

STEEL

The Magazine of Metalworking and Metalproducing

VOL. 117, No. 4 July 23, 1945

NEWS

TECHNICAL

FEATURES

MARKETS

NEXT WEEK...

Model War Plant Points to Greater Manufacturing Efficiency

What the Executive Should Know About Quality Control

Hydraulic Press Stamping at Ypsilanti Machine & Tool

Continuous Drawing of A.P. Shot

"THE WEATHER IS ALWAYS DOING SOMETHING"

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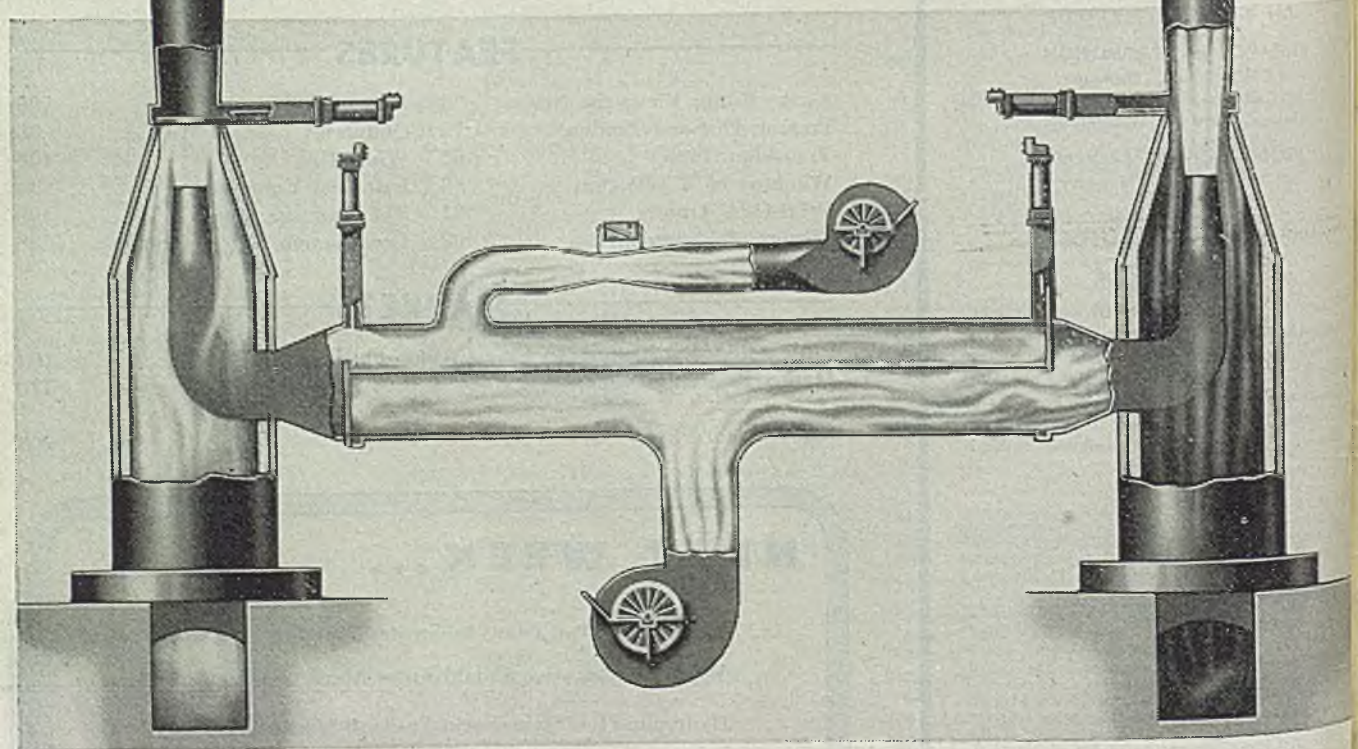

MORGAN CONSTRUCTION COMPANY, Worcester, Massachusetts

ENGLISH REPRESENTATIVE: INTERNATIONAL CONSTRUCTION CO., 56 KINGSWAY, LONDON, W.C. 2, ENGLAND

STEEL
July 23, 1945

Honest Umpiring

Straws in the wind point to the possibility of a fairer attitude in labor relations on the part of the federal administration. There are hopeful signs that the pendulum has swung to the extreme of favoritism for unions and is swinging back toward a greater measure of justice for employers and the public.

One of these signs is the record of government action in the Akron rubber strike. Washington waited longer than usual before seizing the Goodyear plant, apparently reluctant to resort to the familiar, unfair practice of seizure until all other measures had failed. Then, after the Navy had taken over, the commanding officer discharged five employees and disciplined another for staging a work stoppage. This determination to punish offenders is significant in view of the fact that heretofore, government seizure of a plant usually had been tantamount to granting the workers practically anything they demanded.

Even more significant was NLRB action in the newspaper strike in New York in ruling that the union whose members were on strike no longer was the accredited bargaining agent. This placed the newspaper publishers in the position of operating "open shops", wherein they were free to hire nonunion employees if they chose.

Another straw was Secretary of Labor Schwellenbach's statement last Tuesday that henceforth any appointee in his department must serve the broad public interest rather than the narrow interest of the union with which he is identified. This declaration of policy, coupled with the intent of the Truman administration to incorporate all labor relations agencies under Secretary Schwellenbach's supervision, is a strong promise of a more equitable labor policy in the near future.

If Washington will pursue its avowed course of fair dealing consistently, the way may be paved for a general improvement in all phases of labor relations. With a sound government policy in force, it should be easier for management and unions to co-operate in the public interest.

For instance, should the government become a fair and honest umpire, then union labor chiefs could well afford to be less suspicious of well-meaning efforts to remedy faults in existing laws. They could afford to recognize the good points in the Ball-Burton-Hatch bill rather than to emphasize its weaker points. At the same time, management could well afford to recognize that certain of labor's gains are legitimate and deserve to be protected.

Honest umpiring of labor matters by government could go a long way in promoting industrial peace.

THRILLING PANORAMA: Recently Editor E. C. Kreutzberg made a 21,000-mile tour of American bases in the Pacific under the sponsorship of the United States Navy Department. He presents his impressions in two articles, the first of which appears in this issue.

To read the account of his observations is to realize how important is the contribution of industry to the outcome of this war. "The western Pacific base," he says, "is a vast exhibit of all the diversified products of American industry." To maintain it requires 1,660,000 tons of fuel oil, gasoline and lubricants a month and 4380 tons of food a day. Horsepower represented by internal combustion engines—diesel and gasoline—has mounted from 500,000 on Jan. 1, 1943 to 52,390,500 on Jan. 1, 1945. Impressive are the ABSD and ARD, giant floating drydocks; the numerous machine shops, foundries and forge shops on sea and land; hundreds of miles of Seabee-built paved highways, some of them 4-

(OVER)

lane; the thousands of tractors, trucks, cranes, shovels, bulldozers; tank farms, electric generator plants, water distillation plants, extensive refrigerating installations; and finally, the amazing ability of the servicemen to improvise with the materials which come to hand.

The entire panorama of our bases in the Pacific is a brilliant exhibition of the might of this nation in men, material and morale. —p. 77

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CRITICAL MATERIALS: In spite of unusual efforts to expand production, to use substitutes and to economize, the list of materials officially designated as "critical" is surprisingly long. Among the items still on the critical list after 44 months of war are sheet and strip steel, soil pipe, malleable iron fittings, antimony, lead, cadmium and tin. While coal and fuel oil are not listed, they also are far short of needs for essentials.

The situation in tin is particularly interesting because it called for reliance to a large extent upon stockpiles existing at the beginning of the war. The backlog of pig tin, consisting of 83,076 long tons as of Jan. 1, 1942, had dwindled to 23,654 tons on last May 1. That it had not disappeared entirely is a tribute to ingenuity in substitution and conservation and to the tin-saving effect of the nation's electrolytic tin plate facilities. Tin will continue in short supply for many months after V-J Day. —pp. 83, 84, 90

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SOME DON'T NEED JOBS: One of the mysteries puzzling employers and manpower agency officials is what happens to workers when they are laid off after a war contract is completed or canceled. Only a fraction of them seem to seek nearby jobs that are available. Where do the others go?

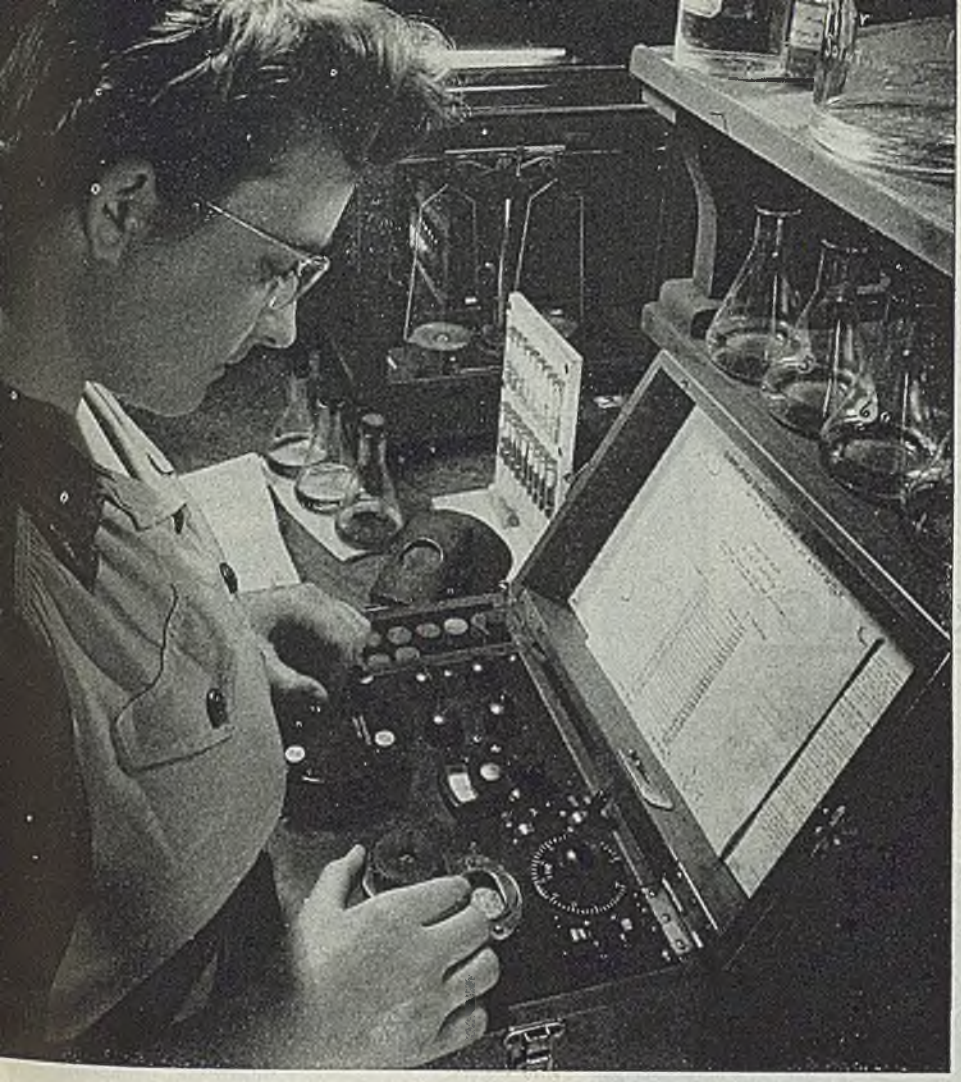
For instance, during May USES offices in the Los Angeles area referred 67,060 applicants to suitable employment, but only 35,495 of them accepted jobs. Some of the remaining 31,565 are believed to have returned to homes in other sections of the country and some women doubtless resumed household duties. Officials believe a substantial number are on vacation or shopping around leisurely for the most desirable permanent jobs.

