.00	18.50
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif.	17.00	12.00	13.00	14.00	22.00	19.50	18.50	19.00	19.50	18.50	19.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	11.50	12.50	13.50	21.50	19.00	18.00	18.50	19.00	18.00	18.50	14.50	16.00	17.50
Seattle	14.50	9.50	10.50	11.50	19.50	17.00	16.00	16.50	17.00	16.00	16.50	12.50	14.00	15.50

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	17.00	18.00	19.00
Unstripped Motor Blocks	15.50	16.50	17.50
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Miscellaneous Malleable	20.00	21.00	22.00

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 states not named in groups A and B, plus Kansas City, Kans.-Mo.

*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. No. 1 chem. borings, 1 per cent oil, $1 under, No. 2, 1.5 per cent oil, $2 under heavy melting steel. No. 3 bundles, $2 under No. 1 heavy melting; cast steel, $2.50 over, No. 2 busheling, $2.50 under No. 1 heavy melting steel, auto springs, crankshafts, $1 over No. 1 heavy melting. †Toledo open-hearth grades cover only No. 2 busheling.

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. Commissions must be shown as separate item on invoice.

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, $6.65 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 $1.00 per ton.

Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) 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; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than $1, if most economical transportation is used.

Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are $3.50 less; (material from which Nos. 1, 2 and 3 bundles made is $4 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 grades of prepared scrap."

Remote Scrap: Consists of all grades, except railroad scrap, in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington, Louisiana, 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. Colorado scrap is remote scrap for Colorado consumers only.

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½, refinery; dealers may add ¾c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more, 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 12.25c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 14.25c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c. E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, corroding or chemical, 6.40c, E. St. Louis for carlots; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey, New York State, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester-Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less than 2000 lbs.

Secondary Aluminum: All grades 15.00c per lb. except as follows: Low-grade piston alloy (No. 122 type) 14.50c; No. 12 foundry alloy (No. 2 grade) 14.50c; chemical warfare service ingot (99½% plus) 14.50c; steel deoxidizers in notchbars, granulated or shot, including ingot containing over 2% iron, Grade 1 (95-97½%) 14.75c, Grade 2 (92-95%) 14.50c, Grade 3 (90-92%) 14.00c, Grade 4 (85-90%) 13.50c, Grade 5 (less than 85%) 12.50c. Above prices for 30,000 lbs. or more; add ¼c 10,000-30,000 lbs.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.) 20.50c lb.; add 1c for special shapes and sizes, including 3-lb. ingot and 12-lb. round ingot; incendiary bomb alloy 23.40c, 50-50 magnesium-aluminum 23.75c, ASTM B80-41T No. 11 25.00c, ASTM B94-40T No. 13 25.00c, all others 23.00c. Prices for 100 lbs. or more; for 25-100 lbs. add 10c; for less than 25 lbs. 20c; incendiary bomb alloy f.o.b. plant any quantity; carload freight rate allowed all others for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.75-99.79% incl. 51.62½c; Grade C, Cornish refined 51.62½c; Grade D, 99.0-99.74% incl. 51.12½c, Grade E, below 99%, 51.00c.

Antimony: American, bulk, carlots, f.o.b. Laredo, Tex., 99.0-99.8% grade 14.50c, 99.8% and over (arsenic 0.05% max.; no other impurity to exceed 0.1% 15.00c. Add ¼c for less-carlots to 10,000 lbs.; ½c for 9999-224 lbs.; 2c for 223 lbs. and less.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: Prices per 76-lb. flask f.o.b. point of shipment or entry. Domestic produced in Calif., Orez., Wash., Idaho, Nev., Ariz. $191; produced in Texas, Ark. $193. Foreign, produced in Mexico, duty paid, $193.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $15 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $2.11 lb.; 100 lbs. or more on contract, $1.50 lb.

Indium: 99.5%, $10 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y., 44.75c per ounce.

Platinum: $36 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass, 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A, B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.40c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 28.75c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c, Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Bare, soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlots 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s, flat, mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameters 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.50c Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%. Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2%, 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu; 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled, carbonized 47.00c; rolled, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c, del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400-lb. bbls. 39.00c f.o.b. Graselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c, f.o.b. Niagara Falls.

Scrap Metals

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ¾c for 15,000-40,000 lbs.; 1c for 40,000 lbs. or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.875
Commercial bronze 90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz metal	8.000	7.750	7.250
Nickel Sil., 5%	9.250	9.000	4.625
Phos. br., A. B. 5%	11.00	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	3.000	7.500

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbitt-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 8.00c; Muntz metal condenser tubes 7.50c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Prices f.o.b. point of shipment, respectively for lots of less than 1000 lbs.; 1000-20,000 lbs. and 20,000 lbs. or more; plant scrap only. Segregated 2s solids 10.00c, 11.00c, 11.50c; all other solids 9.50c, 10.50c, 11.00c; borings and turnings 7.50c, 8.50c, 9.00c; mixed solids 8.50c, 9.50c, 10.00c, mixed borings and turnings 6.50c, 7.50c, 8.00c.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings, old zinc 7.25c f.o.b. point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c; add ½c 20,000 or more. Unsweated zinc dross, die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clippings 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 122

Following a recent lull, sheet demand is active. This is ascribed in part to the fact that many subcontractors who have been experiencing delay in getting allocation numbers, are now in position to place orders. Some of these subcontractors, incidentally, are only now getting CMP allotment numbers for July shipment and as a number of the mills are well booked for that period, these buyers are having to shop around. Theoretically under CMP capacity is available somewhere for these requirements, but the task sometimes is to find it. One eastern sheet fabricator has been advised by Washington to try the Ford Motor Co. for his hot sheet requirements, and other cases are cited where consumers will probably have to go farther afield than normally in obtaining tonnage. As they have to absorb the added freight, these buyers are not too keen about doing so if it can be avoided.

Substantial orders by the Air Corps for 5-gallon gasoline cans, requiring 22 gage cold-rolled sheets, are beginning to be reflected on mill order books. The program, it is said, calls for 6,000,000 or 7,000,000 of these cans, which, at an estimated figure of about five pounds a can, require from 15,000 to more than 17,000 tons. Production is scheduled to start in August, with output in that month around 1,000,000. Subsequently it is to be stepped up to 1,500,000 cans in October and then tapered off during the remaining four or five months.

Sheet producers are a shade better on cold-finished deliveries than on hot, and while limited tonnage of the latter can be shipped in July, most volume currently booked is for August and schedules for third quarter are filling up.

In New England a few long-range programs, including bombs and insecticide containers, account for several hundred tons a month, but for the most part requirements fluctuate with new war contracts; a steady tonnage moves to warehouses. Fabricators of cartridge cases are not buying far in advance, basing orders well within the 60-day inventory regulations; galvanized sheets are slow.

Bars . . .

Bar Prices, Page 122

On most finishes of bars, deliveries have lengthened further. Beginning with hot-rolled, production schedules are dependent on the tonnage of steel for rolling. With reinforcing bar output reduced, off-heat material with some hot mills is substantial, but relatively little can meet wanted commercial specifications and is therefore going back as scrap. Bessemer deliveries are not much better than open-hearth. Resulting from tightness in semi-finished, not all bar mill capacity is fully engaged, contributing with heavy demand, to the general extended delivery situation.

Some small sizes of hot-rolled carbon bars are available for late July shipment, but middle range sizes are as tight as ever, 1½ to 3-inch, while larger rounds and flats generally are extended into September. Some tonnage is open for August, but little cold-drawn, and new

orders take up most capacity through that period. Several mills are sold up to their warehouse quota and jobbers are turning to new suppliers frequently.

In New England demand for forging stock is outstanding, both carbon and alloys; structural mills are diverting some billets for forging where possible. Aircraft requirements for alloys are heavy. For long range programs, especially shipbuilding, producers of marine hardware have placed tonnage for shipment through first quarter. Shipyards in some cases have covered on steel into February, 1944, with schedules fixed and allotment numbers definite. While consumers do not always have sizes available for specification so far in advance, size changes within the limits of the mill may be accepted, but if a hardship is in prospect, such specification or size changes may be considered as a new order later. As an aftermath, some of this forward tonnage may be affected at rolling time.

Forged link chain continues to absorb a large tonnage of alloy steel, and specifications were changed to an NE grade some time ago. Producers of bolt and nut specialties also maintain cold-drawn and alloy specifications.

While cutting back on certain programs has resulted in some cancellations, cold drawers report that substantial tonnage has come from other directions to fill the gap. In fact, some cold drawers regard demand at present as being as active as at any time this year, a situation which appears to support the contention in trade circles generally that cold-drawn bars represent an important bottleneck among steel products at this time.

Requirements of the airplane industry continue to expand and top all other consuming outlets. Shipyards are taking heavy quantities and some cold drawers declare that despite talk of a curtailment in demand for machine tools, such has not yet been noticeably reflected in the cold-drawn bar requirements of builders.

Considerable tonnage is going abroad under lease-lend, to England and Russia, and while there still seems to be a little surplus in bessemer steel capacity, an increasing tonnage is going to jobbers and to manufacturers of bolts, nuts and screws. A heavy tonnage of 7/16-inch bessemer rounds is being required for machine gun bullets and also for various shell components. One eastern cold drawer has booked a considerable tonnage of 2¼ inch bessemer rounds for an Ohio manufacturer of shell components. Some cold drawers have little tonnage left for shipment in the third quarter.

Plates . . .

Plate Prices, Page 123

Orders for floor plates in New England, notably in lighter gages, are in for first quarter, 1944, delivery where shipyard programs are lined up for that period. Exercising the 30-day leeway, some tonnage is available for late July delivery. Heavy demand holds for floor plate, mostly for ships.

There has been slight decline in demand for carbon plates for flame-cutting, although a few shops still operate equipment at capacity. Deliveries on flanged and dished work have improved; shops quoting 12 to 14 weeks until recently

now promise four to six. Railroads are placing third quarter tonnage, including the New Haven, but the volume asked is below requirements and the tonnage is frequently pared to fit into mill schedules. Some gaps in capacity for July deliveries are unfilled, but as in recent months, allocations and balance in distribution take care of this situation.

Shipyards and ponton builders account for most tonnage. With at least two yards increasing schedules, peak demand for plates probably has not been reached in New England, but should be shortly. While a few shipyard inventories are for the moment slightly higher, these are exceptions and distribution of plates is now operating smoothly, although there is some delinquent material each month, due to overloads, mainly on wider sheared equipment.

Pipe . . .

Pipe Prices, Page 123

Pipe distributors fear that their load directives from mills of 10 per cent of base tonnage for third quarter will not prove sufficient to meet the MRO requirements and that to meet these needs they will have to draw upon stocks which cannot be replaced under CMP procedure.

Meanwhile miscellaneous orders for butt weld pipe are fairly light with delivery schedules easy. Several mills are still able to promise shipment in June. On lap weld and seamless July appears the best that can be done, and some producers are booked up solidly into August it appears. Particular stringency appears in 4-inch pipe. Normally this size goes principally to public utilities, which at present are buying little. It is the general opinion that much of the tonnage, therefore, is going abroad. There is also a shortage of 6-inch pipe, but beyond that size delivery schedules are easier. Boiler and mechanical tubing, particularly seamless, is difficult to obtain for shipment much before the latter part of August; and the smaller the sizes the more difficulty there is.

Distributors' pipe, stocks of butt weld sizes are better balanced, with demand slower and replacement deliveries improved. Ship requirements are the backbone of demand in the East for both pipe and tubing. Deliveries extend into September-October on most sizes of seamless tubing, with smaller sizes slightly earlier; boiler tubes are mostly extended into late third quarter, and beyond in some cases. Prefabricators of pipe are buying in good volume for the oil and rubber program. While 90 per cent of this volume has been placed not all orders have been properly validated and there are some delays. Two Boston engineering firms have placed substantial contracts for prefabricated pipe work.

Aircraft requirements tax tubing mills. Electrically welded tubing is sometimes substituted for cold-drawn seamless. On the whole, however, users of seamless tubing have been reluctant to change specifications. A revised regulation covering replacements of pipe sold under MRO is expected to ease the pinch on jobbers selling largely for maintenance and repair; otherwise some in this field will sell themselves out of business in two or three months.

Wire . . .

Wire Prices, Page 123

Wire mills are sold through third quarter on most active products; new volume continues in excess of shipments on numerous items, notably specialties. Tonnage taken under CMP for delivery beyond third quarter is tentatively entered for scheduling, but often lacks definite details as to sizes and specification. In the final analysis delivery of much of this forward volume will depend on early clarification of details; otherwise an increase in directives is possible to assure shipment as wanted. A flood of late directives intermingled with regular CMP orders would add to confusion. On the other hand, the 60 day inventory rule covering fabricators precludes over-delivery on this forward buying, some of which, involving alloys and specialties, extends into first quarter.

Aircraft requirements are mounting, but brush wire is easier. Output of the latter has been increased recently and deliveries are now 12 to 14 weeks, compared with 22 weeks a month ago. Holdup of lend-lease on music wire has enabled most mills to meet domestic requirements better; spring demand is heavy, covering a wide range for war equipment, valve spring wire included.

Some tonnage booked under PRP and due to be shipped by June 30 may not

be processed before that date, especially when entered late, as was the case with numerous small users who lagged in digesting CMP procedure. This includes some bright basic wire on which deliveries are possible in three weeks, due to the diversion of semifinished from heavy fabric departments; capacity in the latter is not actively engaged. Rope mills continue to take much wire, with backlogs extending four months in some instances. Rumors persist a cutback is likely on bullet core steel.

Demand for nails, while somewhat more spotty, continues heavy; any decline in building affecting nails is made up by heavy requirements for crating, which also takes more strapping and wire. Wire rope producers can take tonnage for July shipment but are filled up for June.

Rails, Cars . . .

Track Material Prices, Page 123

Car buying is featured by the placing of two relatively small orders, one involving 170 special type box cars for the Navy, to be built in the shops of the Chicago, Burlington & Quincy on a non-profit basis, and the other 200 flat cars of 50 tons capacity for the Denver & Rio Grande Western, placed with the Mt. Vernon Car Co., Mt. Vernon, Ill., subject to approval by the War Production Board.

Structural Shapes . . .

Structural Shape Prices, Page 123

Better than 95 per cent of the output at one eastern structural mill is going to shipyards or their subcontractors. While this is probably too high for the industry as a whole, most tonnage rolled by other mills for ships is heavy. Jobbers, with deliveries improved, are more reluctant to pay premiums and this has cut into warehouse volume with one producer. Subcontracts have been placed by New England shipyards with numerous structural and plate shops through the remainder of the year, and, while subcontracting has slowed, it has not halted. Demand is mainly for light sections, channels and angles. Heavier shapes for building and bridge requirements are inactive.

Pig Iron . . .

Pig Iron Prices, Page 124

In general pig iron allocations show little change except for some shifts in allotment requests as character of products is altered to meet war demand. In areas where machine tool building is an important factor there is less subcontracting for this purpose but other lines of work fill the gap and foundries continue busy to the limit of manpower.

In the Cincinnati district there is a trend to a greater proportion of southern iron. No merchant iron is being made in that area and some steelmaking requirements are being filled by furnaces elsewhere.

Of the approximately 30,000 tons of pig iron allocated monthly to New England melters, nearly half is basic, with the remainder malleable and foundry grades. The largest allotment of basic recently has been given a steelworks furnace; the foundry grade is covered mainly by the Everett producer and interest centers in final distribution of basic each month. Roughly, about 5000 tons of iron is supplied by Buffalo furnaces; the remainder, mainly in foundry grades, about equals the monthly production of the district furnace. Demand for foundry grades continues to slacken, but not at an accelerated pace and part of the gap may be filled by heavier requirements by textile and heating equipment shops, a result of lifting some restrictions on that type of equipment.

OPA has given permission to the Riddlesburg Coal & Iron Co., Riddlesburg, Pa., to offer for sale not more than 3000 tons of basic at a price not higher than $29.19, f.o.b. furnace, plus transportation charges to the place of delivery "as customarily computed". The Riddlesburg furnace was blown out May 20, after being originally scheduled to go out April 15. The stack was rehabilitated several months ago with government funds after being down for several years. It was put in blast in September, 1941. Up to the beginning of this month it is understood to have been engaged solely in production of foundry iron for the U.S. Pipe & Foundry Co., which organized the operating company.

Scrap . . .

Scrap Prices, Page 126

Better quality of scrap is being offered steelmakers, as inferior grades have been worked off sufficiently to give a much better average, although yards still

contain considerable light material gathered last fall in the household drive. Railroad and industrial offerings are substantial and contain heavier material. Turnings are being accepted slowly and rejections are frequent on the basis of grading.

Floods in Arkansas, Missouri and adjacent states have hampered collection and transportation of scrap in the St. Louis area, receipts being severely reduced. With a large part of the inferior scrap resulting from last summer's drives now consumed quality of supplies is materially better. Current tonnage is made up largely of agricultural, railroad and industrial grades. Most mills in this district have comfortable inventory.

An important Buffalo steelmaker has nearly exhausted its stockpile and is depending on water shipments by lake and barge canal to replenish supplies and prevent curtailment of production. The first cargo from the head of the lakes is scheduled to arrive next week and first barges by canal within a few days. The government has taken over five steel bridges from the abandoned trolley line of the International Railway Co. line from Buffalo to Niagara Falls and Lockport, which will be reassembled for use elsewhere. The remaining 15 bridges will be scrapped or reclaimed. Total tonnage in the 20 structures is estimated at 2831 tons.