This situation, which is similar to that in other industrial areas, suggests that employment estimates for the postwar period probably ignore the fact that many persons recently employed in war plants will not need or want steady, full-time jobs in peacetime. —p. 99

SIGNS OF THE TIMES: Look for a sharp increase in research activity after the war. In addition to recently announced new laboratory projects, General Motors, Ford and Chrysler (p. 94) all are contemplating new or greatly expanded research facilities in the near future. . . . Military authorities have placed orders for 12,795 army freight cars, 1200 troop sleepers and 400 kitchen cars (p. 82) in an effort to ease the approaching acute transportation situation. . . . WPB has issued an analysis of the expansion in manufacturing facilities from July 1, 1940, through May 31, 1944 (p. 89), which shows that the influence of war has not "relocated" industry as markedly as is generally believed. In fact, $19 billion of the $20 billion for expanded facilities was spent in 179 previously existing manufacturing areas. . . . Coal is destined to be one of the chief headaches in reconversion. Production to date in 1945 (p. 166) is 6.9 per cent below the tonnage for the corresponding period of 1944. Steel companies on the average have only a 16-day coal supply against a normal 30-day reserve (p. 83) and blast furnace operators are apprehensive of future shortages. . . . By installing conveyor belts in C-47 cargo carriers, ATSC cut the time required for air crews to drop supplies to ground troops from 40 minutes to a few seconds (p. 102) and also reduced the hazard of enemy anti-aircraft fire. Adapting industrial equipment to military use has been an important factor in this war. . . . Proving again that necessity is the mother of invention, Morton Mfg. Co. and Westinghouse Electric Corp. have developed for the United States Navy a machine for finishing ship propeller blades more quickly and accurately. Equipped with 11 motors, three motor-generator sets and full magnetic control (p. 106), it mills the pressure and suction face sides of propellers simultaneously to any desired contour. This significant accomplishment is a tribute to teamwork in mechanical and electrical engineering. . . . Hitler's much-publicized "volkswagen"—low-cost German automobile—was in production 10 days after V-E Day (p. 104) under direction of U. S. Army ordnance officers. . . . Latest development in the scramble for dominance in western steel (p. 80) is Henry Kaiser's proposal to form a syndicate to lease the Geneva plant and seek the facilities of Colorado Fuel & Iron and Wickwire Spencer. With Fontana, the proposed combination would have 3,497,400 tons of ingot capacity, making it the seventh largest steel company.

E. L. Shaner

EDITOR-IN-CHIEF



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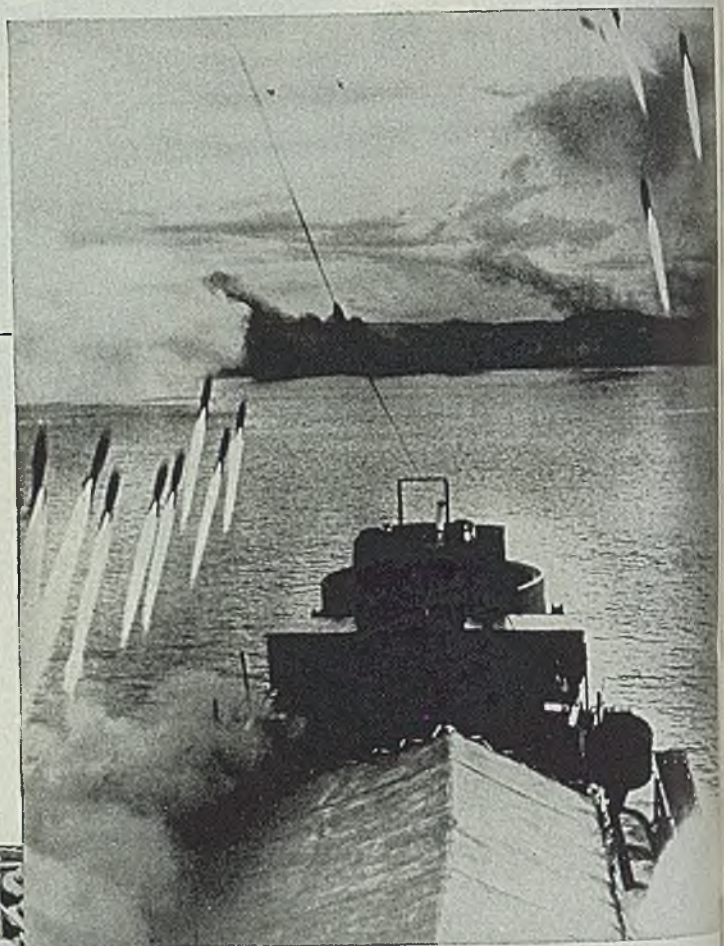

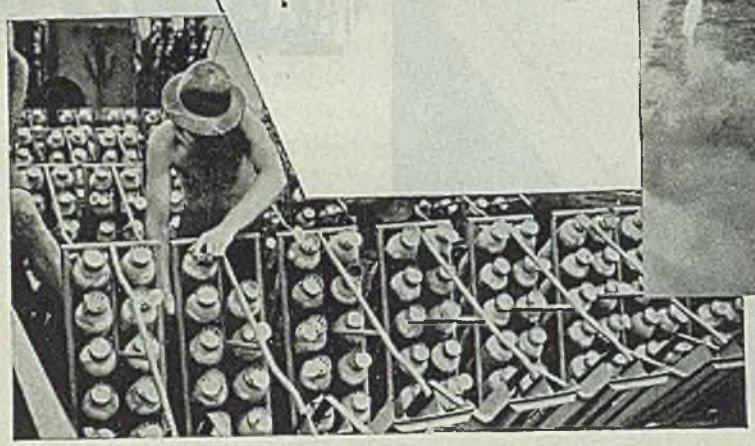

Rocket bombardment of Pacific island. Photo at left shows one of the rocket firing racks being loaded on the deck of an LCI.

"BAZOOKA BOATS" is the Navy's nickname for these rocket-firing landing craft. Here indeed is "hot" metal — working to knock out enemy defenses just before our invasion troops swarm ashore. Rocket projectiles are so effective for many jobs that the navy has budgeted nearly $100,000,000 a month for them — as much as previously spent for all other types of naval ammunition combined.

In stepping up production to meet this tremendously increased demand, the metal working industry knows that faster machining must still go hand-in-hand with accuracy — and this can be done only through the use of highly efficient cutting fluids.

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By E. C. KREUTZBERG
Editor, STEEL

STEEL
July 23, 1945

Advanced U. S. Navy Base Huge Establishment

This is the first of two articles by Mr. Kreutzberg in which he presents his observations on a recent 21,000-mile tour of Pacific bases sponsored by the Navy Department. The second article will appear in STEEL, July 30. In the July 2 and July 9 issues of STEEL the situation in the Pacific as viewed by Mr. Kreutzberg was presented pictorially

E. C. KREUTZBERG

AN AMAZING establishment is the United States Navy's advanced base in the western Pacific. It embraces a vast geographical area. On dry land when suitable islands are available, on floating facilities in atoll lagoons and island harbors where anchorages are to be found, it is distributed over thousands of square miles in the Marianas and western Carolines.

At a typical base in the continental United States the various shops and docks can be reached by a short walk or by a quick trip in a jeep or other motor vehicle. In the western Pacific a trip from one part of the base to another may require four or five hours' journey by fast airplane.

Because so many repair and service facilities are on ships instead of dry land, there is an unparalleled need for water taxi service in the western Pacific. Fantastic numbers of small boats dart from one ship to another, and from shore to ship, at all hours of the day and night. Tossed about in the never-failing Pacific breezes, these fleets are a sight to behold.

Our advanced naval base in the western Pacific is amazing because of its size and scope; it could be created only by a great industrial nation. As has been often said, modern naval warfare is not only a war of ships and guns, but of medicine, food, water, shelter, roads, airports, recreation, communication, laundry and a thousand and one things.

Hence the western Pacific base is a vast exhibit of all the diversified products of American industry.

Recently the foundry on a floating repair ship in "Squadron X," as the floating portion of this base is known, cast a 3000-pound exhaust manifold for a 900-horsepower diesel engine which was being rebuilt. At the same time the watchmaker on the same ship was reconditioning an important timepiece. The machine, forge, optical, sheet metal, battery, electrical and numerous other shops were busy on various maintenance and repair jobs on a 24-hour schedule. Simultaneously many other activities were underway; water was being distilled for use by this and other ships anchored nearby, ice cream was being frozen for several thousand men, the laundry was in operation, etc. This ship is only one of several hundreds that comprise Squadron X, all equally busy.

Magnitude of the operation at this advanced base is indicated by some statistics recently revealed by the Navy. These come under the head of "logistics" —the term which embraces all activities to maintain our warmaking might. Our average monthly consumption of fuel oil, gasoline and lubricants in the western Pacific comes to 1,660,000 tons, food rations come to 4380 tons per day, 85 per cent of our naval airplanes are "operational" at all times. On Guam alone the Seabees have built more than 200 miles of paved highways, some of them 4-lane. Shipping still is the bottleneck in the Pacific war, with an average turnaround time of 120 days.

The problem of logistics breaks down into ordnance and ammunition, communications, supplies and maintenance, water transportation, fuels and lubricants, fleet supplies and maintenance, medical supplies, food supplies, construction requirements, airplane maintenance and replacements, etc.

Figures enumerated here, therefore, shed only a suggestive light on the size

of the logistics job in the western Pacific. However, 1,600,000 tons of fuel oil, gasoline and lubricants monthly do mean the operation of a large fleet of tankships, of large tank farms, of miles of pipelines, of fleets of oil and gasoline trucks traveling on well-built roads. Similarly, 4380 tons of food a day mean a vast amount of cargo space, much of it refrigerated, many thousands of "reefers" for low-temperature storage at points of consumption, and completely appointed messes for preparing and dispensing this food to our men on ship and shore.

Too, the statement that 85 per cent of our planes are "operational" means huge installations of shops, storage and service buildings, manned by many thousands of trained Navy mechanics, located as close to the combat zones as practicable, capable of performing every operation in maintaining and rebuilding our planes of all types, and of repairing and adjusting the many delicate flight-control, fire-control and other instruments on these planes.

Size of the operation ashore is reflected at the Advanced Base Construction Depot on Guam, set up to supply all materials and equipment for construction of bases west of Guam. This depot maintains stocks of about 100,000 spare parts items for some 75,000 types of equipment. It maintains stocks of all these types of equipment, also of all the needed materials. It takes three months or more after a requisition is made to get delivery from the United States; hence stocks must be complete so that new bases may be constructed without delay ever closer to Japan.

Stores Cover Wide Range

A few of the items stored at this depot are tractors, trucks, cranes, shovels, lumber, electric cable, wire rope, ditchers, graders, scrapers, electric generating plants, water distillation plants, portable tanks, etc.

In addition, the depot is provided with shops equipped to recondition and repair worn or damaged equipment in all these categories; these include even a tire recapping and reconditioning shop. Aside from a large outdoor storage area, the depot consists of prefabricated steel quonset structures which are standard equipment in the Marianas and western Carolines. They are used for all purposes—shops, stores, for services of many kinds, and as living quarters for the men.

Another gage of the volume of business done by our fleet in the western Pacific is seen at the Naval Supply Depot on Guam; "sales" by this depot now are at an annual rate of $1 billion. It handles more than 100,000 different items both in quonset buildings and open air storage spaces. These include thousands of items such as radios and radio spares, ordnance and ordnance spares, engine and hull spare parts, and a complete list of "General Storekeeper" items.

After Okinawa fell to the American forces, the Navy was faced with the problem of ridding the harbors of enemy ships sunk or damaged during the campaign. The Navy had the answer in salvage and rescue tugs as well as experienced divers and rescue men. Here a movable crane riding on an LCI tugs at the wreckage of a Jap freighter. NEA photo

A large space is given over to storage of rolled steel sections of various types and sizes, and to an extensive variety of mill supplies including nuts, bolts, washers, etc. The depot handles all fleet supplies excepting ammunition and medical supplies. Included in the responsibilities of the depot is the operation of a flotilla of auxiliary store ships. Supplementing the Naval Supply Depot and its auxiliary store ships is a large fleet of cargo ships which takes supplies directly out to Squadron X from San Francisco, and several concrete ships which are used for storing and dispensing ships' stores to the ships of Squadron X.

Other important Navy establishments in the Marianas are a Ship Repair Base, a Small Boat Base, a Combat Boat Base, and a Naval Air Base. All are equipped with shops capable of performing many operations. The Naval Air Base, for example, has many service buildings and shops and is operated by some several thousand enlisted men trained in the various crafts at Navy schools on the mainland. It is capable of making all repairs, up to and including complete overhaul and rebuilding. One section of the air base is given over to "depreserving" new planes as they are received from the United States; all instruments and functional parts are taken apart, inspected, reassembled and adjusted in accordance with a factory checklist. In addition, each plane is provided with last-minute modifications, especially in radio and radar equipment; thus each plane taken into combat represents the very latest in Navy specifications.

Another indicator of operations in the western Pacific is the recent Navy estimate that 1945 requirements of spare parts for internal combustion engines, both diesel and gasoline, in that area will come to $444,000,000. Horsepower in service in the western Pacific increased from 500,000 on Jan. 1, 1943, to 52,890,500 on Jan. 1, 1945. Meanwhile the vessels are growing older and repairs are needed on a larger scale.

The engine parts system has its center at the Naval Supply Depot at Mechanicsburg, Pa., and the staff there must see to it that stocks of parts are shipped to the vital forward locations. In the western Pacific this means frequent changes in destinations as combat operations move farther west. As a general rule, contracts for spare parts must be placed about nine months ahead of actual need at points in the advanced naval base.

Engine parts originally listed under each manufacturer's stock number now are cross-indexed to show interchangeability. This improvement has made the spare parts investment go farther; more important, it has reduced delays in making essential repairs. This development is only one phase of a general trend in the Navy toward maximum standardization of spare parts.

Another feature of Navy distribution of spare parts of any type is the use of air freight when necessary to expedite

important repairs. When the *U.S.S. New York* recently damaged her huge propeller and hub, replacement parts were shipped in a Naval Air Transport Service plane, and the big warship was able to get back to her battle station in minimum time. The Navy relies on water shipments as far as possible but it finds that the expense of delivering spare parts and materials by air in emergency cases is a trifling consideration when compared with the investments in facilities in need of repairs, and the need for getting these facilities back in service. No actual records have been kept, but the tonnage delivered by air is large.

A particularly valuable and impressive floating facility in the western Pacific is the "ABSD," the floating steel drydock known as the Advanced Base Sectional Dock. The sections, each with its own hull, are towed to the desired forward position, and welded together into one dock with capacity up to 100,000 tons, if desired; this is more than enough to raise our largest battleships. Several ABSDs in the Pacific permit quick overhauls without delays attendant on a trip back to a mainland base. But for the ABSDs three of our battleships which played a vital part in winning the battle for Leyte Gulf would not have been present in that engagement. No other Navy in the world has anything like these mobile, floating drydocks.

Auxiliary Repair Docks

Worth its weight in gold also is the floating drydock known as the ARD (Auxiliary Repair Dock). Built as a single, complete unit, it is broad in the beam and engulfs ships up to 6000-tonners and repairs them in quick time.

One of the big developments in this war is the steel pontoon tank, designed by the Navy for a multitude of purposes, and produced at many fabricating plants throughout the country. These tanks are assembled into barges, into loading and unloading docks, floats, etc. They are used individually for storing and dispensing water, gasoline, fuel oil, etc. They are to be seen in use all through the western Pacific area, in connection with shower baths and toilet facilities, as wheeled sprinklers to keep down dust on coral roads and airstrips, as beer coolers, etc.

All over the Pacific area examples are to be found of the ability of Americans to improvise with the materials at hand to meet their needs. The ever present laundry problem is solved on many islands by "home-made" contrivances consisting of a windmill and eccentric wheel driving a plunger up and down in an old oil drum full of soapy water.

Dallas huts and tents are insulated from the sun's heat by hanging a cargo parachute a few inches under the roof.

An ordinary locker or box is converted into a "hot closet" by installing an electric light in it; this prevents fungus from forming on the cloth and keeps brass buttons and buckles from corroding.

Seats at the Raymond Clapper movie theater on Kwajalein are ordinary bomb-tail racks placed in the upside-down position. Seats at many outdoor theaters are strips of steel airplane landing mat laid across up-ended boxes or cocoanut logs. Steel landing mat strips are used as walkways, as gates, fencing, and for other purposes.

Our Navy makes good use of captured Japanese motor vehicles, hangars, buildings and materials. Our radio tower on Kwajalein is the same steel radio tower the Japanese built and used. Our forces have made good use of structural steel sections bought by the Japanese from American mills and used by them in their installations. Steel rail used in the marine railway at the Small Boat Base was obtained from a narrow-gage industrial railroad serving a Japanese sugar refinery on Saipan; the remainder of that rail, along with the miniature locomotives, now are part of the materials-handling system serving the bomb dump of the XXI Bomber Command on Saipan.

Another example of ingenuity was noted when Japanese cast iron car wheels from the Saipan sugar mill railroad broke under the weight of boats hauled up the marine railway at the Small Boat Base. Navy machinists made wheels out of four torch-cut steel plate disks, three of one diameter to form the tread and the fourth of larger diameter to form the flange section; these disks were riveted together, and turned down on a lathe and have been giving excellent service.

Wherever the war has touched in the Pacific big accumulations of scrap metals are to be found. Wrecked invasion craft lie half submerged on the coral beaches. This battle scrap now is not being touched. After the war, when men and ships again are available for ordinary business, it probably will be moved, if

(*Please turn to Page* 186)

Present, Past and Pending

■ 1945 MUNITIONS OUTPUT CUT 4% BELOW EARLY ESTIMATES

WASHINGTON—Munitions output (on March, 1944, peak dollar basis) has dropped to 85 per cent, will drop to 80 per cent by end of August and to 70 per cent by December. Production schedule for 1945 has been cut from $60,700 million to $49,900 million.

■ ASKS FREIGHT RATE CUT RECONSIDERATION

CHICAGO—The West faces bankrupt railroads or higher freight rates on agricultural products, livestock and raw materials if recent class rates ordered by the Interstate Commerce Commission are allowed to stand, the western railroads declared last week in a petition asking reconsideration of the ICC decision which cuts class rates in western territory 10 per cent beginning Aug. 30.

■ STEEL DIVISION PERSONNEL CHANGES ANNOUNCED

WASHINGTON—New appointments in Steel Division, WPB, include: Patrick Treacy as assistant to the director, succeeding Clark W. King; C. D. Grabeel as secretary, Production Directive Committee of which A. A. Archibald is now chairman; Edward S. Lee as chief, Alloy Steel Branch, succeeding J. F. Reid; Frank T. McCue as chief, Plate and Sheet Branch; Miss Anne Donigan as chief, Appeals Section, succeeding Nicholas D. Patti. The Control and Distribution branches have been merged in the Distribution and Control Branch with Charles Halcomb as chief, Wilson K. Ray as deputy chief of distribution and C. W. Eichelberger as deputy chief of control.

■ CHEVROLET MAY BUILD TWO PLANTS IN CLEVELAND AREA

DETROIT—General Motors Corp. is considering a proposal to build an automobile manufacturing plant and an engine and axle manufacturing plant in Cleveland.

■ PLACING UNRATED ORDERS FOR STAINLESS PERMITTED

WASHINGTON—Manufacturers and steel warehouses now are permitted to place unrated orders for stainless steel which completes the open ending of the Controlled Materials Plan, WPB announced. This action resulted from a drop in military and foreign requirements and a freer supply of nickel.

■ WILLYS-OVERLAND BUILDING JEEPS FOR CIVILIAN USE

TOLEDO, O.—Willys-Overland Motors Inc. is producing 60 Jeeps a day for civilian use, having new arrangement of top, mounting of tire and revised gear ratios.

■ OLDSMOBILE UNVEILS FIRST POSTWAR MODEL

LANSING, MICH.—First showing of the 1946 Oldsmobile was made last week with production scheduled to start in the early fall.

■ UNITED GAS TO BUILD 143-MILE 24-INCH PIPELINE

WASHINGTON—United Gas Pipe Line Co. has been authorized to construct a $7,261,-221 143-mile 24-inch pipeline from Carthage, Tex., to Monroe, La.

Kaiser Proposes Syndicate To Operate

Would combine Geneva Steel, Fontana, Colorado Fuel & Iron and Wickwire Spencer to form seventh largest steel company in country. Plan favored by some government spokesmen who object to acquisition of facilities by eastern producers

BATTLE over the disposition of the war-born western steel plants rapidly is approaching a boiling point and indications are the issue may be decided on a political rather than economic basis.

Three major interests have expressed openly their desire to buy or lease properties. United States Steel Corp. early this year announced its interest in acquiring the government-owned Geneva plant in Utah for postwar operation and also the Fontana plant built by Kaiser Co. Inc. with Reconstruction Finance Corp. funds, should the plant be offered for sale.

Colorado Fuel & Iron Corp. has expressed an interest in buying or leasing the Geneva plant.

Currently attracting the most interest, however, is the proposal of Henry J. Kaiser of the Kaiser company to organize a syndicate of western financial and industrial interests (to be known as the Kaiser Syndicate) for the purpose of leasing the Geneva plant. Kaiser then would seek also the facilities of the Colorado Fuel & Iron Corp. and those of the Wickwire Spencer Steel Co. These combined with the Fontana plant would give the Kaiser Syndicate control over 3,497,400 tons of ingot capacity and make the combination the seventh largest steel company in the United States. Conversations between Mr. Kaiser and Charles Allen Jr., chairman of Colorado Fuel & Iron, concerning the possible merger already are underway.

Kaiser Plan Favorably Received

That the Kaiser plan may be received favorably by some Washington authorities is indicated in several recent statements. Just before retiring as attorney general, Francis Biddle in a report to Congress on the disposal of surplus steel plants recommended operation of the Geneva plant by an independent western interest and criticized the dominating influence of eastern producers.

The Department of Commerce recently proposed that the facilities be leased for long terms to small plants to keep the excess capacity from being acquired by big industries.

A more direct build-up for the Kaiser proposal was offered by Edward H. Heller, a member of the Surplus Property Board, in a press conference in San Francisco July 11. Mr. Heller suggested that a western corporation be formed to purchase, lease or take an option on the Geneva and Fontana mills, provided the latter be put up for disposal. To implement the acquisition, Mr. Heller proposed that leading western cities, through action by civic groups, organize public subscription campaigns for financing such purchase or purchases and to provide working capital.

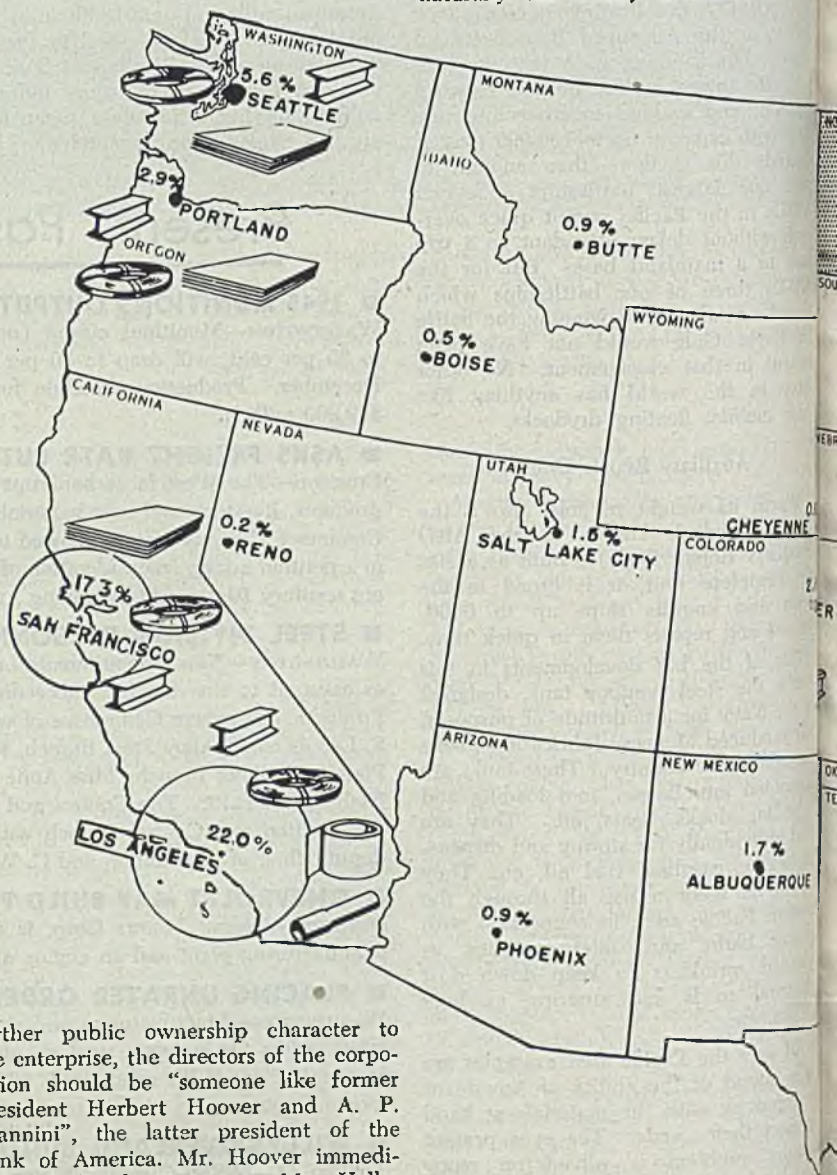
Mr. Heller proposed that, to give further public ownership character to the enterprise, the directors of the corporation should be "someone like former President Herbert Hoover and A. P. Giannini", the latter president of the Bank of America. Mr. Hoover immediately declined. Moreover, Mr. Heller suggested that someone like Mr. Kaiser "would make an excellent manager of the enterprise."