From New England shipyards a substantial volume of high quality low phos open-hearth scrap finds a ready market and a good part of the tonnage is placed by allocation. Improvement in the quality of scrap coming from dealers' yards continues with most "drive" scrap cleared up, the remainder of several thousand tons being available mainly for No. 2 bundles. Machine shop turnings are more active, but bushy and alloy turnings lag, although better segregation is noted with the latter. Foundry grades are slow and some shops have built up heavy reserves; some short steel scrap is bought but on the whole reserves are ample for some months at the current rate of melt. Small lots of stove plate are in demand for blast furnace use; uncleaned motor blocks are at a standstill.

Warehouse . . .

Warehouse Prices, Page 125

Demand for steel out of warehouse continues heavy, notably for bars and plates. Jobber stocks as a rule are better balanced to meet requirements, although plates and most alloy products are moved promptly. In addition to volume ordinarily going to warehouses, some small-lot inquiries are routed to jobbers from mills under CMP. Small-sized carbon rounds are becoming tighter, whereas up to now stocks of these have been well rounded with most distributors.

In addition to substantial needs for shipyards, notably for repairs, miscellaneous demand for plates is heavy and inquiries as far away as the Gulf coast are made to eastern warehouses. Shapes are also moving in better volume, angles for ships especially. Buying of butt weld pipe is holding up well, considering the lack of new building, and nails, somewhat slower last month, are on the rebound.

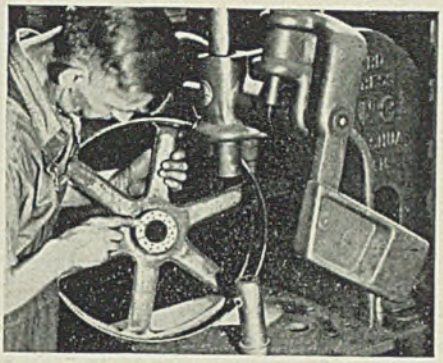
Steel warehouses in New England are dependent on shipyards and their subcontractors for a substantial part of sales. To meet demand, inventories are better balanced in cold-finished bars, shapes, plates and NE alloys. While some sizes are frequently missing, it appears that replacements to jobbers are on an improved foundation. An adverse factor is tapering in machine tool requirements.

Shutting off supplies of heat-treated and normalized carbon and alloy steel is serious for distributors of these specialties. The 30 cents per 100 pounds extra allowed for this processing is too small for profit when plain bars are bought for heat-treating outside and most heat-treating shops are overtaxed already. Light gage black sheets are not as active as most hot-rolled products. Secondary sellers of nails are confronted by a problem of replacement on MRO sales.

WPB Strengthens Position Of Jobbers' Rated Orders

Direction No. 1 to CMP Regulation No. 3 has been revised to indicate that its intention is to place rated orders of dealers, distributors, and jobbers on a par with orders in the same rating band bearing allotment numbers of symbols.

The direction does not have the effect of granting preference to rated orders of dealers, distributors and jobbers



PUT METALINE OILLESS BEARINGS IN THAT "TOUGH SPOT"

You know right where it is.

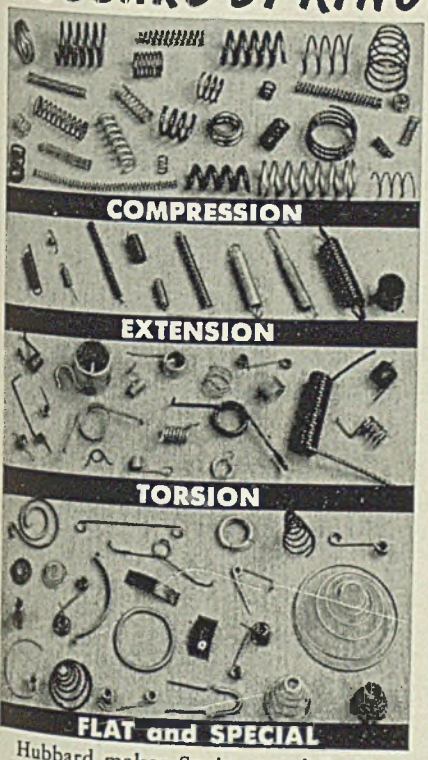
It's hard to get at, easy to overlook, annoying to service and there's the deuce to pay if it stops the works.

For all such locations, as well as for those less difficult, specify Rhoades Metaline Oilless Bronze Bearings. They never take oil or grease, for the lubricant, that is right for the job is built in. They fit accurately and, once properly installed, require no further attention.

Metaline Bearings are made of high grade bronze in one and two piece types, plain or flanged, in a wide range of sizes. We can accept war orders and other orders with proper certification.

R. W. RHOADES METALINE CO., Inc.
50-17 FIFTH ST. LONG ISLAND CITY, N. Y.

HUBBARD SPRINGS



Extension spring with raised elongated hook end.

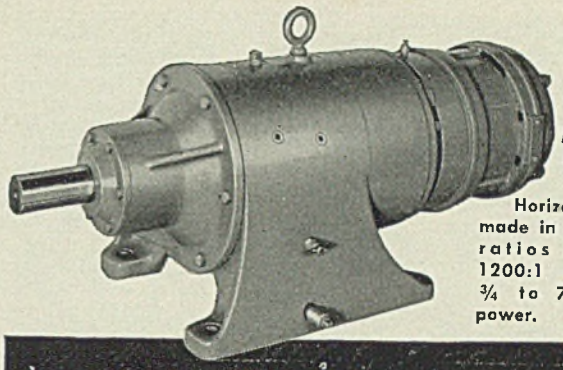
Torsion spring with one offset hook end and one straight end

Torsion spring with special hook end.

Torsion spring with both ends special.

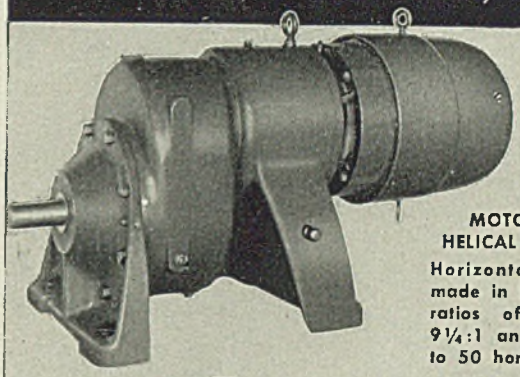
Hubbard makes Springs and Spring Parts in all types, forms and shapes, and in all kinds of metals, for manufacturers' products and specific needs.
ALSO—SMALL STAMPINGS AND WIRE FORMS

M. D. HUBBARD SPRING CO.
702 Central Ave., Pontiac, Mich.



MOTORIZED PLANETARY REDUCER
Horizontal drive, made in 35 sizes in ratios of 10 to 1200:1 and from ¾ to 75 horsepower.

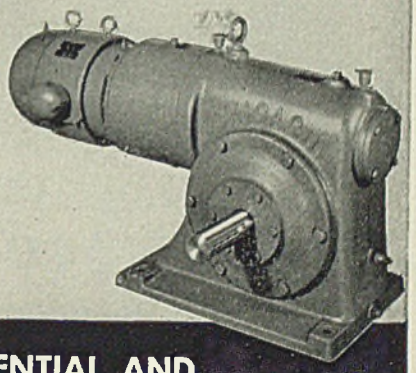
D.O.JAMES MOTORIZED SPEED REDUCERS



MOTORIZED HELICAL REDUCER
Horizontal drive—made in 13 sizes in ratios of 1¼ to 9¼:1 and from ¾ to 50 horsepower.

ARMY E NAVY

MOTORIZED WORM GEAR REDUCER
Horizontal drive—made in 11 sizes in ratios of 6 to 80:1 and from ⅛ to 50 horsepower.



SAVE ESSENTIAL AND VALUABLE SPACE

War time requirements make the D.O.James Motorized Reducers a very important Must in solving and meeting the power-saving needs of modern industry. Their accessibility and compactness make them most desirable when floor space is limited. Their soundness of design and manufacture insures maximum efficiency with minimum maintenance.

D.O.JAMES MANUFACTURING CO.
Established 1888
1140 W. Monroe Street Chicago, U. S. A.

MAKERS OF ALL TYPES OF GEARS AND GEAR REDUCERS

over other orders in the same rating band bearing allotment numbers or symbols.

This means that a dealer's order rated AA-1 would have preference equal to a manufacturer's order rated AA-1 bearing an allotment number. However, the dealer's order rated AA-1 would not displace a manufacturer's order rated AA-1 in a production schedule.

The direction has been revised also to apply the equality of dealers, distributors and jobbers rated orders to all such orders. Previously, it applied only to those orders placed prior to April 7, 1943, calling for delivery not later than June 30.

Nonferrous Metals . . .

Nonferrous Prices, Page 127

New York — Copper fabricators to some extent are affected by an amendment to order M-9-c, but few tonnage items are involved. Changes in the order are summarized on page 54.

Allocations to fabricators and consumers for June shipment are completed, the total tonnage required about equalling that of recent months. What remains to be allocated will be released from MRC reserves as required. With the exception of some foundries, consumers will receive the volume requested; in the case of foundries scrap inventories and other factors conditioned on the individual shop are taken into consideration. Two new report forms and one dealing with copper allocation certificates, required for deliveries, have been issued for filing each month, slightly changing details of current procedure. Some producers have limited volume of copper for sale for June shipment, but this is being absorbed.

Mine production of recoverable copper in the United States, Alaska included, last year approximated 1,072,003 short tons, up 12 per cent from 1941. Arizona was the largest producer, 36 per cent; Utah, second, 29 per cent, and Montana, third, 13 per cent.

All grades of zinc are easier with essential requirements met; the entire production this month will not be fully taken and reserves increase slightly each month. For galvanizing the demand is geared and limited to the volume of steel available, but needs for brass-making are steady and maintained. Lead is available for June delivery but demand is inclined to lag. Production of lead from small units eligible for premiums has not yet been a factor in the industry.

MRC Sets Prices on Manganese, Chrome Ore

New price schedules, effective May 15, covering purchases of domestic manganese and chrome ores by Metals Reserve Co., have been issued by Jesse Jones, secretary of commerce.

Base price for domestic manganese ore and concentrates is $1 per unit of contained manganese, equivalent to $48 per gross ton for ore or concentrates containing 48 per cent manganese, 6 per cent iron and 11 per cent of silica and alumina. Premium of ½-cent per unit of contained manganese for each 1 per cent of manganese content above 48 per cent. Penalties are provided for ore below 48 per cent.

Base price for domestic chrome ore and concentrates is set at $52.80 per gross ton containing 48 per cent of chromic oxide with a chromium to iron ratio of 3 to 1. For chromic oxide content above 48 per cent a premium is allowed of $1.10 per ton for each 1 per cent of chromic acid content. Penalties also are provided for ores containing less than 48 per cent.

Pacific Coast . . .

Seattle — Development of new industries and expansion of existing plants indicate increased activity in the Pacific Northwest in the near future. Utilization of mineral deposits in this area, heretofore dormant, is of major interest.

Tests will be concluded soon which will determine the location of a proposed reduction plant to extract alumina from local clays. Two bodies are being explored by the Bureau of Mines, one near Castle Rock, Wash., the other near Hobart Butte, Oreg. Plans contemplate a plant to produce 150 tons of alumina daily which will be used instead of bauxite. Columbia Metals Corp., in which Washington and Oregon capital is interested, is reported to be backing the project, anticipating federal aid.

Expansion of the Everett Pacific Shipbuilding Co., established last year to undertake large contracts for the navy, is announced. Facilities will be pro-

vided for repairing ships up to 10,500 tons. The new project will cost $5,000,000 and is interpreted as meaning that this plant will be permanent. Another contract for construction of an 18-ton drydock, costing $3,500,000, has been awarded to this plant by the Bureau of Yards and Docks.

Col. K. B. Harmon, head of the Pacific Coast ordnance district, has released announcement that Pacific Car & Foundry Co., Seattle, for more than a year has been building 32-ton Gen. Sherman tanks at its Renton plant. Of the metal involved, 80 per cent is said to have come from scrap material, this being the only western plant building similar equipment from blueprint and pattern to mold loft and back to machine shop. This plant formerly manufactured railroad cars and similar equipment.

Steel in Europe . . .

London—(*By Radio*)—Heavy pressure is being exerted in Great Britain for delivery of plates, sheets and structural sections for shipbuilding. Rerollers are fully occupied with essential orders. Pig iron producers are in hopes substantial tonnages of North African iron ore will be available, now that Axis armies have been driven out. Substantial demand for black plates is being experienced. Scrap supply is sufficient to meet needs of steelmakers.

New Tin Plate Extras

Carnegie-Illinois Steel Corp. has issued a new list of extras and deductions on black plate and also on electrolytic tin plate coke and charcoal tin plate, manufacturing ternes and special coated manufacturing ternes. Both lists are dated May 19. Only minor changes in packing charges are included in the new lists, both of which supersede similar lists dated Oct. 15, 1942.

Canada . . .

Toronto, Ont. — Considerable unrest has developed in Canadian steel labor circles during the past few days as the result of announcements from Ottawa and local sources regarding extensive curtailment in war materials production, especially affecting guns, ammunition and explosives. Against the big reduction in output of the materials referred to above there will be a sharp increase in production of escort ships, fighting aircraft, radios, etc., and it is planned to place most workers in these enterprises. Most Canadian steel producers report no cancellation of steel orders, on the contrary backlogs continue to pile up under a persistent flow of new business. However, announcement was made this week that there have been cancellation of orders for special alloy bars for manufacture of guns and there now is a surplus of these materials and a possibility that production may be cut.

Demand for plate and sheets is gaining in volume and mill representatives state they are having difficulty meeting all demands from government purchasing agencies and as a result are showing little interest in other inquiries.

Brisk demand is reported for carbon bars, with new orders appearing from a diversified group of buyers. Mill representatives state that backlogs for carbon bars extend well into third quarter and new business is continually being added.

NEW BUSINESS

Plant Expansion, Construction and Enterprise, Government Inquiries, Sub-Contract Opportunities, Contracts Placed and Pending

SUB-CONTRACT OPPORTUNITIES

Data on subcontract work are issued by regional offices of the War Production Board. Contact either the office issuing the data or your nearest field office. Write, don't telephone, and mention key letters and numbers appearing before each item to assure prompt attention and avoid delay.

Philadelphia Office. Contract Distribution Branch. Production Division, WPB. Broad Street Station building reports the following subcontract opportunities:

Buescher-19-1: A government agency requires 950 fuel pump drive gears for diesel engines. Delivery required within 90 days after date of contract. Dimensions, 2.441-inch O.D. x 1⅞-inch width; bore 1.3755-inch -.001; 20 teeth, 10 pitch, 26 degrees, 50 minutes R. H. helix. Material, SAE 1035 O. H. steel; heat treat in bar 35 to 38 scleroscope. Prints at Philadelphia office.

Buescher-19-2: A government agency requires 600 fuel pump drive gears for diesel engines. Delivery required in 90 days after date of contract. Dimensions, 4.634-inch O.D. x 1 13/32-inch width; bore .983-inch plus .001; face of gear ¾-inch; 57 teeth, 14 pitch 25 degrees R. H. helix cut teeth. Heat treat 38 to 43 scleroscope. Material, SAE 3149 O.H. forging grade steel. Prints at Philadelphia office.

Buescher-19-3: A government agency requires 400 crankshaft gears for diesel engines. Delivery required in 90 days after date of contract. Dimensions, 4.1595-inch minus .003-inch O. D. x 1½-inch width; bore 2 inches minus .001; 27 teeth, 8 pitch cut teeth, 30 degrees, 30 minutes, 48 seconds L.H. helix, 14½ degrees pressure angle, involute tooth .001 eccentricity allowed on pitch diameter. Material, SAE 1035 O.H. steel heat treated in bar to scleroscope hardness of 35 to 38. Prints at Philadelphia office.

Buescher-19-4: A government agency requires 1950 flywheel gears for diesel engines. Delivery 90 days after date of contract. Dimensions, 18.680 inches O.D. x 1 1/16-inch width; bore 17.481 inches minus .004-inch; 148 teeth, 8-10 pitch; .196 to .192-inch tooth thickness; involute form of tooth, 20 degrees pressure angle. Pitch circle eccentricity .0025-inch. Material, SAE 1050 O.H. forged steel heat treated to scleroscope hardness of 45 to 60. Prints at Philadelphia office.

Buescher-19-5: A government agency requires 550 fuel pump drive gears for diesel engines. Delivery 90 days after date of contract. Dimensions, 6.052-inch O.D. x 1¼-inch width; gear face ⅝-inch; bore .983 plus .001; 54 teeth, 14½ degree pressure angle; module 2.75. Material, SAE 3140 forging grade steel. Heat treat scleroscope 38 to 43. Prints at Philadelphia office.

Buescher-19-6: A government agency requires 725 oil pump drive gears for diesel engines. Delivery 90 days after date of contract. Dimensions, O.D. 1.795-inch x 2 3/16-inch width; 16 teeth special form; 10 pitch 1.6-inch P.D.; 25 degrees pressure angle. Material, SAE 3135, heat treat scleroscope 33 to 38. Prints at Philadelphia office.