Mr. Kaiser said he found the idea "stimulating." In fact he was so stimulated that a letter outlining his plans for the Kaiser Syndicate was sent to the Defense Plant Corp. three days after Mr. Heller's press conference.

Both Mr. Heller's plan and those of the Department of Commerce and the Department of Justice appear to have been designed to forestall the big steel companies, principally U. S. Steel, from acquiring Geneva and the other plants.

United States Steel Corp. in announcing its interest in acquiring the western plants pledged its intention of operating them "at as high a rate of capacity as would be warranted by the market for their products in the market naturally served by their facilities" (STEEL, Feb. 12, p. 65).

Western industrialists and politicians naturally are keenly interested in the



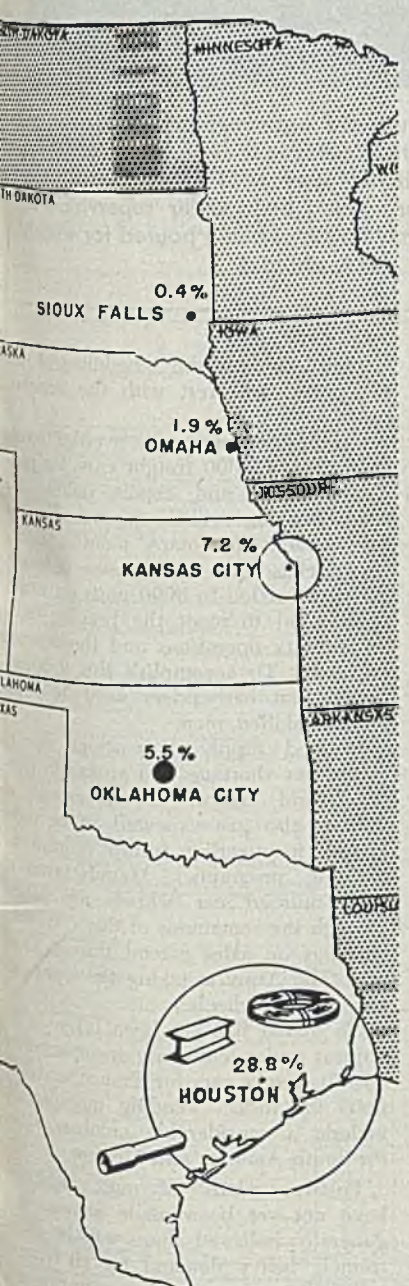
Distribution of steel products to leading markets in the western states is depicted in this map by Kaiser Co. Inc. Houston, Los Angeles and San Francisco are shown as the principal outlets

War-Born Steel Plants

continued operation of the war-built plants and the suggestion that eastern producers may seek to acquire them only to close them down is clearly prejudicial to bids of those eastern steelmakers.

When Mr. Heller was asked if his proposal would bar U. S. Steel from bidding on Geneva, he said:

"No. If the business and labor people of the West lack the enterprise to organize and make an offer of the sort suggested, of course any corporation could make an offer. But it is the policy of the board to prefer offers which contemplate using a plant rather than shutting it down."



Negotiations under the Heller program would be with the SPB and the RFC. The government would expect to write down part of its more than $200 million investment in Geneva, Mr. Heller said. Part of the loan of $111 million on Fontana also would be written off if Fontana were included in the proposal.

Mr. Heller did not touch on prospects for postwar markets, reduction of rail freight rates and other similarly important factors which will be final determinants of successful operation of the newly-built steel facilities, whether the plants are operated by western companies or eastern producers.

He suggested, however, that the aluminum fabrication plants in the West, built during the war to supply material for aircraft, might be converted into steel fabrication plants and become part of the western steel enterprise.

Conversion Feasibility Doubted

In the opinion of some observers, this assertion indicated a lack of knowledge of the geography and physical capacity of the aluminum fabricating plants. There are two such aluminum plants, one in the Pacific Northwest and one in Arizona. Both are far from the raw steel producing plants and both considerable distances from the principal consuming centers. Although large, these aluminum plants would be only a drop in the bucket in comparison with the increase in steelmaking capacity.

In Mr. Kaiser's letter to S. H. Husbands, head of the Defense Plant Corp., Mr. Kaiser offered the following general terms for lease of the Geneva plant:

1. The initial term of the lease shall extend for a period of five years from the date on which the proposed plate mill modification has been completed and shall be renewable for successive terms of five years each, provided such terms are mutually agreeable.

2. During all of the time the lease remains in effect the lessee would be obligated to operate all of the leasehold facilities to the fullest extent consistent with the general business conditions to the end that the greatest employment and production will be accomplished.

3. The Kaiser Syndicate will arrange to finance the modification of the existing plate mill at the Geneva plant so that the rolling of hot strip will be possible. Such modification is estimated to cost approximately $7 million. The modified facilities will become the property of the government, subject to the conditions hereinafter mentioned.

4. The rental for the Geneva plant shall be negotiated and fixed at an amount per ton of finished steel products which will contemplate a reasonable return to the government. The rate of such rental will be determined when the reports of the consultants employed by the RFC concerning the valuation of this property are available. The rate of rental shall be computed on the basis of the value of the modified facilities. The costs of modifying the plate mill hereinabove mentioned shall be applied in discharge of the first rentals which become payable.

5. If the lease should not be renewed or is terminated for any reason prior to the time that the accrued rentals equal the costs of modification, the government, in such event, shall pay to the Kaiser Syndicate the difference between such accrued rentals and the total costs of modification.

6. Likewise, in the event the lease is not renewed or is terminated by the Defense Plant Corp., it will reimburse the Kaiser Syndicate for the actual cost of such raw materials, materials in process, supplies, rolls, and spare parts acquired in connection with the normal operations of the steel mill, as are on hand at the time of such termination.

7. The Kaiser Syndicate will be granted an option to purchase the Geneva plant at a price to be reached by negotiation.

8. This proposal contemplates that the Defense Plant Corp. will transfer all of its rights under existing agreements for all raw materials necessary to the operation of the Geneva plant.

Improvements Proposed

To successfully accomplish operations under the proposed lease, the Kaiser statement says, the Kaiser Syndicate contemplates the following:

1. When the writedown on the Fontana Steel plant has been determined, Kaiser Co. Inc., which owns the Fontana plant, will join the Kaiser Syndicate to arrange for the erection of a cold strip mill on the Pacific Coast, the present estimated cost of which is $25 million.

2. The Kaiser Syndicate has under consideration plans for the erection of a seamless tube and electric welded pipe mill. This installation may be located in Utah, at a cost of about $25 million.

3. The Kaiser Syndicate also has under consideration erection of railroad car fabricating facilities, complete with a plant for manufacturing steel wheels and axles. Such installation may be located in Utah, at a cost of approximately $12 million.

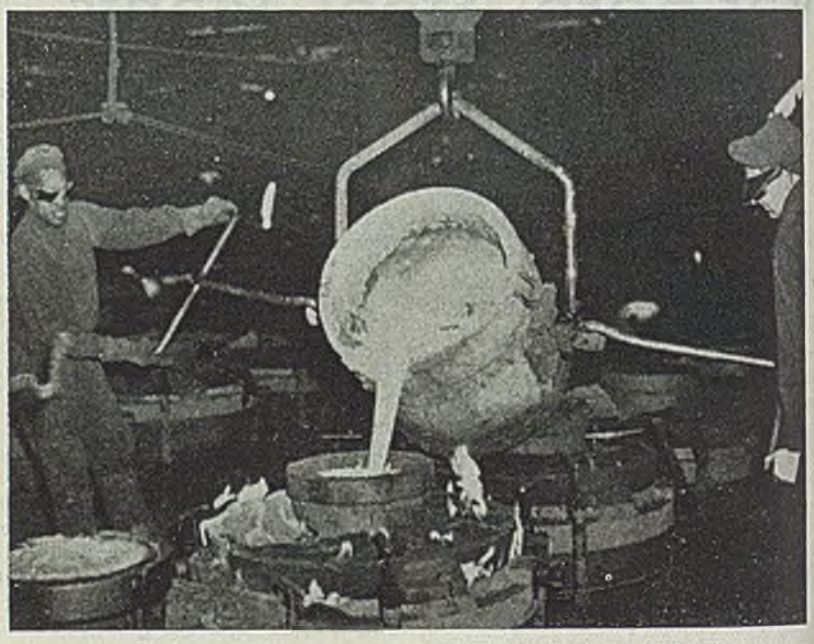
4. Contingent upon a satisfactory statement of paid-in capital, the Kaiser Syndicate has been assured by the Bank of America that adequate working capital will be provided by that institution or by a banking syndicate.

Mr. Kaiser said the proposals listed have been jointly considered by the Kaiser Syndicate, General Metals Corp. and other interested parties.

Defense Plant Corp. after receiving the Kaiser proposal announced no offers to buy the Geneva plant have been received yet, although there have been talks regarding its disposal with U. S. Steel and Colorado Fuel & Iron officials.

Car Plants' OrderBooks Well Filled

Military authorities order in excess of 13,000 units. Large backlog of business assures active operations for months



CARS FOR RUSSIA: Under a mutual aid agreement, three Canadian companies are building railway cars for Russia. One plant alone at Trenton, N. S., will turn out 1500 units this summer. The cars, which are designed to carry a 55-ton load, are being built under supervision of Soviet technicians. Shown above is molten metal being poured for wheels for flat cars. NEA photo

IN AN EFFORT to alleviate the serious transportation problem ahead the military authorities have placed orders for 12,795 army freight cars, 1200 troop sleepers and 400 kitchen cars. Potential domestic freight car orders, the bulk of which are expected to be placed soon for delivery in 1946, are estimated at 25,625 units. This latter figure likely will be increased 15,000 to 20,000 before the close of this quarter.

Building schedules have not yet been established on the military freight car orders, but production of them will be given preference although carbuilders are now free to arrange their own schedules to suit operating conditions.

The 12,795 army freight cars, for use in the Philippines, China, Burma and India war theaters, were placed with the following builders: American Car & Foundry Co., 4000 box cars at Madison, Ill., 190 tank cars, at Milton, Pa., 130 refrigerator cars at Chicago; Bethlehem Steel Co., at Johnstown, 1290 low-side gondolas, 1290 high-side gondolas and 500 flats; General American Transportion Corp., 1860 flats at East Chicago, 195 tank cars at Scranton, Pa.; Greenville Steel Car Co., 1500 flats at Greenville, Pa.; Pullman Standard Car Mfg. Co., 1840 box cars at Butler, Pa.

Pullman Standard Car Mfg. Co. will build the 1200 troop sleepers at Michigan City, Ind.; while the 400 kitchen cars will be constructed by American Car & Foundry Co. at its Berwick, Pa., yards. Delivery on the recent army freight car order is expected to get under way early in October and run through February next year. The shipment schedule on the troop sleepers and kitchen cars, to start in September and be completed by end of the year, indicates the urgent need for these types of cars.

In addition to the military requirements, railroad carbuilders still have to deliver 30,000 of the 52,000 domestic freight cars booked for shipment this year. Another factor in the transportation construction picture is the recent approval of 664 new railway passenger cars, including those previously authorized but not built, by WPB. Award of these passenger cars likely will be distributed to American Car & Foundry Co., Edward G. Budd Mfg. Co., Pullman Standard Car Mfg. Co., St. Louis Car Co. and at the Pennsylvania Railroad's own shops. There is critical need for passenger railway cars during the final months this year when the peak in the westward movement of military personnel is expected. However, it is unlikely delivery of these cars can start before January.

Orders were placed recently with Pullman Standard Car Mfg. Co., American Car & Foundry Co. and Electromotive Corp. for new lightweight trains and diesel electric locomotives at a cost of more than $12 million. Forty-seven of the 100 cars ordered will be sleeping cars. Electromotive Corp., LaGrange, Ill., booked four 4000-horsepower and three 2000-horsepower diesel electric locomotives. The passenger cars will have low-alloy high-tensile steel underframes with superstructures of aluminum alloy. Mail, baggage, and express cars will be built of low-alloy high-tensile steel throughout. Construction will start as soon as WPB authorizes use of the materials needed.

The War Production Board last week removed controls over production of new locomotives and railroad cars. Orders may now be booked and scheduled by manufacturers without prior clearance. Except in cases of military necessity, which might require rescheduling, full responsibility for the scheduling of new production will rest with the manufacturer.

On the basis of current average monthly output of 4000 freight cars, the present domestic and export railroad car order backlog will keep carbuilders at full capacity for many months. Industry officials state an increase in freight car construction to 8000 units per month is essential to meet the pressing needs for military operations and the domestic railroads. To accomplish this it is estimated that carbuilders need 1800 additional skilled men.

Limited supply of castings, due to manpower shortage and strikes in foundries, and critical low inventories of lumber also are expected to be major factors in meeting future railroad car building programs. Manufacturers of steel railroad car wheels are booked through the remainder of this year; order backlogs on axles extend through October. The Army is taking the entire output of iron wheels.

No action has yet been taken on the request under lend-lease arrangement for 36,750 freight cars for France, and 6000 units for India. Pending inquiries also include a considerable number of cars for South America and Mexico.

Postwar plans of most carbuilders have not yet been made known. It is generally believed there will be an extremely heavy demand for all types of railroad equipment for many months after hostilities cease.

May Steel Shipments Score Gain

Increases registered for plates, bars, sheets and wire. Tonnage movement in first five months of 1945 down compared with like period of 1944

FINISHED steel shipments in May totaled 5,938,055 net tons, compared with 5,769,786 tons in April, according to the American Iron & Steel Institute, New York.

Shipments for five months this year totaled 28,525,620 tons, against 29,218,912 tons in the comparable period in 1944.

During May 521,004 tons were shipped to members of the industry for conversion into further finished products, compared with 515,722 tons in April.

Plate shipments increased from 668,717 tons in April to 739,008 tons in May. Hot-rolled bars shipped in April totaled 847,232 tons, in May 873,911 tons; hot-rolled sheets in April totaled 598,478 tons, in May 614,591 tons; drawn wire in April 184,314 tons, in May 195,809 tons. Further details and breakdown of various products are presented in the accompanying tabulation.

Companies included in this table in 1944 represented 99 percent of the total output of finished rolled steel products as reported to the Institute. Figures on maximum annual potential capacity embrace total tonnage of each product that could be produced under full operation, assuming exclusive use of all available facilities, without regard to availability of ingots.

Coal Stocks Shrink; Cut In Industrial Use Looms

Unless coal production is substantially increased over coming months curtailment in industrial use of as much as 20 per cent may be necessary to offset an estimated 25 million ton deficit in supplies anticipated for the year ending April 1 next.

Inadequate stocks in the Pittsburgh district have not yet reached the point of restricting blast furnace operations but furnacemen are apprehensive for the future with coal inventories well below normal.

Dr. C. J. Potter, solid fuels administrator for war, recently said the average steel mill has only a 16-day coal supply against a normal 30-day reserve. He said one mill had only a 6-day supply.

On a national basis output of bituminous coal in the first six months of this year was 7 per cent below the total for the comparable 1944 period. Recent strikes at four mines of Jones & Laughlin Steel Corp., one at National No. 1 mine of the H. C. Frick Co., and at Pittsburgh Coal Co.'s Westland pits have accentuated the shortage in the Pittsburgh district the past month. Three of the Jones & Laughlin mines are back in production but 90,000 tons of production were lost.

Bituminous coal mine operators are meeting in Washington this week with Office of Price Administration officials to determine whether additional price ceiling increases are warranted. Increase granted the operators May 1 was almost entirely absorbed by the boost in labor costs. Talk current at Pittsburgh is that the mine operators may be granted a further increase of 6 cents per ton.

AMERICAN IRON AND STEEL INSTITUTE
CAPACITY, PRODUCTION AND SHIPMENTS

Period May - 1945

Steel Products	Number of companies	Items	Maximum Annual Potential Capacity Net Tons	Current Month: Production: Net Tons	Current Month: Production: Per cent of capacity	Current Month: Shipments (Net Tons): Total	Current Month: Shipments (Net Tons): To members of the industry for conversion into further finished products	To Date This Year: Production: Net Tons	To Date This Year: Production: Per cent of capacity	To Date This Year: Shipments (Net Tons): Total	To Date This Year: Shipments (Net Tons): To members of the industry for conversion into further finished products
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	21	1	xxxx	xxxx	xxx	814,738	208,555	xxxx	xxx	3,933,731	987,805
Structural shapes (heavy)	11	2	9,580,550	313,364	40.6	316,242	xxxx	1,378,806	37.4	1,405,449	xxxx
Steel piling	3	3		17,126		18,674	xxxx	104,687		107,433	xxxx
Plates (sheared and universal)	27	4	17,841,320	762,579	50.3	739,008	52,885	3,771,146	51.1	3,696,047	239,984
Skelp	6	5	xxxx	xxxx	xxx	68,742	31,638	xxxx	xxx	319,045	179,151
Rails—Standard (over 60 lbs.)	4	6	3,669,000	190,262	61.0	185,152	xxxx	926,900	61.0	917,450	xxxx
—All other	5	7	512,000	17,432	40.1	14,817	xxxx	76,803	36.2	75,652	xxxx
Splice bars and tie plates	12	8	1,745,960	67,379	45.4	66,959	xxxx	320,467	44.3	327,908	xxxx
Track spikes	10	9	349,400	13,318	44.9	13,526	xxxx	64,581	44.7	66,539	xxxx
Hot Rolled Bars—Carbon	37	10	xxxx	778,345	xxx	616,315	90,574	3,764,161	xxx	2,934,639	452,310
—Reinforcing—New billet	13	11	xxxx	53,665	xxx	52,438	xxxx	248,555	xxx	251,552	xxxx
—Rerolled	13	12	xxxx	9,885	xxx	7,771	xxxx	32,363	xxx	32,868	xxxx
—Alloy	24	13	xxxx	270,365	xxx	197,387	24,987	1,348,390	xxx	984,941	120,843
—Total	46	14	22,381,700	1,112,260	58.5	873,911	115,561	5,393,469	58.2	4,204,000	573,153
Cold Finished Bars—Carbon	23	15	xxxx	162,183	xxx	167,535	xxxx	767,351	xxx	771,984	xxxx
—Alloy	25	16	xxxx	40,362	xxx	35,730	xxxx	194,861	xxx	178,667	xxxx
—Total	32	17	3,015,910	202,545	79.0	203,265	xxxx	962,212	77.1	950,651	xxxx
Tool steel bars	17	18	273,010	13,071	56.4	13,133	xxxx	60,746	53.8	60,884	xxxx
Pipe & Tubes—Butt weld	16	19	2,232,520	137,866	72.7	130,900	xxxx	639,637	69.2	613,974	xxxx
—Lap weld	9	20	830,200	49,831	70.6	51,100	xxxx	230,353	67.0	234,661	xxxx
—Electric weld	11	21	1,570,900	91,327	68.4	79,795	xxxx	442,181	68.0	386,738	xxxx
—Seamless	16	22	3,377,700	273,422	95.3	229,376	xxxx	1,320,088	94.4	1,055,885	xxxx
—Conduit (cap. & prod. incl. above)	7	23	xxxx	xxxx	xxx	6,804	xxxx	xxxx	xxx	35,936	xxxx
—Mech. tubing (cap. & prod. incl. above)	12	24	xxxx	xxxx	xxx	71,513	xxxx	xxxx	xxx	339,916	xxxx
Wire rods	28	25	7,266,670	406,730	65.9	113,278	32,768	1,950,714	64.9	547,330	174,589
Wire—Drawn	41	26	5,664,690	319,817	66.5	195,809	6,989	1,556,406	66.4	936,569	39,866
—Nails and staples	19	27	1,253,360	53,553	50.3	52,206	xxxx	253,930	49.0	253,695	xxxx
—Barbed and twisted	15	28	539,610	21,541	47.0	21,678	xxxx	101,577	45.5	100,433	xxxx
—Woven wire fence	16	29	1,113,860	30,393	32.1	30,404	xxxx	156,788	34.0	155,731	xxxx
—Bale ties	12	30	149,700	7,046	55.4	7,632	xxxx	30,883	49.8	33,940	xxxx
Black Plate—Ordinary	9	31	xxxx	xxxx	xxx	44,435	674	xxxx	xxx	218,283	2,333
—Chemically treated	8	32	465,000	11,483	29.1	9,850	xxxx	53,731	27.9	47,545	xxxx
Tin and Terne Plate—Hot dipped	10	33	3,793,850	186,041	57.7	182,154	xxxx	846,976	53.9	908,866	xxxx
—Electrolytic	10	34	2,231,850	79,500	41.9	78,464	xxxx	352,128	38.1	369,568	xxxx
Sheets—Hot rolled	29	35	19,197,320	1,220,248	74.8	614,591	46,978	5,648,696	71.1	2,903,347	192,002
—Cold rolled	12	36	7,131,460	398,119	65.7	242,715	xxxx	1,846,582	62.6	1,082,637	xxxx
—Galvanized	16	37	2,915,130	160,402	64.8	158,591	xxxx	748,336	62.0	743,142	xxxx
Strip—Hot rolled	24	38	7,055,390	246,471	41.1	140,539	24,956	1,164,140	39.9	718,568	118,377
—Cold rolled	35	39	3,119,850	120,136	45.3	112,217	xxxx	602,333	46.6	567,302	xxxx
Wheels (car, rolled steel)	5	40	319,400	26,355	97.1	26,020	xxxx	125,753	95.1	124,426	xxxx
Axles	6	41	408,170	13,609	39.2	14,967	xxxx	62,133	36.8	63,293	xxxx
All other	5	42	190,490	4,192	25.9	3,850	xxxx	20,148	25.6	18,846	xxxx
TOTAL STEEL PRODUCTS	152	43	xxxx	xxxx	xxx	5,938,055	521,004	xxxx	xxx	28,525,620	2,507,260
Effective steel finishing capacity	152	44	67,310,000	xxxx	xxx	xxxx	xxxx	xxxx	xxx	xxxx	xxxx
Percent of shipments to effective finishing capacity	152	45	xxxx	xxxx	xxx	94.7 %	xxxx	xxxx	xxx	93.4 %	xxxx

Dwindling Tin Stockpiles Preclude Release for Reconversion Uses

Reserves have dropped 70 per cent since Pearl Harbor. Proposals for thinner coatings of food and vegetable cans under consideration. Substitutes must be used in most peacetime products until after reopening of prewar sources of supply

DWINDLING stockpiles of tin and the improbability that these supplies can be increased substantially until several years after V-J Day will keep this essential metal among the most critical for many months to come.

Available supplies of pig tin have dropped 70 per cent since Jan. 1, 1942, from 83,076 long tons to 23,654 tons on May 1 this year. Civilian demand, sharpened by four years of a slim tin diet, would consume this reserve in a few months if government restrictions were lifted. Average prewar automobiles, for example, used 8 pounds of tin per car. A 6,000,000-car year thus would chew up virtually the entire reserve.

Chances that any substantial quantities of tin will be released for reconversion purposes are precluded by the short stockpiles, the War Production Board has announced. However, industry has learned to make good use of substitutes during the past four years and the lack of tin is not expected to pose too difficult problems for reconversion industries. Silver-lead solders, aluminum refrigerator coils, aluminum and galvanized steel shelving instead of tinned steel shelving, and substitution of copper-lead bearings, lead arsenic bearings and low-tin bearing for babbitt metal are typical examples of how the shortage has been solved.

Proposals for thinner coatings of tin on steel plate to be used in making food cans have been placed before the Can Manufacturers Industry Advisory Committee. The proposals will be reviewed by experts and industry committees.

Can manufacturers already have accomplished much in the use of thinner coatings especially through use of electrolytic tin plate. By the end of 1945, the can industry will have saved about 58,000 tons of tin.