Buescher-19-7: A government agency requires 1750 oil pump idler gears for diesel engines. Delivery 90 days after date of contract. Dimensions, O.D. 1.795-inch x 1.312-inch; 16 teeth, special form, 10 pitch, 1.6 P.D.; 25 degree pressure angle. Material, SAE, 3135 steel, heat treat to scleroscope 33-38. Prints at Philadelphia office.

Buescher-19-8: A government agency requires 275 reduction gear pinions for diesel engines. Delivery in 90 days after date of contract. Dimensions, O.D. 4 inches, width 3 1/32 inches, gear face 1¾-inch; 22 teeth, 6 pitch, 14½-degree pressure angle. Tolerance, face to be flat and square with bore within .0005-inch; P.D. concentric and parallel with bore within .001-inch. Material SAE 4820 O.H. steel. Carburize and harden to Rockwell C-50-55. Prints at Philadelphia office.

Buescher-19-9: A government agency requires 275 external shaft assemblies for diesel engines. Delivery 90 days after date of contract. Dimensions, overall length 11-51/64 inches, gear face 1.339 inches, gear diameter 2.260; 21 teeth, 10/12 pitch, 20 degree pressure angle; ground step 1.5747-inch plus .0004-inch; body ground 1.280-inch plus .001; end ground .786-inch plus .001; outline drilled full length. Material, SAE 4820, carburize and harden scleroscope 70-80. Prints at Philadelphia office.

Buescher-19-10: A government agency requires 350 internal reduction gears for diesel engines. Delivery 90 days after date of contract. Dimensions, O. D. 5/8-inch, width 2⅞ inches; gear face 1.18-inch; ground bore 1.3225-inch; ground diameter, 1.968-inch; plies .0005-inch; internal gear, 43 teeth, 10/12 pitch, 20 degrees pressure angle; P.D. 4.3-inch. Material, SAE 6145 steel forging. Heat treat Rockwell C47-53. Prints at Philadelphia office.

Buescher-19-11: A government agency requires 450 generator drive gears for diesel engines. Delivery 90 days after date of contract. Dimensions 3-33/64-inch O.D. x 2⅜-inch width, gear face 1 3/32-inch; 30 teeth, 10 pitch, 26 degrees, 50 minutes L.H. helix. Material, SAE 1120 O.H. steel. Heat treat in bar scleroscope 35-38. Prints at Philadelphia office.

Boston office, Contract Distribution Branch of WPB, 17 Court street, is seeking contractors for the following:

SC-95: Single-spindle automatic screw machine work for machines having 1-inch diameter bar capacity, No. 2 B & S specified. Material and tools supplied by prime contractor. Several sizes. Rating, AA-1. Reference, 1-A-991.

Chicago office, Contract Distribution Branch of WPB, 226 West Jackson Boulevard, is seeking contractors for the following:

Bell & Howell Co., 7100 McCormick boulevard, Lincolnwood, Ill., attention Clinton S. Davis. Priority AA-1. Push pin support and adaptor, 1700 of first and 1800 of second. Contractor supplies material, cold-rolled steel and aluminum, respectively. Subcontractors in Chicago area preferred. Equipment, 1 and 2½-inch turret lathes, No. 1 horizontal milling machine, one and two-spindle bench drills 5/16-inch capacity. Tolerance, .001.

Ajax Engineering Co., 2451 South LaSalle street, Chicago, attention R. B. Ickis. Priority, AA-1. Inside and outside focusing barrels With octuple threads to be lapped with one another. Work to be done by watch or instrument makers or others accustomed to close tolerances and fine finish. Quantity, 10,000 of each, at 2000 per month. Contractor furnishes materials, brass bar and tubing, gages and tap for octuple thread. Dimensions, 1 x 1 inch. Equipment, 6 x 12-inch bench lathe, single-spindle automatic screw machine 1½-inch bar capacity, thread mill disc cutter 6 x 12 inches. Tolerances from .001 to .0005.

Elgin National Watch Co., 107 National street, Elgin, Ill., attention H. E. Corr. Six to 12 months die work for contractors having facilities to manufacture sub-press dies (compound), jigs, fixtures, gages, tools, etc. Work requires shops with high grade tool and die makers, augmented with excellent jig boring, grinding and turning equipment, as well as fine measuring and checking devices. First delivery in about 90 days.

Invincible Metal Furniture Co., Manitowoc, Wis., attention E. F. Gosz. Priority, AA-1. 60 per cent; AA-2X. 40 per cent; end use USA 6.60. Monthly production requirements on thumb screw are 2193, beginning in July, through October. Contractor will assist in supplying material. Quantity, 8770. Dimensions, 1¼ x 4¼ inches. Material, forging steel. Equipment, 100-pound drop hammer, ⅝-inch bar capacity turret lathe, single-die bolt threading machine.

Independent Pneumatic Tool Co., 600 West Jackson boulevard, Chicago, attention A. Anderson. Priority, AA-1. Job includes cylinders, ratchet rings, valve chests. Material, alloy steel, supplied by contractor. Quantity, 6000 each of five items. Equipment, internal and cylindrical grinders.

Stewart-Warner Corp., 1828 Diversey Parkway, Chicago, attention J. R. Brandenburg. Priority, AA-1. Material, aluminum, cold-rolled steel and brass, supplied by contractor. Job includes five parts, clutch drive, collar, lock screw and similar parts. Any open capacity during next 90 days can be used. Equipment, No. 2 and No. 6 B. & S. automatic screw machines.

Stewart-Warner Corp., 1828 Diversey Parkway, Chicago, attention J. R. Brandenburg. Priority, AA-1. Job covers forming of ferrules on a Waterbury-Farrel press. Subcontractor to furnish progressive dies. Contractor supplies material for ferrules. Equipment, 3-ton eyelet-forming press, die-making equipment. Quantity, 30,000 each of two items.

Torrington Co., Bantam Bearing division, South Bend, Ind., attention J. F. Ochlhoffen. Priority, AA-1. Quantity, 6000 of one and 3000 of another item, beginning July 1. Contractor will furnish SAE 52100 Brightmanized turned tubes in 16 to 20-foot lengths. Equipment, 3½ and 4½-inch capacity single-spindle automatic screw machines, 7 x 16 x ¾-inch collet bench lathes. Tolerance, .005.

Westinghouse Electric & Mfg. Co., 246 East Fourth street, Mansfield, Ohio, attention F. K. Ackerman. Priority, AA-1. Job is shaft, to be finished complete. Contractor can provide tooling for No. 2G Brown & Sharpe and will furnish 18-8 free machining stainless steel bar. Quantity, 25,000. Equipment, 1-inch single-spindle automatic screw machine, 3 x 12-inch plain external cylinder grinder, 7 x 16 x ¾-inch collet bench lathe,

¾-inch drill capacity two-spindle bench drill.

STRUCTURAL SHAPES . . .

SHAPE CONTRACTS PLACED

1000 tons, defense plant, Tennessee, to American Bridge Co., Pittsburgh; Stone & Webster Co., Boston, engineer-contractor.

120 tons, buildings, Mystic Steamship division, Eastern Gas Fuel Corp., East Boston, Mass., to West End Iron Works, Boston; Waghorne-Brown Co., Boston, engineers.

Unstated, eight radial gate hoists at Alder and La Grande power houses, Tacoma's second Nisqually project to Star Iron & Steel Co., Tacoma, low at $74,160.

SHAPE CONTRACTS PENDING

380 tons, steel piling for waterfront construction, Camden, N. J.; Lake States Engineering Co., Chicago, contractor.

365 tons, state bridge, Delaware county, Pennsylvania; Cayuga Construction Co., New York, low bidder on new bid call.

REINFORCING BARS . . .

REINFORCING STEEL PLACED

650 tons, modification building, Douglas Aircraft Co., Tulsa, Okla.; 400 tons to be furnished by U.S. Engineer, 250 tons by Patterson Steel Co., Tulsa, Okla.

650 tons, modification building, Douglas Aircraft Co., Oklahoma City, Okla.; 400 tons to be furnished by U. S. Engineer, 250 tons by Robberson Steel Co., Oklahoma City, Okla.

400 tons, modification building, aircraft plant, Marion, Okla., for War Department, to Joseph T. Ryerson & Son Inc., Chicago.

REINFORCING STEEL PENDING

6600 tons, six floating dry docks, Atlantic Coast yard; V. P. Loftis Co., Wilmington, N. C., general contractor; more than 700 tons steel piling required for facilities.

560 tons, expansion, Northern ordnance plant, Fridley, Minn., operated by Northern Pump Co.; bids asked.

RAILS, CARS . . .

FREIGHT CARS PLACED

Navy, 170 special type box cars, to Chicago, Burlington & Quincy shops, at Havelock, Neb.

Denver & Rio Grande Western, 200 fifty-ton flat cars, to Mt. Vernon Car Co., Mt. Vernon, Ill., subject to WPB approval.

BUSES BOOKED

Twin Coach Co., Kent, O.: Ten 41-passenger for Eastern Massachusetts Street Railway Co., Boston; four 44-passenger for Duke Power Co., Charlotte, N. C.; four 41-passenger for Boston Elevated Railway Co., Boston; three 44-passenger for Georgia Power Co., Atlanta, Ga.; one 41-passenger for United Electric Railways Co., Providence, R. I.; one 35-passenger for Savannah Electric & Power Co., Savannah, Ga.

CONSTRUCTION AND ENTERPRISE

OHIO

CLEVELAND—Odenkirk Corp., newly incorporated by E. B. Odenkirk, president and treasurer, E. W. Fitch and H. C. Odenkirk, vice presidents, and Kenneth Wilson, secretary, will manufacture heaters, boilers, plumbing specialties and air conditioning for commercial purposes, when suitable location is found.

CLEVELAND—Straehle-Topinka Co., Jos. F. Topinka, president, 1426 West Third

street, intends erecting new plant if it continues to be unsuccessful in locating suitable two-story building.

CLEVELAND—Boehm Pressed Steel Co., 2219 West Sixty-third street, will build one-story steel storage building.

CLEVELAND—Westinghouse Electric & Mfg. Co., L. A. Watts, Union Bank building, Pittsburgh, Pa., has granted contract for foundry alterations, 1216 West Fifty-eighth street, to Dick Construction Co., 2532 Library avenue, Pittsburgh. Estimated cost, $100,000. (Noted April 26.)

CLEVELAND—American Steel & Wire Co., A. C. Chesney, purchasing agent, Rockefeller building, has awarded contract to Cleveland Construction Co., 3866 Carnegie avenue for repairs to 18 factory and mill buildings. Estimated cost, $125,000.

CONNECTICUT

STAMFORD, CONN.—Union Wire Die Corp., 375 Fairfield avenue, has plans for one-story, 35 x 35 x 40-foot brick, steel and concrete boiler plant. D. Mansell, 24 Park Row, architect.

NEW JERSEY

WALLINGTON, N. J.—Tube Reducing Corp., 520 Main avenue, plan to construct factory. E. E. Seelye, 101 Park avenue, New York, engineer.

PENNSYLVANIA

CHERRYVILLE, PA.—Cherryville Foundry Co., L. Dieter, general superintendent, will build a foundry unit to cost $40,000.

McKEESPORT, PA.—Carnegie-Illinois Steel Co., M. W. Reed, chief engineer, Carnegie building, Pittsburgh, has awarded contract to G. H. Chilli, First National Bank building, Homestead, Pa., for metallurgical laboratory building addition, two-story, 23½ x 55½ feet.

MICHIGAN

DEARBORN, MICH.—Heiser Tool & Mfg. Co., 1308 South Monroe, has been incorporated by Warren R. Heiser, 24147 Union avenue with $10,000 capital, to deal in parts, and special machinery.

DETROIT—Canfield Tool & Die Co. 10111 East Canfield avenue, has been incorporated by Frank Grzanka 823 Navahoe avenue, to manufacture tools and machines with 450 shares. No par value.

ILLINOIS

CHICAGO—Chicago Die Mold Mfg. Co., 1735 West Diversey parkway, has plans nearing completion by S. Klefstad, 3600 West Fullerton avenue, for one-story, 218 x 243 feet, brick factory, $75,000.

ROCKFORD, ILL.—Eclipse Fuel Engineering Co., has given contract to Scandroli Construction Co. for a one-story factory addition, 76 x 293 feet. A. R. Eastman is architect.

TENNESSEE

MEMPHIS, TENN. — Road Builders Equipment Co., E. F. Higginbotham, vice president, 340 North Third street, will soon let contract for plant enlargement.

MINNESOTA

MINNEAPOLIS—Durkee-Atwood Co., 40 Wilder, Nicollet Island, has given contract to Everett Addy for a one-story factory addition, 48 x 60 feet.

MINNEAPOLIS—Chas. Olson & Sons Inc. 2945 Pillsbury avenue, has given contract to Jas. Leck Co. for a one-story factory addition, 46 x 165 feet.

MINNEAPOLIS—Northern Pump Co., 1620 Central avenue, J. B. Hawley, Jr., president, has given contract to Geo. F. Cook Construction Co. for an additional one-story factory to contain 300,000 square feet of floor space, two crane bays, etc.

ST. LOUIS PARK, MINN.—Mettaloy Corp., 1320 Rand Tower, Minneapolis, is building a one-story factory addition at 2400 Dakota avenue, St. Louis Park. W. W. Purdy, 2500 Sheridan avenue South, Minneapolis, is architect.

ST. PAUL—Railway Products Corp., 2694 University avenue, has been incorporated by W. E. Rumble, E. G. Vaughan and R. O. Sullivan to manufacture and deal in railway supplies. Road Products Inc., has been incorporated by the same incorporators to manufacture and deal in road construction machinery.

ST. PAUL—Six large buildings on Minnesota State Fair grounds have been taken over by army air force and will be converted into propeller manufacturing plant to be operated by A. O. Smith Corp., Milwaukee, Wis.

ST. PAUL—Ford Motor Co. will expand operations at St. Paul plant to manufacture parts for Pratt & Whitney airplane motors.

NORTH DAKOTA

MINOT, N. D.—Minot Foundry, Victor E. Johnson, manager, has applied for WPB approval to rebuild foundry recently destroyed by fire.

IOWA

DAVENPORT, IOWA — Mutual Engineering Co. has been incorporated by R. A. Ehlers to manufacture tools.

DAVENPORT, IOWA — Davenport Machine & Foundry Co., has given contract to John C. Tunnicliff Construction Co. for a one-story addition to machine shop.

SIOUX CITY, IOWA—Ray-O-Vac Co., Madison, Wis., will soon open a dry cell and radio battery plant in Sioux City.

WATERLOO, IOWA—Waterloo Valve Spring Compressor Co., Nicholas Sulentic, president, has increased its capital stock from $15,000 to $100,000 to provide additional capital for extensions to plant.

MONTANA

BILLINGS, MONT.—Yellowstone Metals, Inc., has been incorporated with a capital stock of $1,000,000 to manufacture manganese, coke, copper and other metal products. Principal stockholders and directors are: Ernest E. Murray, E. A. Beeler and P. J. McKay. Among the directors is Ernest T. Eaton, lieutenant governor of Montana.

BUTTE, MONT.—Domestic Manganese Co. has received WPB approval to build a 400-ton manganese milling plant. Company has applied to RFC for a $250,000 loan to finance construction.

OREGON

PORTLAND, OREG.—Monarch Forge & Machine Works, N. W. Twenty-first place and York street, will construct warehouse addition, 22 x 60 feet, to cost $35,000. George E. Manger, contractor.

WASHINGTON

SEATTLE—Seattle Boiler Works, 5237 East Marginal Way, plans installation of craneway.

SPOKANE, WASH.—Zenith Mines Inc., capital $50,000, has been organized by W. H. Gaines and associates, 303 Realty building.

CANADA

VANCOUVER, B. C. — Marwell Construction Co. has begun erection of two repeater stations at undisclosed locations, for the Department of Munitions and Supply, each to cost about $50,000.

USED and REBUILT EQUIPMENT
MATERIALS

SPECIAL ATTENTION!

STEEL MILLS,
BLAST FURNACES AND FOUNDRIES!

For Sale:

ALLOY ("CRITICAL") SCRAP

TURNINGS: $9.00 G.T. Houston plus payable OPA Nickel or Moly. Premiums.
10 C/L SAE 3100; WPB No. 6
5 C/L SAE 4800; WPB No. 6
10 C/L Moly.-Cr.; WPB No. 7
15 C/L Ni.-Mo.-Cr.; WPB No. 6

TURNINGS: $12.91 G.T. Tracks, Chicago, plus payable OPA Nickel Premium.
9 C/L 1.00-3.75% Nickel; WPB No. 6

FLASHINGS & CROPS: $16.50 G.T. Houston plus payable OPA Nickel or Moly. Premiums.
8 C/L SAE 3100; WPB No. 6
3 C/L SAE 4800; WPB No. 6
9 C/L Mo.-Cr. . . WPB No. 7
5 C/L Ni.-Mo.-Cr.; WPB No. 6

NOTE: Relative quantities of Turnings must be purchased with Flashings and Crops.

IRON & STEEL PRODUCTS, INC.
13462 S. Brainard Ave., Chicago, Illinois
"ANYTHING containing IRON or STEEL"

WANTED
FORGING HAMMERS

1,500 lb. or 2,000 lb. capacity.
Quote price and description.
Address Box 918
STEEL, Penton Bldg., Cleveland.