The Irvin Works of Carnegie-Illinois Steel Corp. in June established an all-time high in electrolytic tin plate production. Operating at 114 per cent of capacity, the plant turned out enough tin plate to manufacture 170 million standard size fruit and vegetable containers. This amounted to 25 million more cans than could have been made with May output, the previous monthly record. United States Steel Corp. subsidiaries since Pearl Harbor have produced enough electrolytically coated tin plate for 7½ billion cans, resulting in a saving of about 9 million pounds of tin.

Third quarter tin mill production is expected to meet the scheduled production of 933,000 tons for all tin mill products. A small carryover tonnage, resulting from strikes and slowdowns, also is expected to be made up. Fourth quarter production is expected to be little changed from the current rate.

A considerable volume of tin plate orders has been placed on an unrated basis, but little hope of deliveries on this tonnage during 1945 is held.

AFA Annual Business Meeting Held July 18

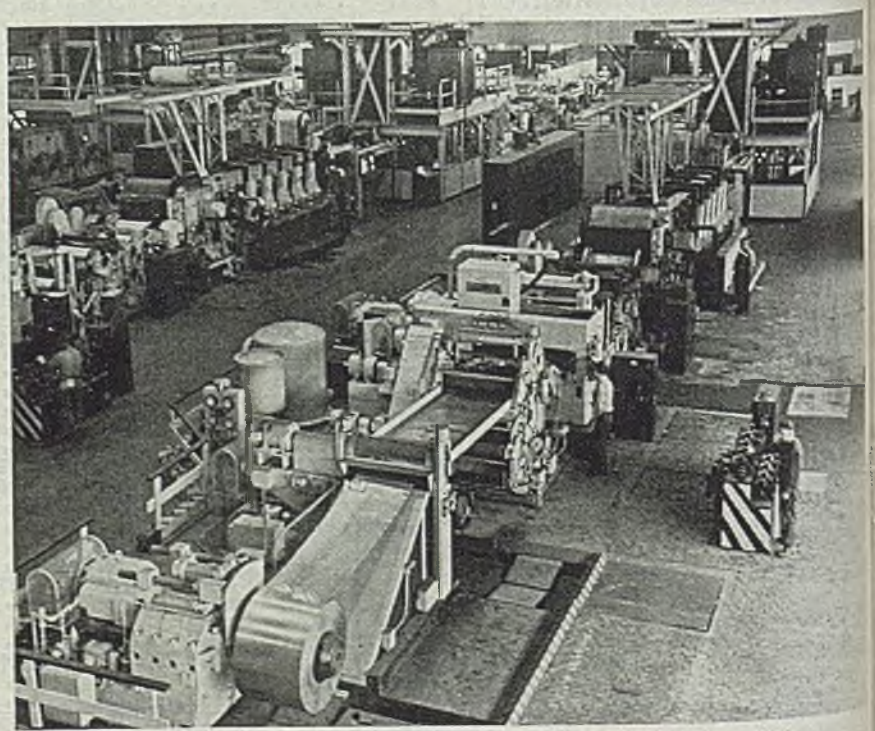
American Foundrymen's Association held its annual business meeting at Chicago last Wednesday. Due to Office of Defense Transportation regulations, attendance was limited to delegated representatives of the association's 30 chapters and members of the Chicago area.

In the absence of Dr. Harry A. Schwartz, manager of research, National Malleable & Steel Castings Co., Cleveland, and the 1945 foundation lecturer, his address on "Solidification of Metals" was digested by Fred G. Sefing, research metallurgist, International Nickel Co., New York. Max Kuniansky, director of the association, discussed "Castings and Postwar Industry."

Distinguished service awards were made to the following: C. E. Sims, Battelle Memorial Institute, Columbus, O.; R. E. Kennedy, secretary of the AFA; Rear Adm. A. H. Van Keuren, director, Naval Research Laboratory; M. J. Gregory, past national director of AFA; Ralph J. Teetor, retiring president.

New officers and directors were introduced: President, Fred J. Walls of Detroit, International Nickel Co. Inc., New York; vice president, Sheldon V. Wood, president and general manager, Minneapolis Electric Steel Castings Co., Minneapolis.

Director for one year, R. J. Teetor, president, Cadillac Malleable Iron Co., Cadillac, Mich.; director for three years, George K. Dreher, vice president, Ampco Metal Inc., Milwaukee; Edwin W. Horlebein, president and general manager, Gibson & Kirk Co., Baltimore; Harold H. Judson, foundry superintendent, Goulds Pumps Inc., Seneca Falls, N. Y.; James H. Smith, general manager, General Motors Corp.'s Saginaw Malleable Iron Division, Saginaw, Mich.; and F. M. Wittlinger, secretary and general manager, Texas Electric Steel Castings Co., Houston, Tex.



These three electrolytic tin plate lines at Carnegie-Illinois Irvin Works, Dravosburg, Pa., established an alltime production record in June. In the foreground a coil of strip steel starts on its way through one of the lines to come out the far end in a continuous stream of tin-plated sheets, cut to size and automatically counted. Lines like these have saved many tons of tin since Pearl Harbor

Steel Castings Wage Ruling Is Revised by WLB

Adjustments for 12 companies made retroactive in most cases to date when union contracts were terminated

WAR Labor Board ruled last week that certain wage adjustments for 27,000 employees of 12 steel casting companies should be retroactive in "most cases" to the date when union contracts with the company terminated. Industry members dissented in the decision.

In an order of May 3 granting the wage adjustments, the WLB had directed that vacation and shift differentials be retroactive, and had left the effective date of other wage provisions, the correction of any inequities, and the mechanical and occupational rates to collective bargaining.

In amending its May 3 decision, the board provided that the correction of wage rate inequities and rates for mechanical and maintenance occupations, as well as vacation and shift differentials, shall become retroactive to the time the contracts ended.

WLB denied the United Steelworkers of America (CIO) request for an extension of the retroactive provision relating to time and a half on six prescribed holidays. Labor members dissented. It also denied the union demand for an earlier retroactive date than Aug. 26, 1944, in the case of employees of the American Steel Foundries, Chicago.

A request for reconsideration of provisions of the May 3 order directing a differential of five cents an hour on the second night shift and ten cents on the third shift also was denied, industry members dissenting. This request was made by National Roll & Foundry Co., Avonmore, Pa.; Mackintosh, Hemphill Co., Pittsburgh; Fort Pitt Steel Casting Co., McKeesport, Pa., and National Malleable & Steel Castings Co., Cleveland.

The other companies in the case are Continental Foundry & Machine Co., East Chicago, Ind.; McConway & Torley Co., Reliance Steel Casting Co., and United Engineering & Foundry Co., all of Pittsburgh; Electric Steel Castings Co., Indianapolis; National Erie Corp., Erie, Pa.; and Symington-Gould Corp., Rochester, N. Y.

Steel Industry May Payrolls Second Highest on Record

Steel company payrolls during May rose to the second highest monthly total on record, but the number of men employed continued the decline which has been going on virtually without interruption since the summer of 1942.

During May, steel payrolls totaled $154,035,100, compared with $146,954,800 in April and $145,426,600 in May a year ago, according to the American Iron & Steel Institute.

An average of 564,600 employes was employed in the industry during May.

Wage Floor of 65 Cents Is Urged by Senate Group

Subcommittee of the Senate Education and Labor Committee last week recommended a favorable report on a Senate concurrent resolution which would set 65 cents an hour as the minimum to correct substandard living conditions. The subcommittee is headed by Sen. Claude Pepper (Dem., Fla.).

The subcommittee further recommended: 1. The WLB adopt a definite policy concerning substandard wages, using the cost of living budget approach as its criterion in determining what wage rate is required to eliminate substandards of living.

2. The WLB apply its policy uniformly in voluntary and dispute cases.

3. The WLB discontinue its practice of offsetting wage increases granted to correct substandards against the 15 per cent cost of living adjustment allowed under the Little Steel ceiling formula.

4. Congress give early consideration to amending the Fair Labor Standards Act with a view to raising the statutory minimum wage and broadening the coverage of the act.

Thousands of Workers Idle In Labor Disputes

Labor disputes throughout the nation last week kept an estimated 27,500 workers idle and while a number of work stoppages were ended several new walkouts were threatened.

Over 1000 foundry workers in 39 foundries in Chicago and the Fox River valley, including Aurora, Joliet and Batavia, Ill., voted to strike July 23.

NWLB Steel Commission's Jurisdiction Broadened

Jurisdiction of National War Labor Board's Steel Commission over disputes involving intraplant wage rate inequities has been broadened to cover American Rolling Mill Co.'s plants at Ashland, Ky., Hamilton, O., and Zanesville, O., and general offices and research organization at Middletown, O.; Great Lakes Steel Corp.'s plant at Ecorse, Mich.; Harrisburg Steel Corp., Harrisburg, Pa.; Missouri Rolling Mills, St. Louis; National Steel Corp.'s Weirton Steel Co. Division, Weirton, W. Va.; Republic Steel Corp.'s Delworth-Porter plant, Pittsburgh, and plants at Elyria, O., and Gary, Ind.; and Truscon Steel Co.'s Youngstown, O., plant.

TRANSITION TOPICS

WESTERN STEEL— Henry J. Kaiser proposes syndicate to operate Geneva steel plant after the war. Suggests combine include Fontana, Colorado Fuel & Iron and Wickwire Spencer plants to form seventh largest steel company in country. See page 80.

COAL— Shortage of stocks causes apprehension over industrial supplies for coming winter. Deficiency of 25 million tons in stocks above ground presages 20 per cent cut in next winter's supplies. See page 83.

TIN— War Production Board warns tin still is in critically short supply and cannot be released for reconversion uses. Thinner coatings for food containers under consideration. See page 84.

LABOR— More equitable federal policy expected to be developed under Schwellenbach. Activities of many agencies dealing with labor problems may be co-ordinated. See page 86.

WAR PLANTS— Construction of emergency facilities largely followed pattern of peacetime location of plants. Forty-eight industrial works and sites declared surplus and listed for disposal. See page 89.

AUTOMOBILES— Producers hope production quotas soon may be removed. Consideration is being given to industry's huge expansion program. See page 93.

THREAD STANDARDS— American technical men working on series of standards for threaded parts for aircraft applications to consolidate views in preparation for British-American-Canadian conference. See page 100.

More Equitable U. S. Labor Policy Expected Under Schwellenbach

New secretary expected to co-ordinate activities of many agencies having partial jurisdiction over labor problems. Policy will be sympathetic to unions but will not lean as heavily on expediency in dealing with disputes as in past

ONE of Washington's hot spots right now is the Department of Labor where, under Lewis B. Schwellenbach, the new secretary, a determined effort is underway to bring some order out of the tangled mess that has been government's labor policy. President Truman's bill of specifications to Judge Schwellenbach when he handed him the portfolio has not been made public. But there are certain positive indications that a lot more is expected of Mr. Schwellenbach than merely to succeed Madame Perkins.

When Mr. Truman assumed the presidency, one of his first acts was to ask Congress for sweeping power to reorganize the executive branch of the government. Today he must supervise more than 100 departments, agencies, and commissions, each headed by a man reporting directly to him. Just what he had in mind has been revealed since in an article by James F. Byrnes in the July issue of *The American Magazine*. In selecting horrible examples, Justice Byrnes dwelt most heavily on the government's labor setup.

Justice Byrnes mentioned the War Manpower Commission, the Selective Service System, the War Production Board, Department of Labor, War Food Administration, Railroad Retirement Board, War Labor Board, War Department, Navy Department, Civil Service Commission and the Retraining and Reemployment Commission as being among the agencies having some part in the handling of labor problems.

"I think the Department of Labor—under the newly appointed Secretary Schwellenbach—should be charged with the administration of all governmental services relating to labor supply, labor standards and labor relations," wrote Justice Byrnes who now as secretary of state, is the senior member of the cabinet.

Since embarking on his new duties Judge Schwellenbach's course of action indicates that he assumes himself to be the key labor man in the Truman administration. At the outset he called the country's outstanding labor leaders into a series of conferences just concluded. These included William Green of the AFL, Philip Murray of the CIO, John L. Lewis of the UMW and A. F. Whitney of the Brotherhood of Railway Trainmen. The purpose was to find out what was on their minds, what steps in their opinion are necessary to make for smooth government relations with labor.