—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.

AT BIG SAVINGS

We can furnish rails; spikes; bolts; tie-plates; angle bars, and other track accessories. Steel equipment of all kinds. Write, wire or phone for prices.

SONKEN-GALAMBA CORP.
108 N. 2nd St. Kansas City, Kans.

BORING MILL, 84" N-B-P, R.P.T., M.D.
GEAR PLANERS, Bevel 36" & 54" Gleason, M.D.
HAMMER: Steam Forging 1100 lb. N-B-P.
SHEAR, Plate 60"x1/4" L & A, M.D.
SHEARS, Plate 44" & 54" x 3/16" M.D.
STRAIGHTENER, Wire Shuster, cap. 5/8".
STRAIGHTENER, Tube Torrington 1/4"-5/8" O.D.
STRAIGHTENER, Plate 12-roll H&J, 84"x1/4", M.D.
TURRET LATHE, 3-A W&S, H.S. 3 11/16", S.P.D.
TURRET LATHE, 34" Gisholt, H.S. 4-1/4", M.D.
TURRET LATHE, 26" Libby, H.S. 7-1/2", S.P.D.

LANG MACHINERY COMPANY
28th Street & A. V. R. R. Pittsburgh, Pa.

—FOR SALE—

2—100 TON LADLES
7—2-HIGH MERCHANT ROLLING MILLS
5—ELECTRIC FURNACE TRANSFORMERS
1—LEWIS RAIL BREAKING PRESS
1—BILLET LIFTING MAGNET
2—RUBBER LINED DUST CATCHERS
2—BOLT OR UPSETTING MACHINES
2—FRICK DRINKING WATER COOLING SYSTEMS
12—STEEL BUILDINGS, With or Without Crane Service
1—TAYLOR WINFIELD BUTT WELDER
1—ENTERPRISE FLASH TRIMMER.

HETZ CONSTRUCTION CO.—Phone 4474—WARREN, OHIO

WANTED TO BUY

BROWN & SHARPE #13 or NEWARK 2B AUTOMATIC BEVEL GEAR CUTTING MACHINE.

Must be in A-1 Running Condition. Send Complete Data Including Picture and Manufacturer's Serial Number of Machine To:

WESTCOTT CHUCK COMPANY
P. O. Box 270 Oneida, N. Y.

ROLLING MILLS *and* EQUIPMENT
FRANK B. FOSTER
829 OLIVER BUILDING PITTSBURGH, PA.
Cable Address, "FOSTER" Pittsburgh

RELAYING RAIL

Practically all weights—Any quantity. Immediate shipment, strictly first quality reconditioned Relaying Rail and Accessories.

Write, Wire, or Phone
MIDWEST STEEL CORPORATION
Charleston, W. Va.

FOR SALE

STEEL BUILDINGS
AND TANKS
PIPE AND BOILER TUBES

JOS. GREENSPON'S SON PIPE CORP.
National Stock Yds., Illinois

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

SELLERS—BUYERS—TRADERS

More for Your Dollar!

IRON & STEEL PRODUCTS INC.
13462 S. Brainard Ave.
Chicago, Illinois

38 Years' Experience

"Anything containing IRON or STEEL"

IMMEDIATELY AVAILABLE

1564 ft. 150 lb. Sullivan 22 x 12 x 14" WN31 Compressor, driven by Synchronous Motor, 3/60/2300 Volt. Complete and guaranteed. 5' x 18' Air Receiver and pipe and fittings also available.

MISSISSIPPI VALLEY EQUIPMENT CO.
503 Locust Street St. Louis, Mo.

RAIL-ACCESSORIES
RAILWAY EQUIPMENT

• BOUGHT • SOLD •

WRITE—WIRE—PHONE
DULIEN STEEL PRODUCTS, INC.
414 First Ave., So. Seattle, Wash.
2280 Woolworth Bldg. New York, N. Y.

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

Help Wanted

STEEL FOUNDRY MANAGER

Opportunity for an experienced practical foundryman with at least 20 years shop experience to take charge of all operations in a steel foundry located in northern Ohio. Must have working knowledge of all departments and be able to train men. Present manager desires to withdraw. Right man to become official in the company. Present capacity 600 tons light steel castings. In reply state all details, experience, salary desired, personal conditions. Address Box 921, STEEL, Penton Bldg., Cleveland.

WANTED

ASSISTANT SERVICE MANAGER

Railway supplies with experience in field service to relieve service manager of various duties to include: selection and assignment of personnel (100 men in field), correspondence, supplies, office records, investigations.

ASSISTANT SALES MANAGER

with education equivalent to mechanical or electrical engineer. Technical devices.

GOOD OPPORTUNITIES
WAR & PEACETIME INDUSTRY
(ESSENTIAL ACTIVITIES)
LOCATION, VICINITY N. Y. CITY
REPLIES STRICTLY CONFIDENTIAL

SEND COMPLETE DETAILS TO BOX 585

Equity Advertising Agency,
113 West 42 St., N. Y. C.

ALESMAN—FAMILIAR WITH ALLOY AND ainless mill products. Replies confidential. ddress Box 912, STEEL, Penton Bldg., Cleveand.

Help Wanted

GENERAL MACHINE SHOP SUPERINTENDENT

Experienced in both large and small machine work, production and jobbing. Permanent position, not affected by war conditions. Plant now 100% on defense work.

Write Box 905,
STEEL, Penton Bldg., Cleveland.

SUPERINTENDENT TO TAKE CHARGE OF plant manufacturing steel containers, production minded executive with practical mechanical knowledge of product and ability to handle and train new employees. Good salary, bonus, and attractive future in permanent position if qualified. Reply Box 919, STEEL, Penton Bldg., Cleveland.

WANTED: EXPERIENCED AND COMPETENT Engineer, Estimator and Salesman for both welded and riveted plate and structural fabrication. Apply in writing, giving experience and full particulars. Address Box 911, STEEL, Penton Bldg., Cleveland.

WANTED: SALES MANAGER, GENERAL Steel Plate, Structural and Allied Fabrication—Middlewest. Must have engineering background, also executive and organizing ability. Write giving age, education, experience, salary, and references. Address Box 924, STEEL, Penton Bldg., Cleveland.

WANTED: SALES MANAGER, GENERAL steel plate and structural products—Gulf States. Write giving full information experience, salary. Address Box 925, STEEL, Penton Bldg., Cleveland.

Accounts Wanted

I WANT TO REPRESENT A GOOD STEEL or aluminum foundry, machinery, equipment or supply account in the Wisconsin and Chicago territory. Have developed an enviable clientele. Thirty-five years experience in all branches of the foundry and selling castings. Commission basis preferred. Reply Box 922, STEEL, Penton Bldg., Cleveland.

Positions Wanted

CHIEF ENGINEER, CHIEF ESTIMATOR OR Plant Engineer with broad diversified experience in structural steel, plate work, plant layout and design, refinery equipment, maintenance, cost, purchasing and expediting. Employed at present, desire to make change. 17 years actual experience. Age 36 years, good education, married, A-1 references. Draft classification 3A. Prefer south location. Reply Box 910, STEEL, Penton Bldg., Cleveland.

SALESMAN
SALESMANAGER
Now with reputable steel mill. Knows machine tools, machinery and steel. Shows excellent selling record. Travelled extensively. Wish change for best reasons. Reply Box 926, STEEL, Penton Bldg., Cleveland.

ACID OPEN-HEARTH MELTER FOREMAN or Assistant Superintendent, Age 25, technical university graduate offers experience in A.O.H. melting and research for opportunity to learn basic O.H. or basic or acid electric practice. Prefer employment which will offer part time research opportunity but will consider strict production if exceptional future is offered. Reply Box 920, STEEL, Penton Bldg., Cleveland.

DESIGNING ENGINEER, FAMILIAR WITH all phases of Steel Mill Design, both Electrical and Mechanical, desires position in Steel Mill on Improvement and Development Work. Can furnish good record of achievement. Address Box 915, STEEL, Penton Bldg., Cleveland.

MANAGEMENT ENGINEER
Desires Permanent Position. Have Wide, Varied, Thorough Experience in Management Engineering, Production Control, Cost Reduction, Budgetary Controls, Methods, Incentive, Surveys and Investigations. Efficient, Aggressive Organizer. Age 45, Married. Address Box 923, STEEL, Penton Bldg., Cleveland.

Employment Service

SALARIED POSITIONS—This advertising service of 33 years' recognized standing negotiates for high salaried supervisory, technical and executive positions. Procedure will be individualized to your personal requirements and will not conflict with Manpower Commission. Retaining fee protected by refund provision. Send for details. R. W. BIXBY, Inc., 110 Delward Bldg., Buffalo, N. Y.

CONTRACT WORK

KIRK & BLUM

WELDED MACHINE BASES, PEDESTALS and FRAMES
LATHE PANS
GEAR and BELT GUARDS
Pressed Steel Louver Panels and Cover Plates
THE KIRK & BLUM MFG. CO.
2622 Spring Grove Ave., Cincinnati, Ohio

HOT DIP GALVANIZING

"A Material Difference"

GALVANIZED PRODUCTS
PRODUCTION HEAT TREATING
COMMERCIAL METALS TREATING INC.
TOLEDO, OHIO

SHEET STEEL FABRICATORS

Welded or Riveted Construction. Can handle No. 10 gauge and lighter. Send us your inquiries for estimates.
THE HAINES COMPANY
1931 W. Lake St. Chicago, Ill.

Send your inquiries for
SPECIAL ENGINEERING WORK
to the
A. H. NILSON MACHINE COMPANY,
BRIDGEPORT, CONN.
designers and builders of wire and ribbon stock forming machines.
We also solicit your bids for cam milling

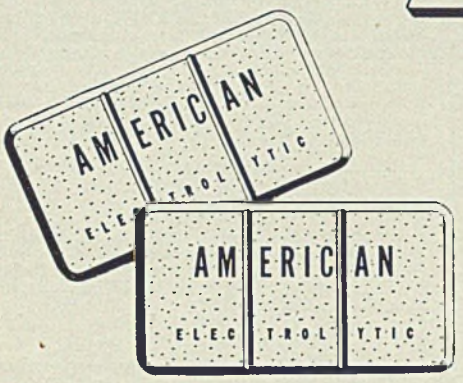
Castings

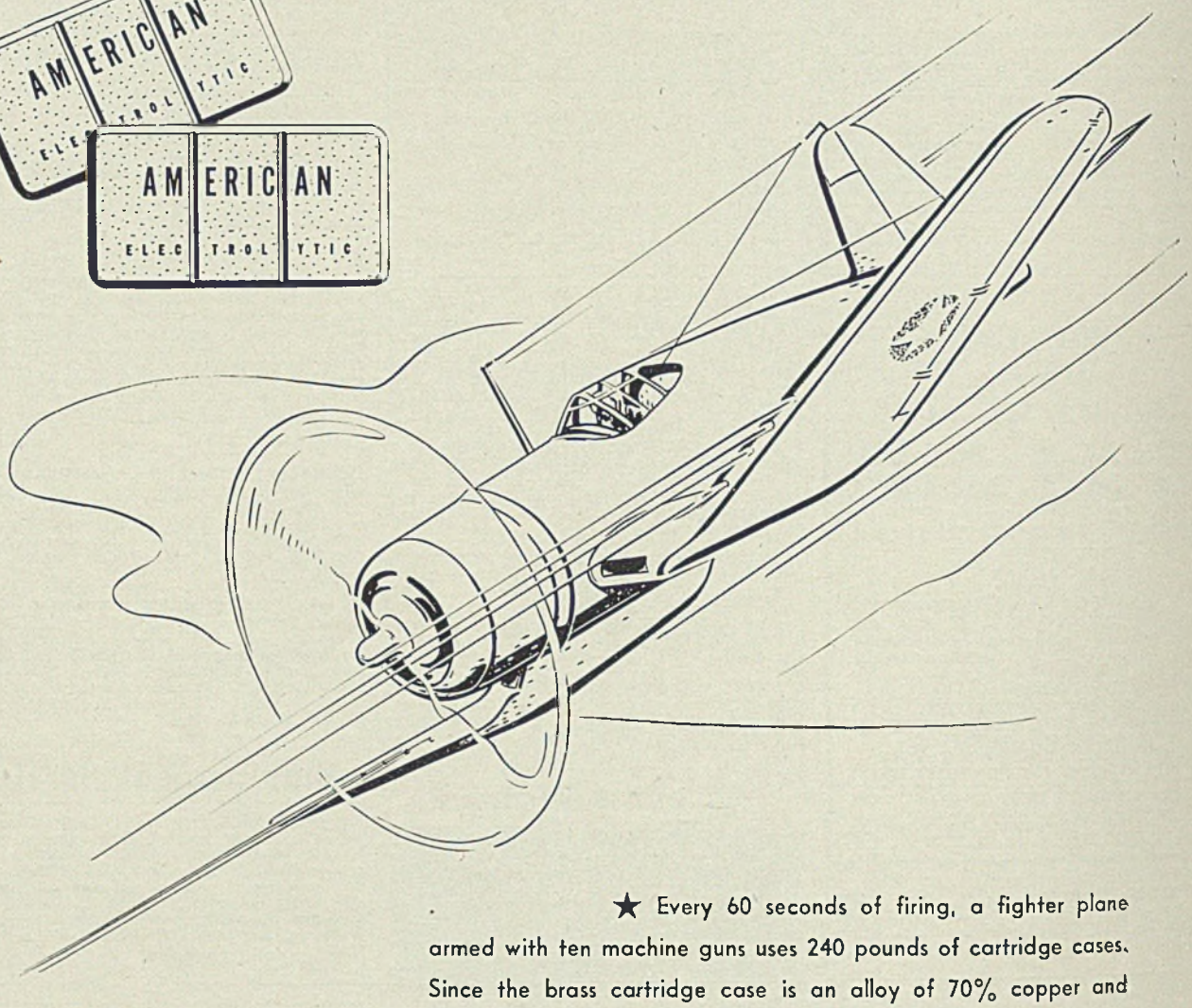
KING FOUNDRIES, INC., NORTH WALES, Pa. Grey Iron and Semi Steel Castings, also alloyed with Nickel, Chrome, and Molybdenum. Wood, Iron, Brass, and Aluminum Pattern work.

SAY IT HERE

If you have facilities to handle additional work. An advertisement in this section will tell others of your capacity, etc. Write STEEL, Penton Bldg., Cleveland.

2 SLABS OF ZINC A MINUTE





★ Every 60 seconds of firing, a fighter plane armed with ten machine guns uses 240 pounds of cartridge cases. Since the brass cartridge case is an alloy of 70% copper and 30% zinc, this means that the equivalent to 2 slabs of zinc or the zinc content of about two tons of Tri-State ore is used every minute of fighting by every ten gun fighter plane.

This is only one example of the important use of zinc in the war . . . only one example of the reason for our own expanded production. Today we are supplying every grade of zinc for war-time requirements . . . tomorrow when victory permits, we will be able to supply our customers with a more complete line of zinc metals than ever before.

EVERY GRADE OF ZINC FOR WARTIME REQUIREMENTS

PRIME WESTERN
★
SELECT
★
BRASS SPECIAL
★
INTERMEDIATE
★
HIGH GRADE
★
SPECIAL HIGH GRADE

AMERICAN ZINC SALES COMPANY
Distributors for
AMERICAN ZINC, LEAD & SMELTING CO.
COLUMBUS, OHIO CHICAGO ST. LOUIS NEW YORK

ADVERTISING INDEX

*Advertisements appear in previous issues.

Where-To-Buy Products Index carried quarterly.

(Continued on next page)

ADVERTISING INDEX

*Advertisements appear in previous issues.

Where-To-Buy Products Index carried quarterly.

HOT JAVA in Iceland...

from a zinc coated STEEL CUP

When you compare a canteen cup or mess-kit with a tank, the eating utensil seems piddling and insignificant. But multiply it by an 8,000,000-man army and you immediately see that a large tonnage of steel is involved.

It's special steel, too. Made in deep-drawing quality, so that a canteen-cup can be pressed out of a flat circular disc (rolled rim, kidney shape and all). Bethlehem is supplying mess-kit manufacturers with this special deep-drawing steel in substantial quantities. This is just one more example of the many calls nowadays on Bethlehem's sheet-steel capacity, both for direct war equipment and for supplementary jobs on the working front.

BETHLEHEM STEEL SHEETS

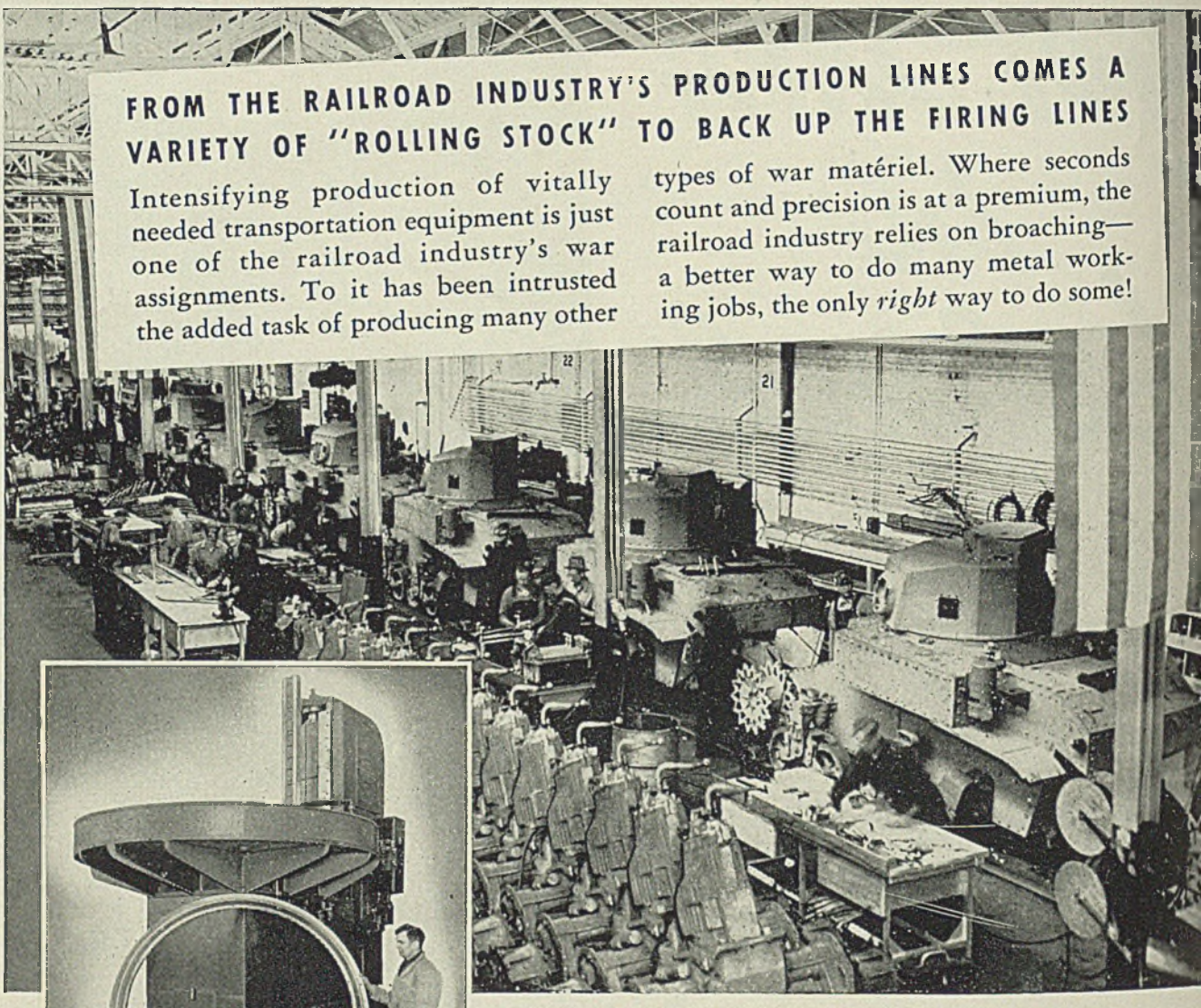
BETHLEHEM STEEL

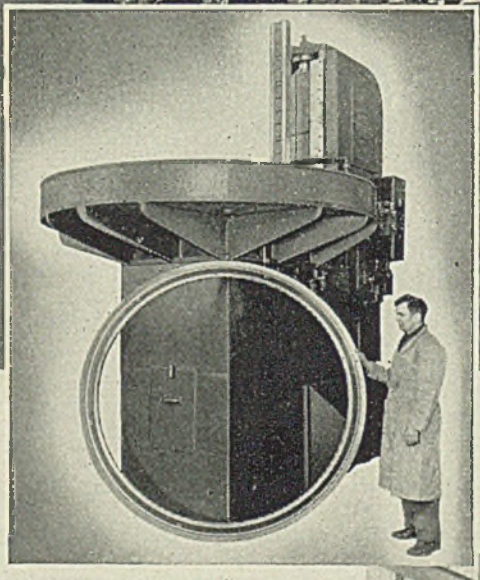
★ ★ ★

LINES BEHIND THE LINES

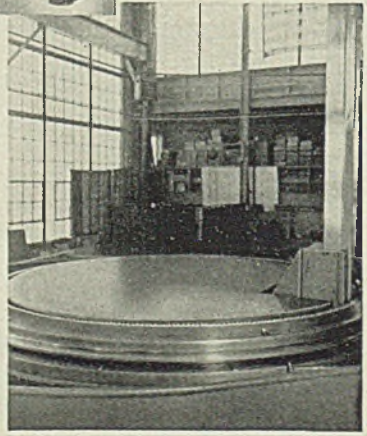
FROM THE RAILROAD INDUSTRY'S PRODUCTION LINES COMES A VARIETY OF "ROLLING STOCK" TO BACK UP THE FIRING LINES

Intensifying production of vitally needed transportation equipment is just one of the railroad industry's war assignments. To it has been intrusted the added task of producing many other types of war matériel. Where seconds count and precision is at a premium, the railroad industry relies on broaching—a better way to do many metal working jobs, the only *right* way to do some!





This big tank turret gear, taller than a six-foot man, is economically and automatically broached on an *American* surface broaching machine. No special skill is needed. One operator, one machine, and tooling by *American*—equal a precision job at a production rate!



Three internal teeth are cut and finished with each pass of the tool. At completion of the stroke the broach is hydraulically withdrawn from the cut, and the gear is indexed to next working position during the upward stroke. When the 348 teeth are finished the machine automatically stops, permitting easy and rapid reloading of a new blank.

BROACHING IS BETTER THE *American* WAY

American
BROACH AND MACHINE CO.

ANN ARBOR, MICHIGAN

•

BROACHING MACHINES
PRESSES
BROACHING TOOLS
SPECIAL MACHINERY

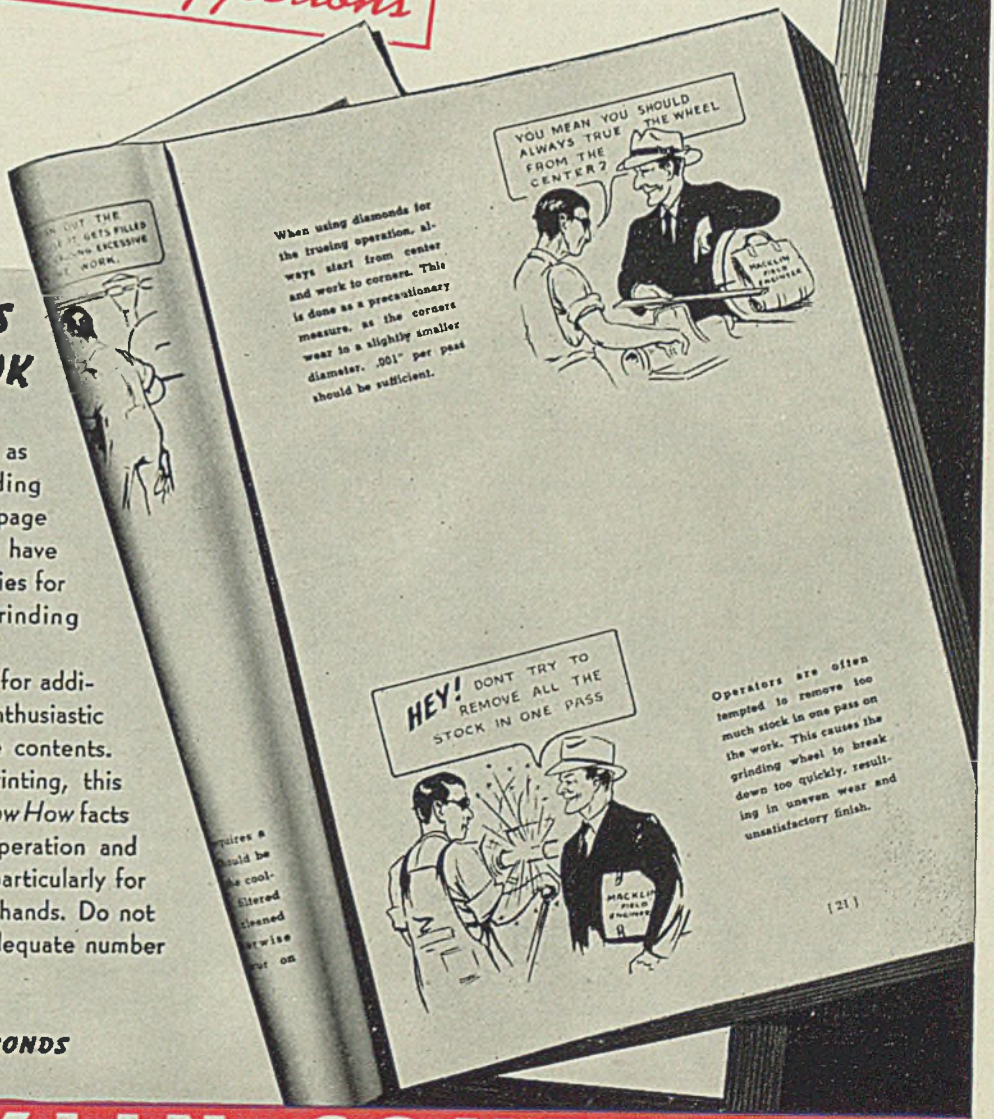
DIVISION OF SUNDSTRAND MACHINE TOOL CO. ROCKFORD ILLINOIS U.S.A.

MACKLIN GRINDING WHEELS

HELPFUL HINTS

and

Safety Suggestions



GET YOUR COPIES OF THIS FREE BOOK

Many of the larger as well as the smaller users of grinding wheels have found this 64 page booklet so valuable that they have requested as many as 100 copies for distribution through their grinding departments.

Comments with requests for additional copies have been highly enthusiastic on the instructive value of the contents.

Already in its second printing, this illustrated booklet contains *Know How* facts invaluable as an aid in the operation and care of grinding wheels, and particularly for the instruction of new grinder hands. Do not hesitate to call on us for an adequate number of copies to cover your needs.

★

INVEST IN WAR BONDS

MACKLIN COMPANY

Manufacturers of GRINDING WHEELS — JACKSON, MICHIGAN, U. S. A.

Distributors in all principal cities

Sales Offices: — Chicago - New York - Detroit - Pittsburgh - Cleveland - Cincinnati - Milwaukee - Philadelphia

BEHIND THE SCENES

The Tools of War

■ If you haven't already seen the exhibit of military equipment in the Chrysler Building, don't fail to drop in for a few minutes on your next trip to New York. It's second only to a trip to Aberdeen Proving ground, which, of course, is a little more difficult to arrange.

We're sure you'll agree that just as our industrial equipment and production methods are superior to those of the Axis nations, so also is our military equipment. One ack-ack gun, for instance, is completely controlled by electric motors and controls, the power being supplied by a gasoline-driven generator. It may be aimed by remote control which draws an accurate bead on enemy aircraft.

There are a lot of other things to see, including blockbusters, various types of guns, a complete bomber fuselage and the like. Although the stuff we are using against the Japanazis is the last word, they haven't seen anything yet. A number of new things are in the works, some of which will even out-Bazooka the famous Bazooka which cuts through thick armor plate like cheese—as the Germans who *were* in Tunisia will well testify.

Machines That Have Morals

■ Of course in our own market analysis work on STEEL we have for several years used the I.B.M. punched card system for tabulating and maintaining our data. So, also, has many another private business in their production or payroll work. But, mister, if you really want to be flabbergasted sometime take a run out to Suitland, Maryland where, in a building that stretches from here to there, the census tabulations are made and the data kept. They've got machines that will do everything except brush your teeth and tuck you in bed. Their pride, which was designed by Dr. Hollerith when a bureau employe, and is made right there on the spot in their own machine shop, counts at the rate of 400 cards a minute up to sixty different totals and variations without sorting the cards and gives it all to you on a neatly printed sheet. And the damned thing actually does its own thinking. For instance, we watched it making a count of the women in the country, showing age, marital status, etc., etc., all at the same time. Well a card went through punched to show a girl of five as being married. Without so much as even mulling it over the machine refused to count the card and pushed it aside so the mere human being running the count could fix the poor girl's plight.

Correction

■ Those of you who read with interest the story in the May 3 issue on the wartime shifts in population, reported as coming from the Bureau of the Census, will be interested in this letter from Dr. Philip M. Hauser, assistant director of the bureau in Washington:

> **I should have made more clear the fact that I prepared this analysis as a population student at the invitation of the American Management Association rather than in my capacity as assistant director of the bureau. The classifications and predictions made have, therefore, no official status and the Bureau of the Census should not receive the brickbats that may be stimulated by the article.**

This, of course, is not to say that the classifications and predictions are not accurate. Rather it is to clarify a point in view of the fact that many manufacturers have already used this information and will continue to use it to relocate their branch offices and to plan and revise their postwar distribution procedure.

Visit to the Census Bureau

■ Incidentally we had the pleasure last week of meeting Dr. Hauser and his very capable associates at the Bureau of the Census, as well as J. C. Capt, director of the bureau. Never have we had more pleasant and efficient cooperation from either any other government agency or any private business. As was outlined in STEEL's story in the May 17 issue it will well pay any manufacturer interested in postwar or current markets to get better acquainted with his bureau of the census. You will get an intelligent and cooperative reception.

Innocent Observer

■ Those interested in a little education in the art of scientific gambling should contact most anyone who attended the Triple Mill Supply meeting in Cincinnati earlier this month. Of course we just stuck our toes in to see how the water was and in a quick five minutes got rid of a dollar's worth of nickels in a one-armed bandit across the river at the famous Beverly Hills club in Kentucky; figuring the machine requiring silver dollars would be a little too rough. For those inclined toward the higher sciences, you can name it and get it with $1000 pay-offs on the bingo games.

Bouquets

■ Two nice bouquets in the mail this week:

> **I wish to go on record as saying that there is no better source of information to the metallurgist than STEEL. Also I wish to compliment you upon your publication of the handbook "Modern Small Arms" and would be very interested in any other such publications that may appear in the future.**
>
> *—James P. Davis,*
> *Ordnance Dept., Aberdeen, Md.*

> **Your magazine fills a valuable part of every day business and you can rest assured I shall not be without it.**
>
> *—Harold Jacobs*
> *Clayton, Missouri*

The Postwar Automobile

■ As with E. C. Kreutzberg's special report on Postwar Planning, there has been such a demand for reprints of A. H. Allen's series on the Postwar Automobile that we are reprinting it for further distribution. In limited quantities, copies are available to regular subscribers free of charge by writing to the Readers Service Department, Penton Building, Cleveland.

Vol. 112, No. 22, May 31, 1943, issue of STEEL, published every Monday at Cleveland, Ohio. Entered as second class matter at the post office. Cleveland, O., under act of March 3, 1879. U. S. and possessions, Canada, Mexico, Cuba, Central and South America, 1 year $6; 2 years $10; all other countries, 1 year $12. Current issues, 25c. Yearbook of Industry issue, $2.00.

Editorial Contents—Page 25

Even the "Experts" Were Stumped IN A QUIZ ON BAR TURNERS

Do you run into oversized or undersized diameters?

Are you ever troubled with "barber-pole" or "Chinese-writing" finishes?

Ever have a "lump" at the start of a cut?

Ever cuss at the "sloppy fit" of re-ground cutters?

THE Warner & Swasey Single Cutter Bar Turner sees more service than any other tool used in turret lathe setups for bar work.

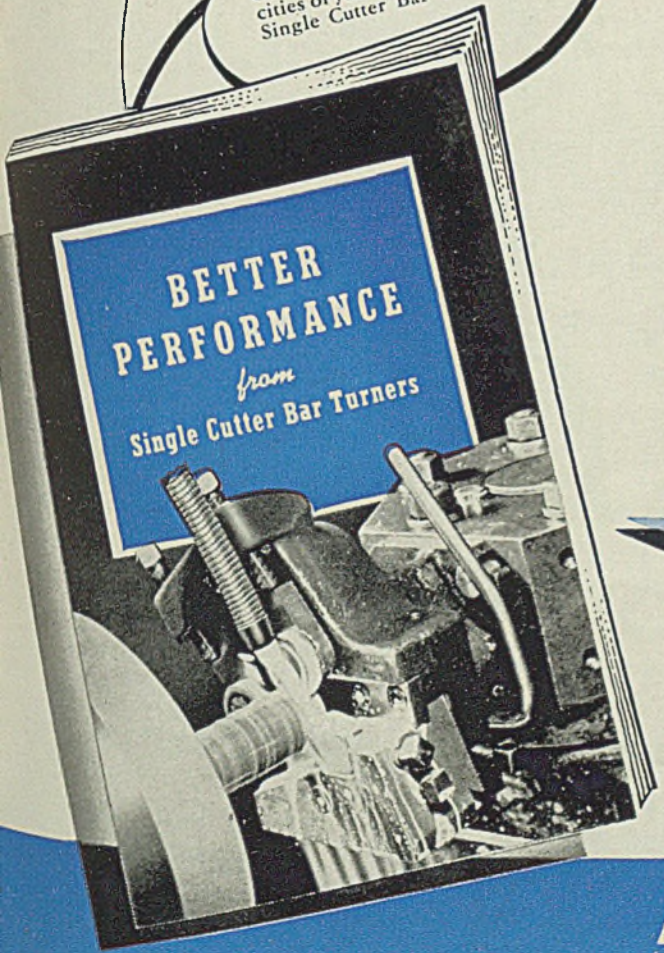
Job studies of this tool in action in plants all over the country disclosed to our field men the urgent need for a better knowledge of the mechanical details in the tool itself, and a better understanding of its usage.