A leading complaint, he found, had to do with the work of the Bureau of Labor Statistics; for a number of years labor spokesmen have been condemning the BLS cost-of-living index as inaccurate and misleading. They told Judge Schwellenbach that on numerous occasions the BLS index had prevented them from obtaining for their union members wage increases warranted by increased living expenses; for example, the WLB based the Little Steel wage formula on the BLS cost-of-living index.

Judge Schwellenbach assured the union leaders during these conferences that he would order an immediate investigation of the Bureau of Labor Statistics and its operations. He is quoted in labor circles as having said that the bureau must be revamped or abolished because its work is "too academic" and "not realistic enough," and as having admitted that its statistical work was "lousy." Labor men are highly elated with this outcome of the conferences.

Another complaint advanced to Judge Schwellenbach was that the CIO is not at present represented in the department's administration. He is quoted as having promised to make an appointment from the ranks of the CIO whereby that organization will have an equal voice with the AFL. AFL's representative is Daniel W. Tracy, first assistant secretary of labor, who formerly was president of the Brotherhood of Electrical Workers.

Seeks NLRB Supervision

Another complaint had to do with the National Labor Relations Board; this agency was accused of biased rulings in cases involving union jurisdiction. Judge Schwellenbach is said to have informed the union men that he proposes to make a move to have the NLRB incorporated into the Labor Department where it would be subject to his general supervision. To bring about such a change proper authorization by Congress would be necessary.

That Judge Schwellenbach's appointment means a "new deal" in regard to the handling of labor problems under President Truman also is indicated by the advisory staff on which he relies. Excepting for Mr. Tracy, Judge Schwellenbach has ignored officials in the Labor Department. He brought in with him a group of trusted old friends and associates. These include Edward Carl Moran, former congressman from Maine; Edward Connally, former district attorney of Spokane, Wash.; A. A. Laframboise, the judge's confidential clerk for a number of years; John Carson, former labor counsel for the Bituminous Coal Commission; Ike Comeaux, comptroller of the Seattle city lighting system and former Bonneville Power executive; and John Steelman, formerly the department's conciliation director.

RAYMOND M. FOLEY

Recently confirmed by the Senate as commissioner of the Federal Housing Administration, Mr. Foley becomes the fourth man to head FHA since it was created in 1934. Formerly Mr. Foley was FHA state director for Michigan. NEA photo

Mr. Moran has been assigned to determine what is to be done about the Bureau of Labor Statistics and the BLS cost-of-living index. He will be second assistant secretary of labor but may remain on the scene only long enough to finish his present assignment. He is anxious to get back to private business in Maine. Mr. Moran is that rarity, a Democratic congressman from Maine. He served two terms during which he built a good labor record. As a member of the Maritime Commission, 1937-1940, he also won the commendations of both the AFL and CIO.

While Mr. Schwellenbach's actions to date thus have won praise from labor leaders, they cannot be taken as forecasting a policy of subserviency to the unions. For one thing, the judge has a reputation for being fearless and for refusing to allow others to make up his mind for him. For another, decisions on questions involving labor are reached only with White House approval, and late developments indicate that the Truman administration is less inclined to follow a policy of appeasement than previously had been the case.

One of these developments was the

introduction of the federal labor relations act sponsored by Senators Hatch, Burton and Ball. In the first place, the close friendship between President Truman and Senator Hatch makes it unlikely that this bill could have been introduced without President Truman's prior knowledge. In the second place, there has been no active opposition by the administration to this bill despite its condemnation by union leaders.

This bill was referred to the Senate Committee on Education and Labor where no public hearings or other activities have been planned for it. In the meantime, a lot of support is developing for the bill, especially among large numbers of small businessmen who believe a law of this character would help business by preventing work stoppages that reduce purchasing power of the workers involved. The impression prevails, at least at this time, that if this bill, or one like it, finally should be brought to a vote in this session the administration will not offer any obstacles.

Another development that is in marked contrast with the policy of expediency and appeasement which has been reflected so often in the past is the decision whereby the War Labor Board, on July 12, rescinded its order of June 14 extending the contract between the Newspaper Delivery Men's Union in New York and the New York newspaper publishers. The decision relieved the publishers of any contractual obligations to the union; under it they may hire anyone they want. Particularly significant is the fact the decision of the WLB in thus substituting an open for a closed shop in this case was reached unanimously. That was the first time such a thing has happened and it is significant for the reason that such a decision could not have been reached over White House disapproval.

Rules To Be Applied Firmly

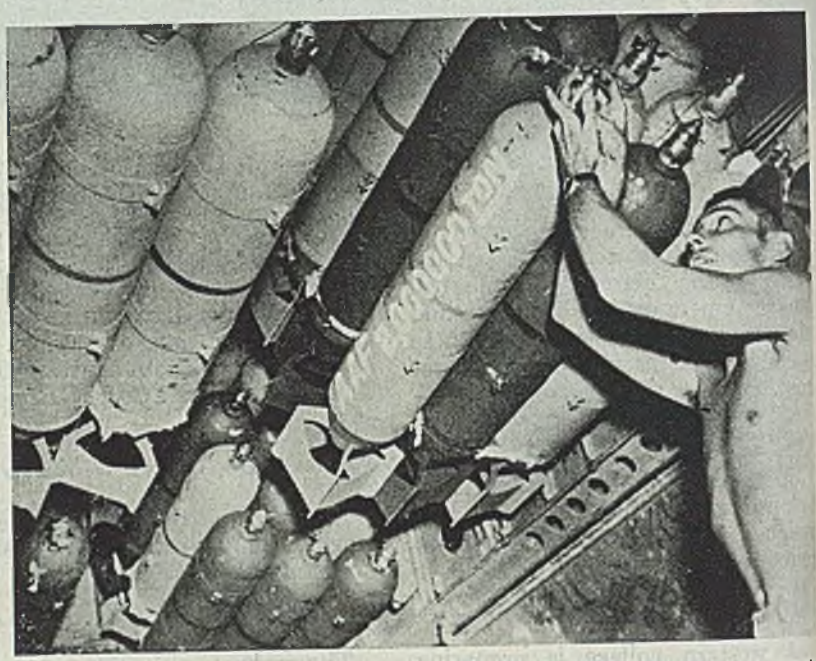
The Truman labor policy, as indicated at this stage, is to be one of friendliness toward "labor" as personified by the union leaders; but the rules are to be clarified and applied more firmly, and there will be less use for the old policy of expediency in adjusting labor problems of the future. In this process Judge Schwellenbach is slated to take the lead.

Judge Schwellenbach's first speech as labor secretary, on July 13, is regarded as significant in Washington where it generally is believed the most difficult problems that will face the Truman administration after the war with Japan will be labor and other human problems. The judge voiced a warning that neither strikes nor labor-baiting will be tolerated.

"To advance any demand to the point of stopping production instead of using machinery available for peaceful settlement is not in the national interest and will not be supported by public opinion. I urge labor to support the no-strike pledge," the new secretary of labor said.

At the same time he called upon management not to "seize upon the chance" to cut wages and destroy unions in the changeover to a peacetime economy. "I shall expect management," he said, "to refrain from doing those things, thoughtlessly or purposefully, which provoke men and tempt them to act first and reason later."

The Truman administration evidently hopes to bring about a more definite labor policy by a process of administrative evolution, with Judge Schwellenbach carrying the banner. It knows that a serious attempt in Congress to reform the National Labor Relations Act at this session would stir up a lot of excitement and resentment, would make labor leaders more touchy and self-conscious as the period of full changeover to the civilian economy approaches. Hence, the Truman administration is not expected to ask Congress for any new labor legislation, at least this session.



2,000,000TH TON: Making sure the bomb representing the 2,000,000th ton of explosives dropped by the Army Air Forces in World War II goes off when it strikes Japan is this technical sergeant. The scene is the bomb bay of the "Goin Jessie," Superfort at a Tinian base. NEA photo

WPB Approves 159 Requests For Plant Reconversion

Adhering to its policy of granting preferential ratings for construction and equipment materials necessary for industrial reconversion, the War Production Board approved 159 new applications, totaling $44,157,000, from June 30 through July 6, under priorities regulation 24 and direction 5 to order L-41. This made a grand total of 1279 applications, amounting to $243,681,000, approved from April 1 through July 6.

At the close of business July 6, iron and steel products industry had a total of 306 approved applications amounting to $48,903,000 of which $21,205,000 was for construction and $27,698,000 for equipment. Automobile and equipment industry had 271 approved applications amounting to $141,227,000 of which $46,486,000 was for construction and $94,741,000 for equipment. Machinery (other than electrical) ranked third with 264 approved applications amounting to $27,419,000 of which $8,358,000 was for construction and $19,061,000 for equipment. Geographically, Michigan retained its lead with a total of 293 approved applications, followed by Indiana, Ohio, Pennsylvania and Illinois.

Metal Strapping Industry Allotted More Carbon Steel

Supplemental allotment of 10,900 tons of carbon steel has been granted to the metal strapping manufacturing industry to meet special military packaging requirements. Third-quarter allotments of carbon steel to the industry now total 129,500 tons, the largest amount ever granted in a single quarter.

Military packaging requirements have required constantly increasing allotments but the total amount cannot be used to make strapping. Plants receiving these allotments must also use them to make or acquire tools, accessories and fittings needed in connection with the use of metal strapping.

Bulk of New War Plants Built Close to Like Prewar Facilities

UNPRECEDENTED expansion of manufacturing facilities in this country from July 1, 1940, through May 31, 1944, totaling $20,300 million, has been concentrated largely in areas where similar industries operated before the war began. This was revealed last week by the War Production Board in its report on "Characteristics of War Manufacturing Facilities."

A much less widespread relocation of industrial plants throughout the country occurred than might have been the popular conception, the report pointed out, because strategic and economic considerations required the heavy concentration of these facilities in the same states and areas where similar industries had chiefly operated before the war.

WPB's anaylsis provides the first complete breakdown on the locations of the 18,126 facility additions represented in the total valuation of $20,300 million.

Ten Cities Get Third of Plants

About $19 billion worth of the manufacturing facilities, representing 95 per cent, were placed in 179 previously existing "manufacturing areas." The 451 counties that are included in these "manufacturing areas" in 1939 had 84 per cent of the country's manufacturing wage earners; 81 per cent of value of products.

More than a third, or $7500 million of the total value of facilities authorizations, were located in ten of the country's leading industrial cities: Chicago, Detroit, New York, Philadelphia, Los Angeles, Houston, Pittsburgh, Cleveland, St. Louis, and San Francisco. The standing of the six leading states on the basis of number and value of facilities and authorizations as of May 31, 1944, follow: Ohio, 1293, $1,677,000; Pennsylvania, 1220, $1,675,000; Michigan, 1145, $1,549,000; Illinois, 1067, $1,490,000; New York, 1111, $1,383,000; Texas, 441, $1,259,000. "New plants" were authorized in the sum of $13,900 million, over one half of the authorizations being concentrated in East-North-Central, Middle Atlantic and West-South-Central regions. "Expansions" were authorized in the sum of $4200 million, of which more than half went to the Middle Atlantic, East-North-Central and South Atlantic regions. In the case of "conversion," over one half of the $2200 million authorized was placed in the East-North-Central region.

Iron and steel facilities have been heavily concentrated in five states: Pennsylvania, Ohio, Illinois, Utah and California. The latter two states named made substantial percentage gains as steel producers through these additions, Utah with $194 million and California with $147 million.

Aircraft production facilities expansion is concentrated primarily in the East-North-Central and Middle Atlantic regions, which together hold 65 per cent of the value of authorizations. The Pacific and West-South-Central regions, although showing a large share of aircraft deliveries, are the sites of relatively small proportions of the value of authorizations, being 8 per cent and 6.8 per cent, respectively.

"New plants" were 88 per cent federally financed; "expansion" of old plants, 53 per cent privately financed; and 66 per cent of the value of "conversions," federally financed. Geographically, the largest percentage of private financing was in New England, the Middle Atlantic, South Atlantic, and Pacific regions. Public financing was largest in the West-North-Central, West-South-Central, East-South-Central, and Mountain regions.

RFC Offers 48 Surplus Industrial Plants And Sites in 23 States for Sale or Lease

RECONSTRUCTION Finance Corp. is listing 48 industrial plants and sites which have been declared surplus and are available for sale or lease.

Properties are located in 23 states and represent a total disbursement by the RFC, for land, buildings, machinery and equipment, of $101,333,400.