Many operators were not getting the best performance from the tool because simple adjustments were overlooked, cutters were improperly ground or wrongly positioned.

This is no reflection upon these operators. Even the master machinist or veteran setup man can learn things about this important tool that he probably didn't know before.

That's why a 32-page booklet about the Single Cutter Bar Turner has been written and is offered by Warner & Swasey as a guide to better finishes and increased production.

This new 32-page booklet just off the press will help eliminate those troubles. It is packed with information, helpful hints, illustrations, and diagrams that will give you a better knowledge of the versatility and capacities of your Warner & Swasey Single Cutter Bar Turner.



Use the Handy Coupon — Mail Today —It Will Bring the Single Cutter Bar Turner Manual Promptly.

WARNER & SWASEY
Turret Lathes
Cleveland

Warner & Swasey Operator's Service Bureau, Cleveland, Ohio
Please send booklet, "Better Performance from Single Cutter Bar Turners".

Name _____

Address _____

City _____ State _____

I work at (Company) _____

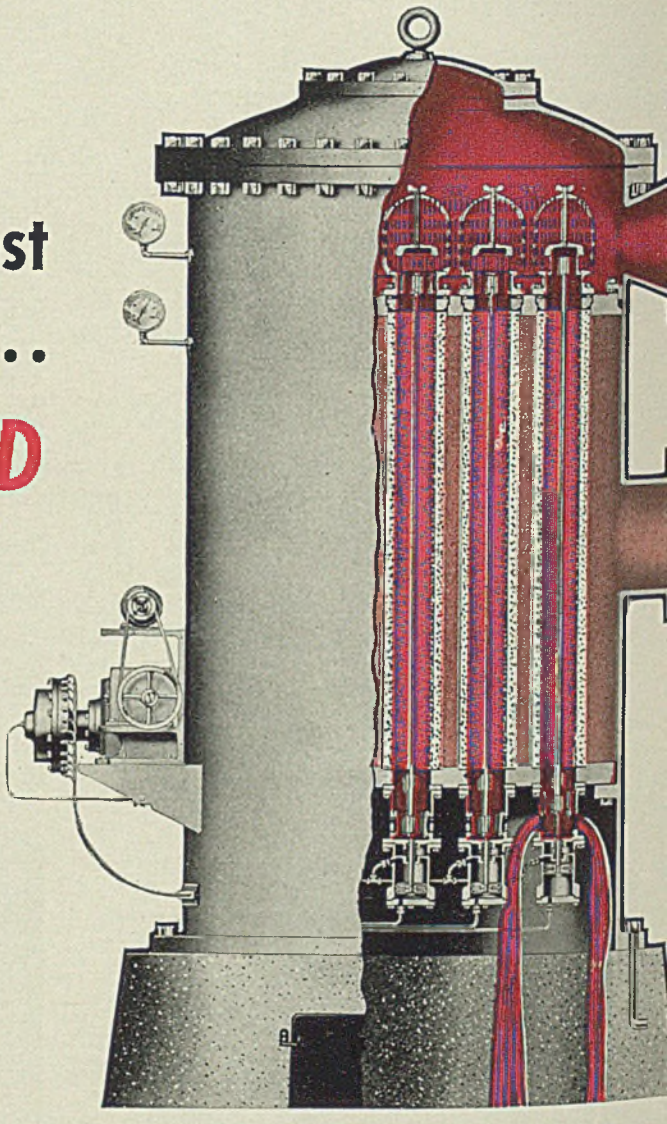
ST-14

YOU CAN TURN IT BETTER, FASTER, FOR LESS . . . WITH A WARNER & SWASEY

Automatic WATER FILTERS

High maintenance cost from dirty flood water...

CAN BE ELIMINATED



● Your bearings and rolls will last longer with FILTERED WATER and your hydraulic equipment will give more hours of trouble free service.

The success of ADAMS AUTOMATIC filters where others have failed is due to low velocity filtration. Where outdated equipment used 5 sq. ft. of filtered area, ADAMS AUTOMATICS use 100 sq. ft. For steel mill service, we recommend Adams monel PORO-SCREEN tubes capable of removing particles 4/1000" and larger. The multiple tube design has no moving clearances and is fully automatic. One tube backwashed at a time while filter is delivering full rated capacity. Adjustable control gives flexibility of backwashing—flood water more frequent—normal water less frequent. Built in four sizes from 300 gpm. to 2000 gpm. Write for Bulletin 901.

★ R. P. ADAMS COMPANY, INC. ★

75 CHICAGO STREET, BUFFALO, N. Y.

ADAMS PORO-STONE AND PORO SCREEN FILTERS

MORE { TONS PER LOAD . . . *EVERY LOAD!*
LOADS PER DAY . . . *EVERY DAY!*
DAYS PER WEEK . . . *EVERY WEEK!*

● That's Plymouth's Promise of Performance . . . a promise to those who have yet to use a Plymouth, a happy realization to Plymouth owners.

Low cost operation, minimum upkeep, rugged construction, ample power, speed, versatility . . . that's why you will find so many Plymouth Locomotives providing industrial transportation. Gasoline or diesel powered Plymouths are the correct solution to haulage problems. And . . .

TRACK HAULAGE IS CHEAPER HAULAGE

PLYMOUTH GASOLINE and DIESEL LOCOMOTIVES

PLYMOUTH LOCOMOTIVE WORKS

Division of The Fate-Root-Heath Co. PLYMOUTH, OHIO, U. S. A.

ST. JOSEPH LEAD COMPANY.

250 PARK AVENUE

NEW YORK

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CABLE ADDRESS
SAINTJOE NEW YORK

AN OPEN LETTER TO OUR CUSTOMERS

We know that the procurement departments of industry have the very toughest problems during war time. At least, metal buying is much more difficult today than metal selling.

The aim of an efficient sales organization should be to advise and assist the buyer, and to expedite shipment of orders.

"ADVISE": We cannot call on you as often as we used to - some of our most experienced men are in full time Government service, others, part time - so we cannot sit down and discuss your problems as we could heretofore.

"ASSIST": A salesman's hardest duty is to refuse to accept 100% of a valued customer's order. Yet we often cannot book more than two-thirds or three-quarters of the tonnage offered.

"EXPEDITE": At present we cannot carry normal stocks of lead, zinc, antimony or cadmium; and direct Government orders, especially for Lend-Lease, must take precedence, so we are often unable to expedite your orders by shipping on the dates requested.

Circumstances may cause us to fall short in performance of our sales ideals, but we still have ideals.

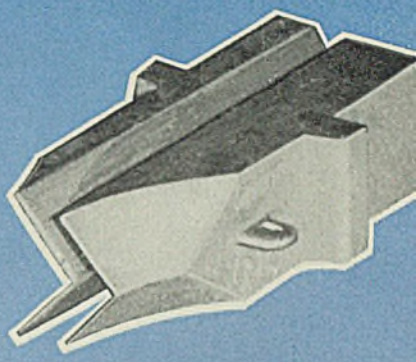
Yours very truly,

Irwin H. Cornell

Vice Pres. and Sales Mgr.

IHC:b

It's the Mettle in your GUIDE that Counts.

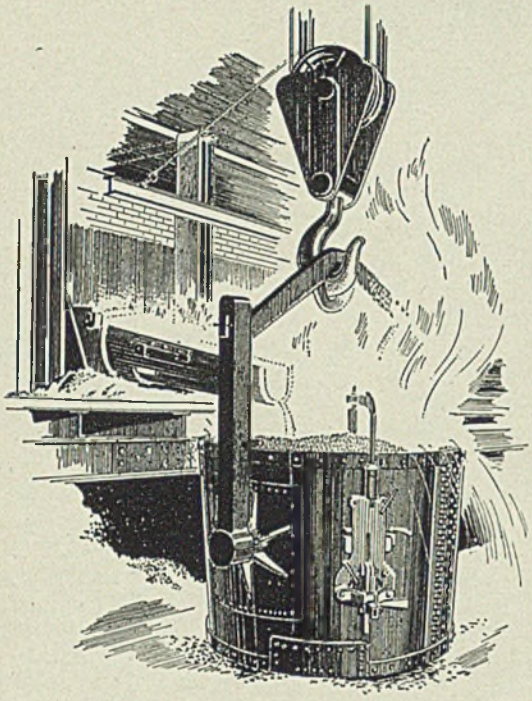


TRANTINYL GUIDES

ARE PRECISION CAS
OF THAT "METTLE

Youngstown Alloy Casting Corporation

YOUNGSTOWN, OHIO



Electromet Facts *for Steel Makers*

In addition to providing a full line of high-quality ferro-alloys and alloying metals, Electro Metallurgical Company can serve you in other important ways:

Experience—We have a background of over 35 years of experience in producing ferro-alloys, and our store of information on the use of alloys is available to the steel industry.

Development—We maintain modern laboratory facilities for developing new ferro-alloys and for solving industrial metallurgical problems. Developments from this research include the low-carbon ferro-alloys, silicomanganese, Silcaz and Silvaz alloys, calcium metal, calcium-silicon, calcium-manganese-silicon, and ferrocolumbium.

Service—A staff of technically trained metallurgists render on-the-job assistance to steel makers in the use of ferro-alloys. Because they have practical shop experience they are qualified to suggest the grades and sizes of alloys best suited for your particular use. They can also advise on possible substitutes for unavailable alloys, and on the best use of the alloys obtainable.

Literature—Booklets and reprints of technical articles give information of the correct use of ferro-alloys. Among these are "Vanadium in Steel and Iron—A Review," "Boron," and "Electromet Products and Service." Write for any of these that can help you.

Facilities—Our plants have been greatly expanded to meet the current demands for ferro-alloys. Warehouses and sales offices are strategically located throughout the major steel-producing districts to insure prompt shipments on emergency and normal orders. Electromet Ferro-Alloys and Metals are distributed through offices of Electro Metallurgical Sales Corporation in Birmingham, Chicago, Cleveland, Detroit, New York, Pittsburgh, and San Francisco. In Canada they are sold through Electro Metallurgical Company of Canada, Limited, Welland, Ontario.

"Electromet," "Silcaz," and "Silvaz" are trade-marks of Electro Metallurgical Company.

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York, N. Y.
In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

Electromet Trade-Mark
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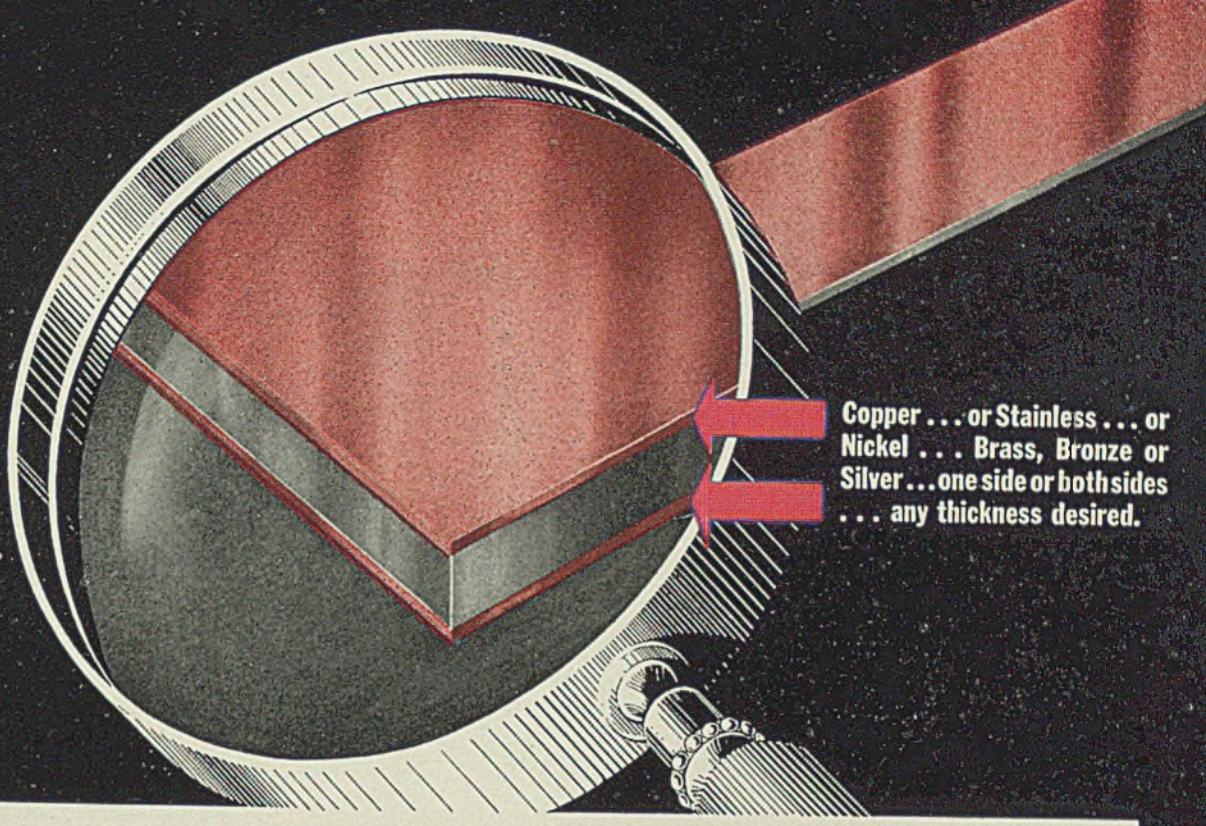


Copper . . . or Stainless . . . or Nickel . . . Brass, Bronze or Silver . . . one side or both sides . . . any thickness desired.

SuVeneer*

*Trademark Reg. U. S. Pat. Off.

THE INSEPARABLY BONDED CLAD METAL

Roll it—spin it—draw it—stamp it! This uniquely-produced composite metal, an exclusive development of Superior Steel Corporation, opens new horizons to designers now occupied in product development for post-war sales.

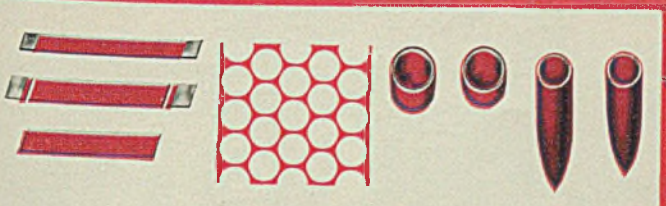
In SuVeneer Clad Metal, other ferrous or non-ferrous alloys are joined with plain steel, covering one or both sides in equal or different thicknesses. The ratio of clad to base metals remains constant through reducing and forming operations, providing high flexibility in product design and manufacture.

Mark "SuVeneer" well for the future . . . get the facts today!

"SuVeneer" in War

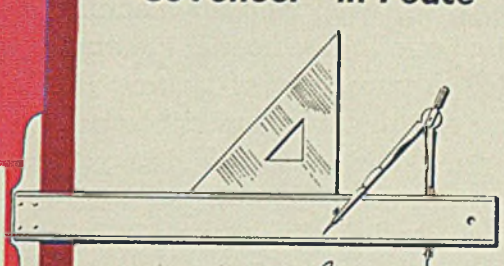
Steel, clad with gilding metal by the Superior process, forms the jackets of x-millions of United Nations' bullets each year—replacing the solid gilding metal jackets formerly used, and saving thousands of tons of copper monthly for other war needs.

Use of this Superior process for such war purposes has been granted, without charge to a score of other steel companies, through the Duration.



. . . from the SuVeneer gilding metal clad strip, to cups, to finished bullet jackets.

"SuVeneer" in Peace



Reserved for tomorrow's designers

Superior Steel CORPORATION

CARNEGIE • PENNSYLVANIA

WHAT WSR (WELDING SERVICE RANGE) *Tells You About Welding Heat...*

When you buy a welding machine, you pay for just one thing: *heat at the end of the electrode.* A sure way of getting the heat you want at the lowest possible cost is to buy on the WSR basis (Welding Service Range) rather than on a theoretical rating.

WSR enables you to determine exactly how much *usable* welding current your machine will deliver. It enables you to put welding heat on the basis of cost per ampere.

P&H gives you this and such additional advantages as *single control,* instantaneous arc response, lower maintenance costs. Get the whole story on welder-wise buying. See your nearest P&H representative or write for the folder on WSR ratings.

P&H builds a complete line of A.C. and D.C. Arc Welders, as well as a full line of welding electrodes.

P&H
ARC WELDERS

General Offices: 4411 W. National Ave., Milwaukee, Wisconsin

HARNISCHFEGER
CORPORATION
ARC WELDERS · EXCAVATORS · ELECTRIC CRANES · P&H · MOTORS · HOISTS · WELDING ELECTRODES

New products arising out of the stress of war will shape the pattern of your postwar production. Long-range planning to meet changing conditions, keen competition, new discoveries will bring rich rewards.

Our knowledge of casting non-ferrous metals, accumulated during almost 70 years, is a vast source of helpful information. Consult with our experienced engineers and metallurgists for new ways and short-cuts to unexpected profits.

N·B·M

NON-FERROUS CASTINGS
BRONZE BEARINGS AND BARS

NATIONAL BEARING METALS CORPORATION

ST. LOUIS • NEW YORK

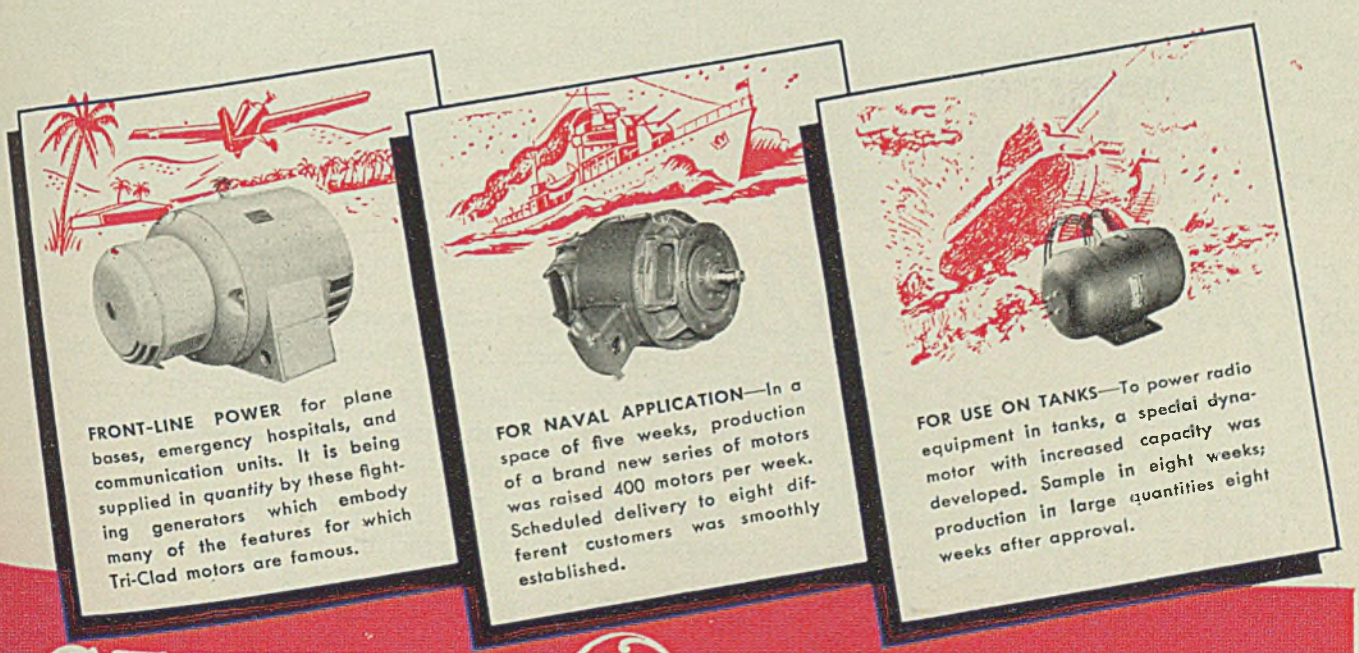
PLANTS IN: ST. LOUIS, MO. • PITTSBURGH, PA. • MEADVILLE, PA. • JERSEY CITY, N. J. • PORTSMOUTH, VA. • ST. PAUL, MINN. • CHICAGO, ILL.

WE INVITE BUILDERS of motor-operated combat equipment to get in touch with us in the earliest stages of planning for their motor requirements. We are building so many new and ingenious fighting motors, it's 10 to 1 that we already have something which can be adapted to meet your needs.

Although we cannot accept any new orders for certain types of fighting motors, we do have, or will have in the very near future, facilities to engineer and build additional fighting motors of other types. We would appreciate the opportunity of reviewing your needs during the earliest stages of your planning, in order to determine how we can help you.

We have the pledge of the more than 1700 design and application engineers in our motor plants to give the fastest service it is humanly possible to give whenever they are asked to help on fighting motors. And even if we must say "No," we believe you will appreciate a fast answer. Get in touch with your local G-E representative to see if the fighting-motor design you need can be adapted to our available production facilities. *General Electric Company, Schenectady, N. Y.*

TO MOTORIZE IT



FRONT-LINE POWER for plane bases, emergency hospitals, and communication units. It is being supplied in quantity by these fighting generators which embody many of the features for which Tri-Clad motors are famous.

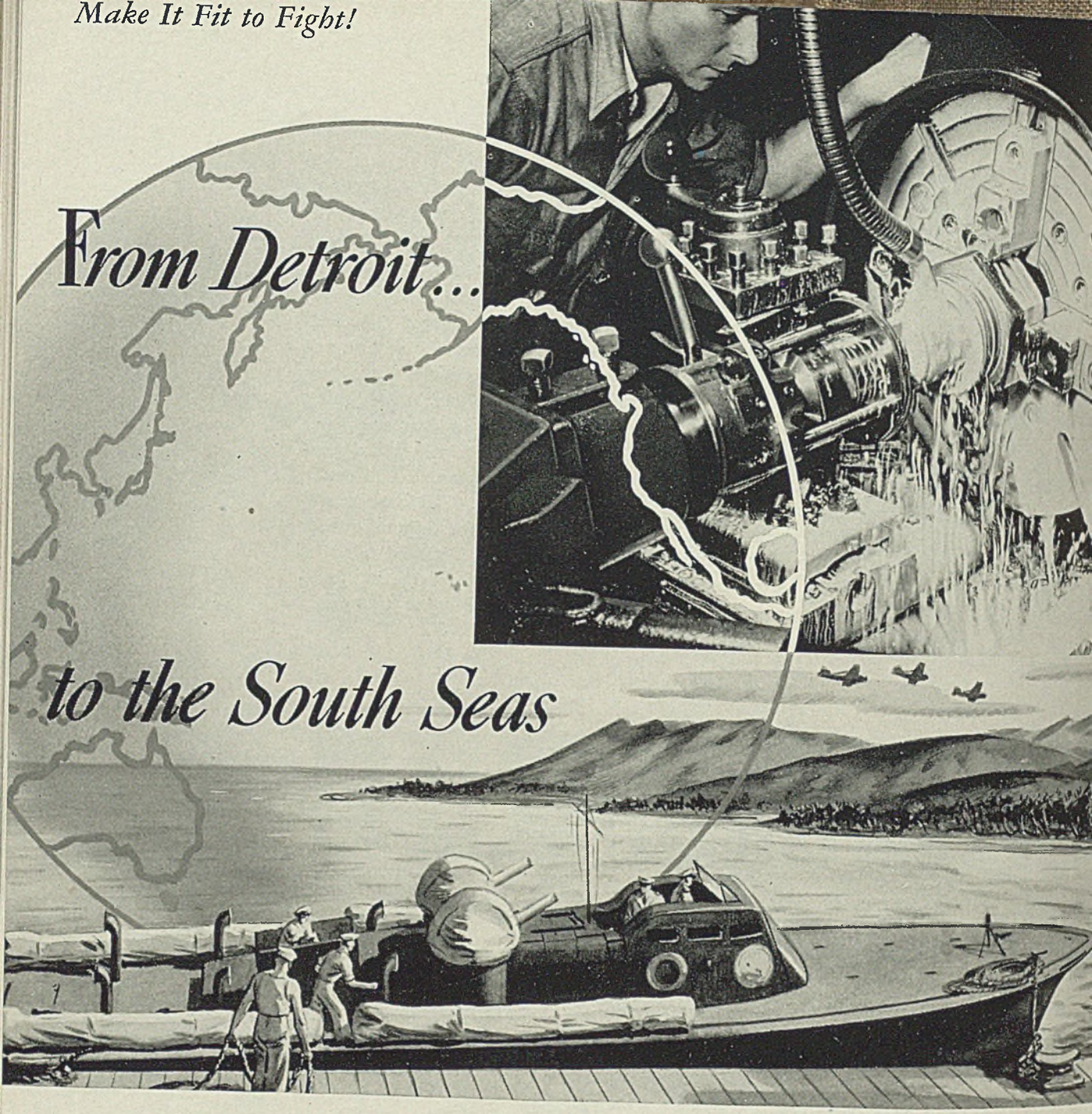
FOR NAVAL APPLICATION—In a space of five weeks, production of a brand new series of motors was raised 400 motors per week. Scheduled delivery to eight different customers was smoothly established.

FOR USE ON TANKS—To power radio equipment in tanks, a special dynamotor with increased capacity was developed. Sample in eight weeks; production in large quantities eight weeks after approval.

GENERAL ELECTRIC

750-201-8030

Make It Fit to Fight!



to fit within .001"

Extreme accuracy is the secret of interchangeable manufacture. Not only in the more rapid mass production of war's implements, but also in supplying replacement parts—for PT boats in the South Pacific—tanks in North Africa—or fighter planes in England.

To put such accurately machined parts *where* they are needed, *when* they are needed, is a job which calls for Gisholt's rigid construction to maintain precision at high cutting speeds.

GISHOLT MACHINE COMPANY
1211 East Washington Avenue • Madison, Wisconsin

GISHOLT

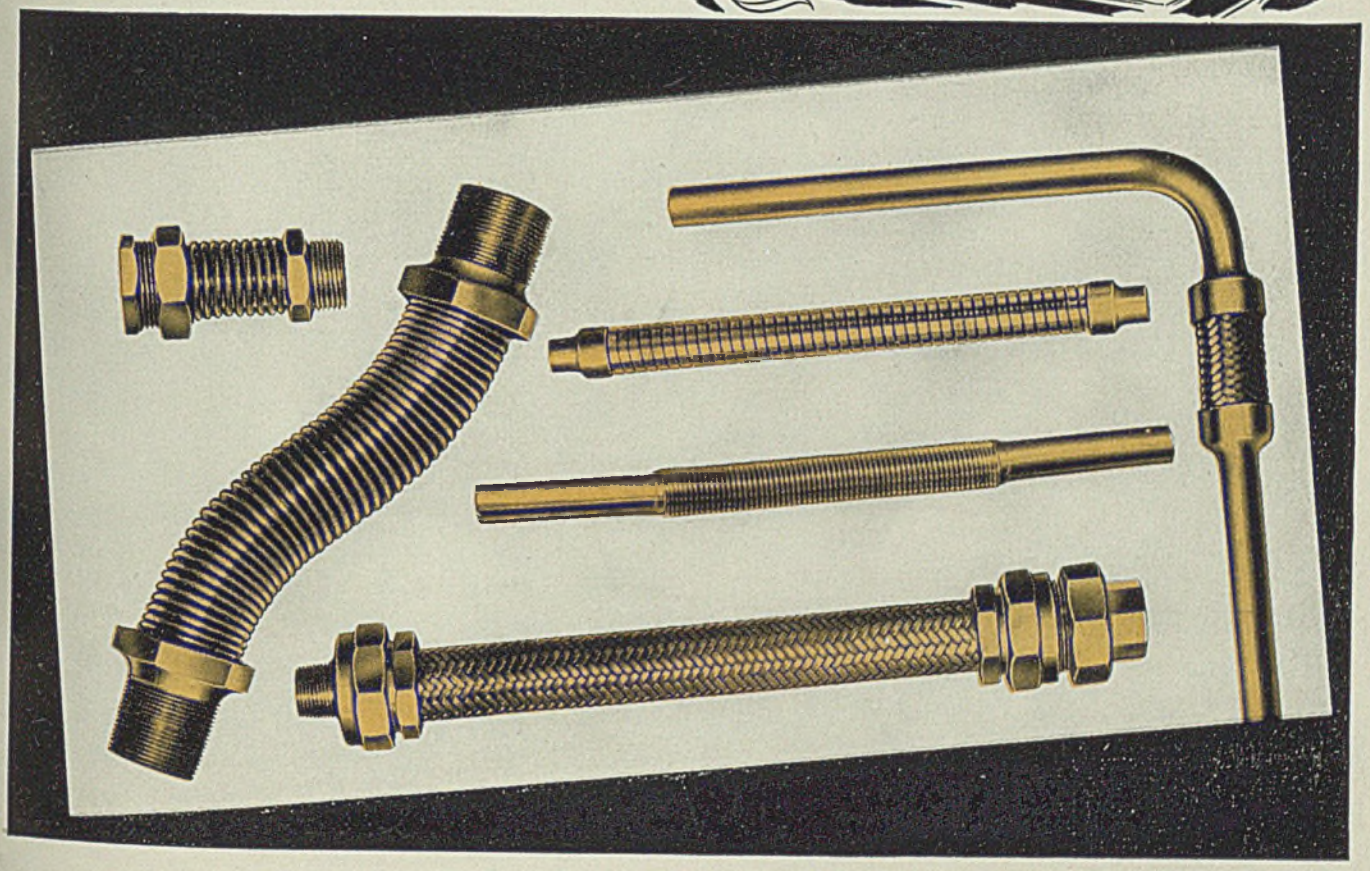
LOOK AHEAD—KEEP AHEAD—WITH GISHOLT IMPROVEMENTS IN METAL TURNING

TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES

ARMY (E) NAVY

At Gisholt, the Army-Navy "E" and

"IT'S THE MOST RELIABLE METAL TUBING WE KNOW OF"



They all agree that it is . . .

And when production-conscious executives must have *absolute, 100% tightness* plus long life in flexible metal tubing, they usually specify American *Seamless* Flexible Metal Tubing. For past experience has shown them that this deluxe product will flex millions of times without failure.

American *Seamless* is all-metal, made from *seamless tubes*. It has neither joints, welds, laps, seams nor packing at which leaks might develop. It combines the flexibility of rubber hose, the dependability of metal, the strength of rigid pipe.

Another interesting feature—you can get American *Seamless* Tubing in practically any workable metal of your choice.

Throughout industry, American *Seamless* is almost a password. Countless war plants are using it to convey air, fuel, water, chemicals, cutting compounds, refrigerants, propane and butane, manufactured freon, ammonia, oxygen, hydrogen, nitrogen, acetylene and many other fluids. They use it too for controlling vibration and for connecting moving or misaligned parts.

Whatever your requirements you'll most likely find that we have a flexible metal tubing or hose that will help you do the job just a little bit better.

Why not investigate?

43200

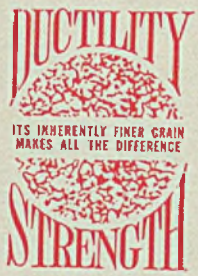
American Seamless—corrugated from seamless rigid tubing . . . pressure tight as the metal tube from which it is made.

ANACONDA

American Metal Hose

AMERICAN METAL HOSE BRANCH OF THE AMERICAN BRASS COMPANY • General Offices: Waterbury, Conn.
Subsidiary of Anaconda Copper Mining Company • *In Canada:* ANACONDA AMERICAN BRASS LTD., *New Toronto, Ontario*

Conserve 2 ways with N-A-X HIGH TENSILE



1. CONSERVE STEEL

The use of N-A-X HIGH TENSILE helps to conserve precious steel—because you can build *lighter* with this low alloy steel without any sacrifice of strength. The high tensile strength of this superior steel makes possible the use of lighter sections—and this effects a saving in over-all weight.

2. CONSERVE TRANSPORTATION

When you build lighter—with N-A-X HIGH TENSILE—you save weight and bulk, too, in many cases. And that helps conserve transportation—a vitally important consideration today.

Why not investigate N-A-X HIGH TENSILE for your products? It can be fabricated easily with all the speed of mild carbon steel. It can be cold drawn, formed and welded by regular shop practice. And it has a high degree of ductility, high yield point and high ultimate strength. Conserve steel—and transportation—with N-A-X HIGH TENSILE.

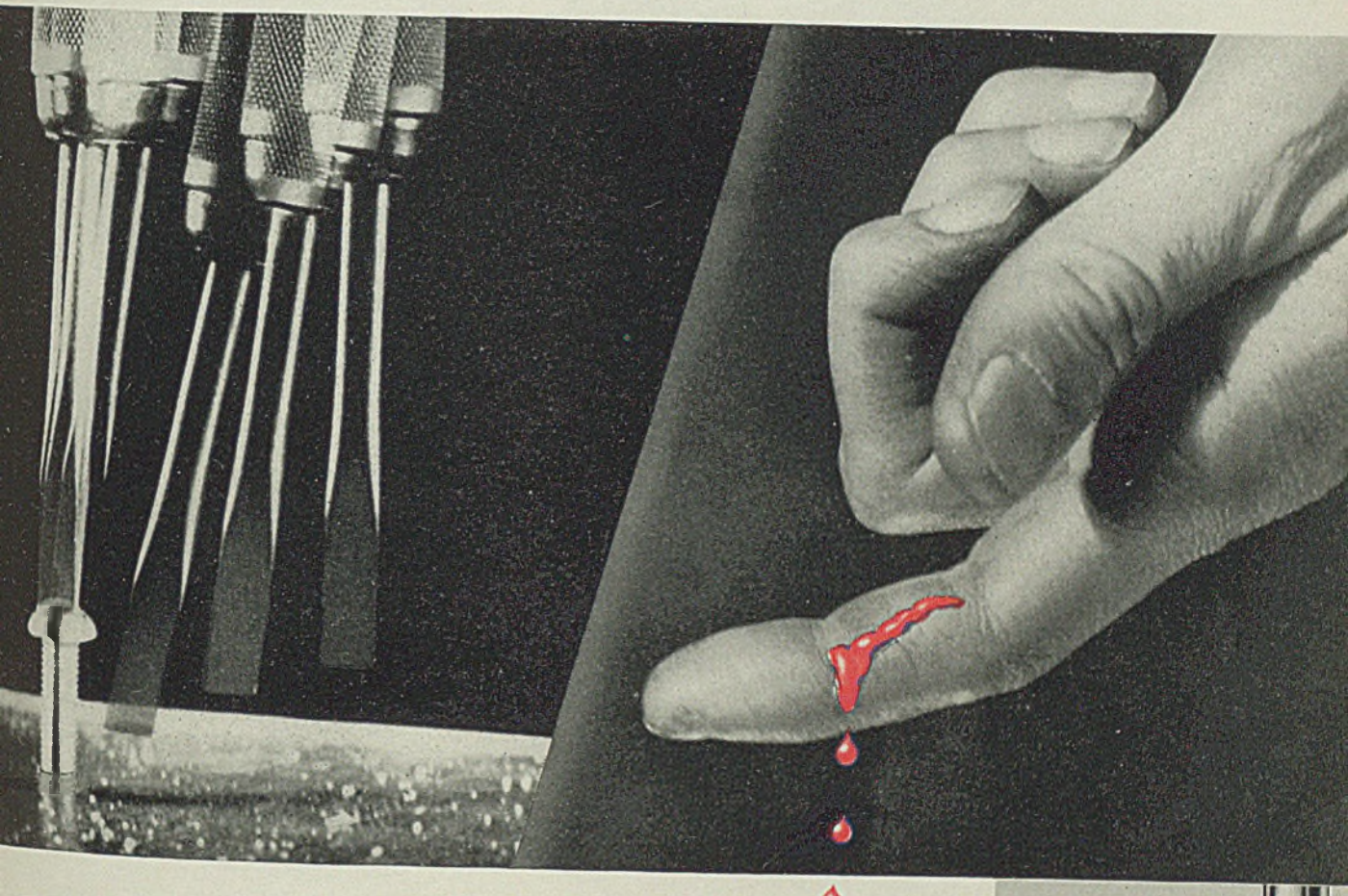
Send for new booklet on N-A-X 9100 series—and useful Hardenability Chart.

GREAT LAKES STEEL CORPORATION
Detroit, Michigan
Sales Offices in Principal Cities

NATIONAL STEEL

Division of
NATIONAL STEEL CORPORATION
Executive Offices · Pittsburgh, Pa.

How to PREVENT THIS SABOTAGE to Your Screw Driving Army



PHILLIPS SCREWS END DRIVER-SKIDS!

Caught in the act by the "frozen" action photography* of Gjon Mili, is a skidding screw driver . . . one of the meanest of saboteurs. Skidding drivers cause accidents that keep all too many workers away from assembly lines, nursing gouged hands. And, fear of such injury slows-down the work of countless others. Always present, the danger increases with rushed, inexperienced workers. So, it's doubly important today to specify Phillips Recessed Head Screws . . . which prevent driver-skids!

Automatic centering of driving force in the scientifically designed Phillips Recess eliminates all other screw driving troubles: the fumbling, wobbly starts . . . redriving of slant-driven screws . . . removal of broken-head screws . . . reclaiming of marred parts. Fast, faultless driving becomes automatic, even for "green hands" Power driving becomes practical.

They cost less to use! Compare *driving* costs. You'll find that screw *price* is a minor part of total fastening expense . . . that it actually costs less to have the advantages of the Phillips Recess.

**Gjon Mili synchronizes exposures with lightning-like flashes of the stroboscopic light, to make skidding driver appear to stand still.*

PHILLIPS *Recessed Head* SCREWS

WOOD SCREWS • MACHINE SCREWS SELF-TAPPING SCREWS • STOVE BOLT

KEY TO FASTENING SPEED AND SAFETY

The Phillips Recessed Head was scientifically engineered to afford:

Fast Starting – Driver point automatically centers in the recess . . . fits snugly. Screw and driver "become one unit." Fumbling, wobbly starts are eliminated.

Faster Driving – Spiral and power driving are made practical. Driver won't slip out of recess to injure workers or spoil material. (Average time saving is 50%.)

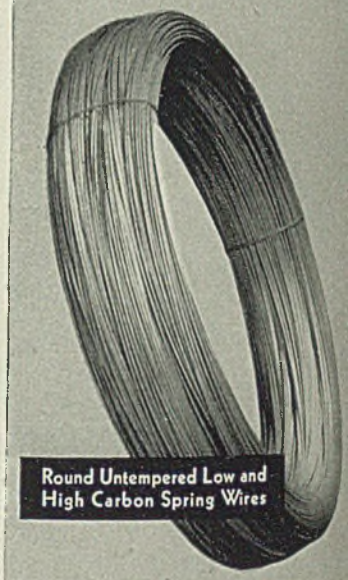
Easier Driving – Turning power is fully utilized by automatic centering of driver in screw head. Workers maintain speed without tiring.

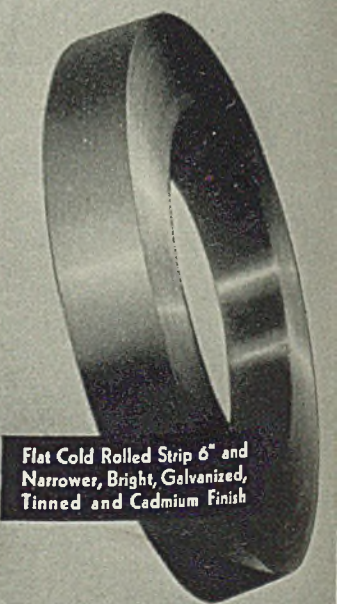
Better Fastenings – Screws are set-up uniformly tight, without burring or breaking heads. A stronger, neater job results.

21 SOURCES

American Screw Co., Providence, R. I.
The Bristol Co., Waterbury, Conn.
Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
The National Screw & Mfg. Co., Cleveland, Ohio
New England Screw Co., Keene, N. H.
The Charles Parker Co., Meriden, Conn.
Pheoll Manufacturing Co., Chicago, Ill.
Reading Screw Co., Norristown, Pa.
Russell Burdsall & Ward Bolt & Nut Co., Port Chester, N.
Scovill Manufacturing Co., Waterville, Conn.

Guard the success of YOUR product with **Washburn Quality Wire and Strip**





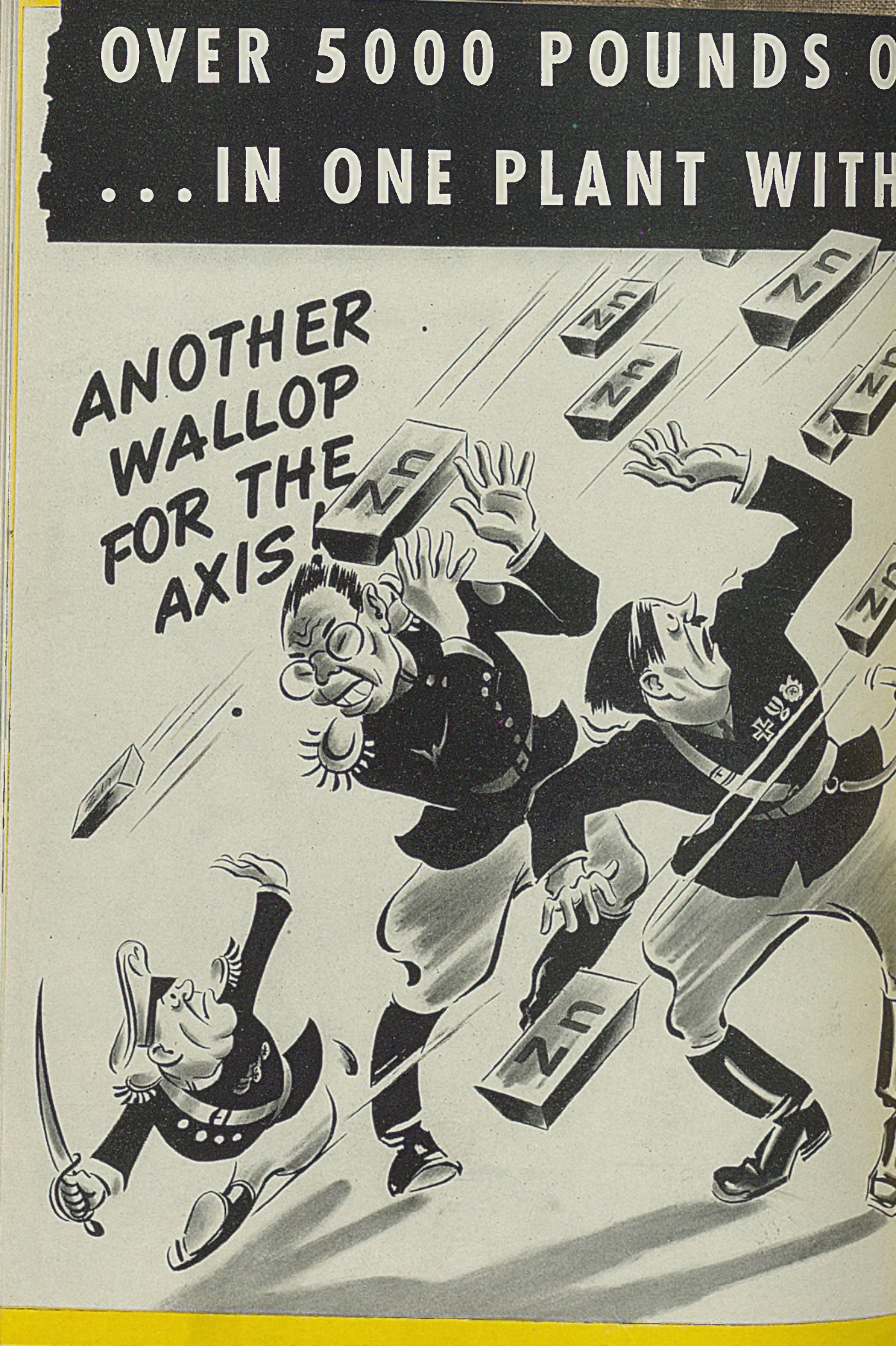
WASHBURN WIRE COMPANY, NEW YORK CITY

WASHBURN

CLEAN, UNIFORM BILLETS – STRIP – RECTANGULAR, ROUND, FLAT RODS – TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

OVER 5000 POUNDS O

...IN ONE PLANT WITH



ZINC A WEEK SAVED...

PENNSALT CLEANER

EVERY POUND of essential metal saved is a blow against the enemy. Pennsalt Cleaners are doing forthright service in many industries, helping to conserve vital time and materials by faster, better metal cleaning—at lower cost.

Saving zinc by the proper removal of oil, grease and other soils from structural steel before galvanizing is an example. In one large fabricating plant rejects after galvanizing ran 20 to 25 per cent before Pennsalt Cleaners were introduced.

Now for the Pennsalt method:—Crates of steel parts are lowered by crane into a tank containing a steam-heated solution of Pennsalt Cleaner. After ten minutes they are taken to a rinse tank, then as they are removed they are water-sprayed. Pickling, rinsing, fluxing and coating operations proceed as before.

Result? Virtually *no* rejects! Average daily production up 20 per cent! And the zinc formerly lost due to stripping rejects now is *saved at the rate of over 5000 pounds per 80 hour week!* Over 260,000 extra pounds a year to help win this war. And this saving was made by only *one* manufacturer!

Many leading plants in every field of metal manufacture are saving needed materials and speeding cleaning operations with Pennsalt Cleaners. They are often able to dispense with hand labor and precleaning . . . and so cut cleaning costs.

In a wide range of duties, Pennsalt Cleaners are removing and preventing the redepositing of dirt—grease, oil, emery dust, rouge, carbon smut, grit. The metals and alloys they clean include carbon and alloy steels, stainless steel, copper, aluminum, zinc, nickel, nickel silver, Britannia metal, brass and bronze.

Whether the part is rolled, forged, stamped, drawn or cast . . . Pennsalt Cleaners are producing a remarkably clean, smooth surface that leads to a better job of Bonderizing, Parkerizing, enameling, painting, galvanizing or plating.

In the complete series of Pennsalt Cleaners, there is one which will meet the specific metal cleaning problem in *your* plant. All Pennsalt Cleaners have exceptional dissolving and emulsifying action, extraordinary lasting power and highly efficient cleansing qualities.

Let one of our experienced technical staff help you choose the Pennsalt Cleaner that will do most to save time, materials and money in your particular metal cleaning operations. Or write fully to our Pennsalt Cleaner Division, Dept. S.

PENNSYLVANIA SALT MANUFACTURING COMPANY

Chemicals

1000 WIDENER BUILDING • PHILADELPHIA, PA.

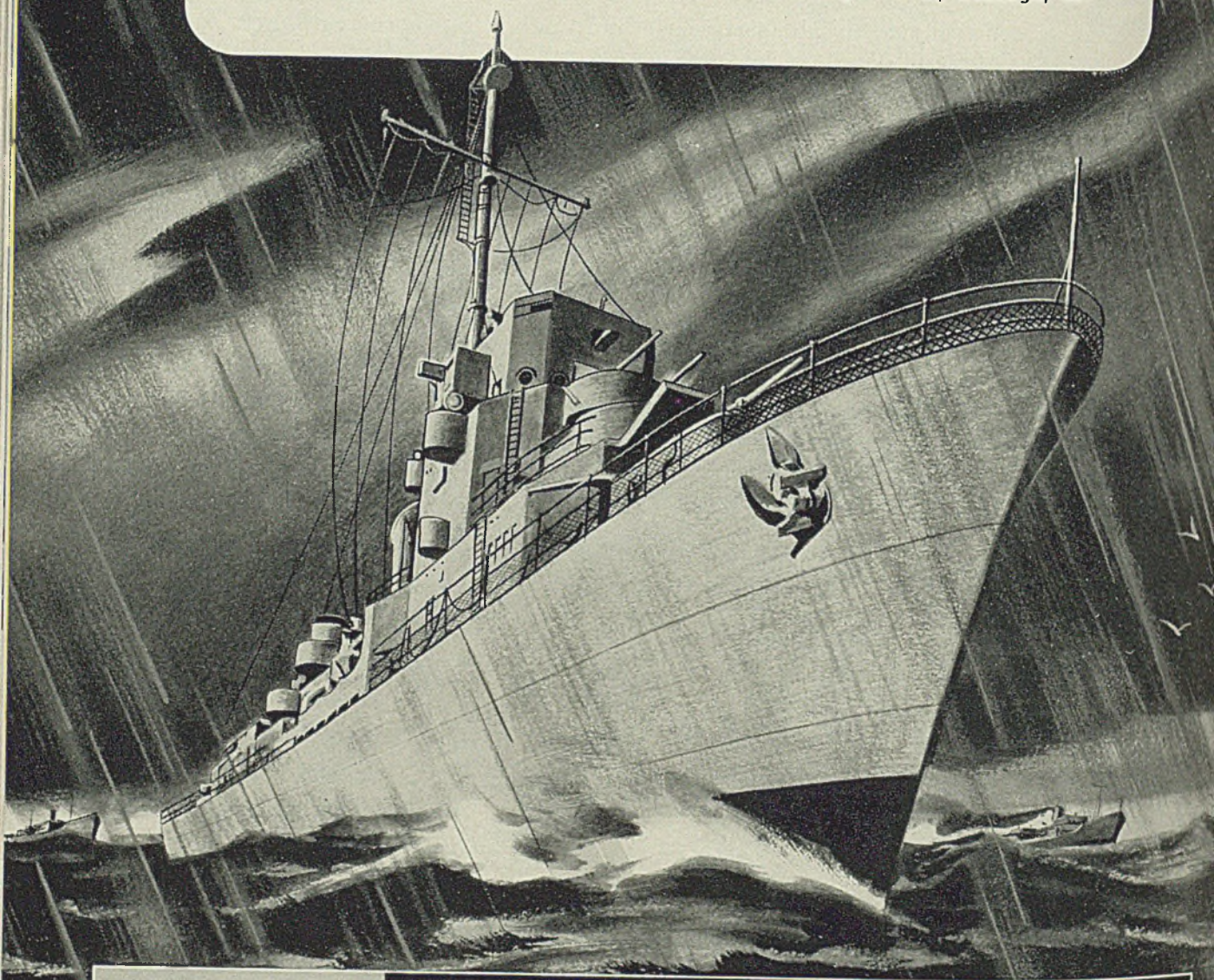
PITTSBURGH • WYANDOTTE • TACOMA

300 feet of "Lightning" that knows how to strike!

"D-E" Boat is what the Navy calls her! She's a Destroyer Escort—300 feet of "lightning" built to dish out what it takes to make Axis "wolf packs" wish they had stayed home.

Slim, sleek, and deadly, the D-E's are propelled by Diesel engines and manned by crews who know how to do the job assigned them.

Many of the Diesels for Destroyer Escorts and other U. S. Navy warships are of Fairbanks-Morse manufacture. The skill, facilities, and engineering experience that have given Fairbanks-Morse Diesels a world-wide reputation for dependability are now being used to provide dependable power for U. S. Navy craft—when dependability is so important. Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Ill.



FAIRBANKS-MORSE

DIESEL ENGINES
PUMPS
MOTORS
GENERATORS
SCALES

WATER SYSTEMS
FARM EQUIPMENT
STOKERS
AIR CONDITIONERS
RAILROAD EQUIPMENT

Diesels