The following partial tabulation lists the properties by former operator and plant location, type of plant and product formerly produced:

Former Operator and Plant Location	Type	Product
Pine Top Asbestos Mine, Globe, Ariz.	Complete	Mining and Mill Treatment
General Fiber Products Corp., Kingman, Ariz.	Complete 8000 sq ft	Yucca Fiber
General American Transportation Corp., Jacksonville, Fla.	Complete terminal, Approximately 196 acres	Petroleum Transportation
Maritime Comm. Nodulite Plant, Ellenton, Fla.	Complete 21,612 sq ft	Nodulite Aggregates Used in Concrete Ship Construction
Great Lakes Carbon Co., Chicago	Complete 2650 sq ft	Calcined Petroleum Coke
Mathieson Alkali Works Inc., Lake Charles, La.	Complete 480,000 sq ft	Magnesium. Several Buildings Being Leased to Dunn Construction Co.
Delta Chemical Co., Baltimore	Complete 5000 sq ft	Chloride of Lime
Pilgrim Ordnance Works, West Hanover, Mass.	135 Buildings 34,256 sq ft	Grinding Magnesium
Die-Typing Corp., Pontiac, Mich.	Complete 30,200 sq ft	Drop Forged Dies
Escanaba By-Pass Project, Escanaba, Mich.	Uncompleted Docks & Approaches	By-Pass for Iron Ore
Ford Motor Co., Dearborn, Mich.	Complete 39,000 sq ft	Turbo Superchargers
Anaconda Copper Mining Co., Columbus, Mont.	Complete	Chrome
Anaconda Copper Mining Co., Columbus, Mont.	Mining	Chrome Ore
Manganese Ore Co., Las Vegas, Nev.	Complete 69,100 sq ft	Process Manganese Oxide Nodules
Alan Wood Steel Co., Ringwood Manor, N. J.	Complete—878 Acres, 90,000 sq ft	Iron Ore
American Rolling Mill Co., Middletown, O.	Complete 18,525 sq ft	Steel Castings
Southwestern Engineering Co., Marshfield, Oreg.	Complete 8740 sq ft	Chrome Concentrates
Benjamin Franklin Graphite Co., Chester Springs, Pa.	Complete—70 Acres 9588 sq ft	Graphite
National Carbon Co. Inc., Wilkes-Barre, Pa.	Complete 11,400 sq ft	Amorphous Carbon
Pittsburgh Ferro-Manganese Co., Chester, Pa.	Complete Plant 23,004 sq ft	Pig Iron and Ferromanganese
Pittsburgh Steel Co., Monessen, Pa.	Complete Plant 35,300 sq ft	Pig Iron
Warner Co., Philadelphia	Complete Plant Approximately 26,000 sq ft	Magnesite
Reynolds Metals Co., Memphis, Tenn.	Land—Warehouse 22,000 sq ft Approximately 270 Acres	. . . . .
Southern Ferro Alloys Co., Chattanooga, Tenn.	Complete 11,700 sq ft	Ferrosilicon
Blanding Mines Co., Blanding, Utah	Complete	Vanadic Oxide
Panaminas Inc., Paytes P. O., Va.	Complete 5700 sq ft	Zinc, Lead & Copper Sulphate Concentrates
Wilkeson Products Co., Tacoma, Wash.	Complete Plant 6305 sq ft	Metallurgical Coke
Wilkeson Products Co., Wilkeson, Wash.	Complete	Coal

Booking of September Sheet and Strip Orders Remains Restricted

WPB bans acceptance of orders for specified types of flat-rolled steel, except deferred orders or as specifically directed; other revisions of regulations affect allotments to shell steel forgers, and scheduling of unrated orders

CONTROLLED Materials Plan and priorties regulations have been revised further by the War Production Board to facilitate the handling of steel orders. These modifications will aid the agency in its efforts to direct supplies into most urgent production channels.

Under direction 75 to PR-1, the "freezing" of third-quarter steel rolling mill order books for certain types of sheet and strip steel, now applies only to orders calling for September delivery, as briefly reported in STEEL July 16. Steel producers must not accept any production orders calling for delivery in September of the types of sheet and strip steel listed below, except authorized controlled material orders identified by a CMP allotment symbol containing the letter "Z" (deferred orders), or orders they are directed to accept by WPB:

Plain hot-rolled sheet and strip, 16 gage and lighter; all gages of galvanized sheet; and all gages of the following sheet and strip: Hot-pickled, cold-rolled, and silicon.

The direction also provides that each steel producer must report weekly the cancellations he has received of orders for these types of steel to be produced or delivered in the third quarter. Each weekly report of cancellations must cover the prior seven-day period, must show the month in which the orders were to be produced, and the product and gage classification.

Direction 76 to CMP regulation 1 provides that a change in an allotment symbol on any order calling for delivery in the third quarter of the types of sheet and strip mentioned above (but not to any other types) will constitute a new order. A producer may keep the order in his schedule only when he is permitted to accept a new order under direction 75.

Restrictions have been lifted on the total amount of sheet and strip steel orders that warehouses are allowed to place with steel mills. This was effected by revoking direction 1 to M-21.

Steel distributors are now prohibited from filling orders for stainless steel under terms of CMP regulation 4, as amended. The regulation has been reworded to state: "This regulation describes the procedure to be followed by warehouses and distributors in delivering controlled materials from stock (including consigned stock) except that, in the case of steel, deliveries from one distributor to another are governed by direction 3 to order M-21."

Permission for the Army and Navy to make direct allotments of steel to forgers making shell steel forgings on Army or Navy subcontracts has been extended through the fourth quarter of this year. Action was taken by amending direction 64 to CMP regulation 1.

The sequence in scheduling unrated orders for steel was explained by WPB, in an amendment to direction 66 to CMP regulation 1. The direction previously had explained the scheduling sequence only for authorized controlled material orders. Amendment of the direction results from the "open ending" of CMP on July 1 to permit deliveries of controlled materials on unrated orders.

The amended direction states that when a producer of steel in controlled material form is unable to schedule all orders that he has accepted in the month for which he accepted them, he should select the orders to be placed on the production schedule according to the following preference:

(1) Carried over and current orders required to be filled by specific direction of WPB; (2) orders bearing symbol "FCN" (further conversion) and CMP orders carried over from previous months except orders with a CMP allotment symbol including the letter "Z"; (3) current CMP orders except those carrying the allotment symbol "Z"; (4) CMP orders carrying the allotment symbol "Z" except stainless steel; (5) unrated orders (including orders bearing the symbol "FCN").

Critical Materials and Products List Revised

List of critical materials and products which are now, or which are expected to be, in short supply and which threaten to limit the production of essential products or the fulfillment of programs of high urgency, as reported by the War Production Board, includes the following: Sheet and strip steel, steel strapping, cast iron soil pipe, malleable iron pipe fittings and unions, iron oxide (yellow precipitate), antimony, bismuth, cadmium, columbium, primary grain corundum, lead, platinum, tin, axles (automotive types only), metal moisture vapor barriers, dental burs, cans, capacitors, railroad freight cars, power transmission chain (except silent), coal, power cranes and shovels (crawler and truck mounted over ¾ cu yd capacity), compressed gas cylinders, steel drums and pails, engines, containers, laboratory equipment, underground mine locomotives, coal mining machinery, textile machinery, rubber processing and tire making machinery, fractional horsepower electric motors, metal screen cloth, metal-clad switchgear (including circuit breakers), track-laying tractors (classes I and II only), power and distribution transformers, automotive-type transmissions, industrial power trucks, and valves.

New Construction Activity Rises 4 Per cent in June

New construction activity in the United States in June aggregated $403 million, a 4 per cent increase over May and a 19 per cent increase over June of last year, according to the War Production Board. New construction for the first half of 1945 totaled $2049 million, indicating a total for the year of $4400 million, or 12 per cent more than that for 1944. It is estimated that privately-financed construction will exceed publicly-financed work in 1945 for the first time since 1940.

Total new construction activity for the five-year period, June, 1940, through June, 1945, was $41,900 million. Of this total, $27,200 million was publicly financed, including $10,500 million for nonindustrial construction (exclusive of machinery and equipment), and $2200 million for housing.

WPB Prepares Directory of Electric Motor Makers

A War Production Board Survey of manufacturers of fractional and integral electric motors and generators shows there are 183 builders of this type of industrial equipment in the United States. These companies are listed in a directory that has been prepared by WPB and which indicates the various types of equipment the companies produce.

Washing Machine Makers Get More Priorities Aid

Additional priorities assistance for third-quarter production of 148,093 domestic washing machines and supplementary authorizations for the production of 27,993 domestic mechanical refrigerators have been assigned by the War Production Board.

Total authorizations granted to date for mechanical refrigerator production in the quarter provide for the manufacture of 255,702 units. A balance of materials remains, sufficient for the production of 9298 units in the third quarter. Manufacturers who wish to make mechani-

refrigerators in excess of the quantities for which they have been assigned priorities assistance may apply for permission to do so under "spot authorization."

Hannah Named Chief of WPB Forgings, Castings Branch

War Production Board has announced the following personnel changes in its Forgings and Castings Branch, Steel Division:

George Hocker has resigned as chief, to return to his former post with Bethlehem Steel Co., Bethlehem, Pa., and will be succeeded by Douglas Hannah, previously chief of the Gray Iron Section; Mr. Hannah will be succeeded by J. B. Shaw who has been deputy chief; T. H. Parke has resigned as deputy chief of the branch to accept an assignment in Europe and will be succeeded by C. A. Hall who continues as chief of the Forgings Section; R. E. Valentine has resigned as chief of the Malleable Iron Section and is succeeded by his former assistant, F. J. Buckley; W. W. Matchneer has resigned as chief of the Steel Castings Section and has been succeeded by H. F. Blattner.

WPB Consolidates Several Units as Work Load Declines

A consolidation affecting several units of the War Production Board was announced last week by Harold Boeschenstein, vice chairman for operations. This action was taken to achieve a more compact administrative structure, in view of the declining work load of some units of the board.

One bureau, Radio and Transport, has been abolished and its divisions, with one exception, transferred to the Equipment Bureau. The exception is the Radio and Radar Division which has been placed directly under the office of the operations vice chairman.

Equipment Bureau now comprises the Aircraft, Transportation Equipment, Service Equipment, Construction Machinery, Automotive, Farm Machinery and Equipment, General Industrial Equipment, and Tools divisions.

John S. Chafee, director, Tools Division, will be director of the expanded Equipment Bureau, and Paul S. Gaston, former deputy director of the Tools Division, will be director of that division.

Stanley B. Adams, formerly director of the Consumers Durable Goods Division, will become director of the Consumers Hard Goods Bureau. This bureau is now made up of the Consumers Durable Goods Division and the Safety and Technical Equipment Division. The new director of the Consumers Durable Goods Division will be Frederick M. Mitchell, previously chief of the Electric Goods Branch of the Consumers Durable Goods Division.

PRIORITIES–ALLOCATIONS–PRICES

Summaries of revocations of and amendments to orders and regulations; official interpretations and directives, issued by War Production Board and Office of Price Administration

REVOCATIONS

SEWING MACHINES: Order L-98, which restricted production of sewing machines for domestic use, has been revoked. (L-98)

ELECTRIC MOTORS: Order L-341, which controlled deliveries of small electric motors, has been revoked. Delivery of these motors has been placed on the basis of priorities regulation No. 1 rather than allocation from WPB. Manufacturers may ship unrated orders whenever possible after all rated orders have been shipped. The motors affected are fractional horsepower alternating current motors of all sizes and types and single-phase alternating current motors from 1 to 5 hp, except specially designed airborne and shockproof shipboard types. (L-341)

FERROCOLUMBIUM: Order M-296, which established complete allocation control over ferrocolumbium, has been revoked. (M-296)

AMENDMENTS

CONSTRUCTION MACHINERY: WPB authorization is no longer required to sell class V special size tracklaying tractors (having a drawbar rating of less than 22 hp) or small selfpropelled maintainers and road patrols. Authorization is still required to sell tracklaying tractors rated 22 drawbar hp and over and graders of the selfpropelled earth-moving type (14,000 lb gross weight and over). (L-192)

CADMIUM: Purchasers now may order cadmium only when the metal will be used in filling a rated order. Permitted uses of the metal are listed in order M-65. All appeals and other communications in reference to the order must be filed now with WPB's Tin, Lead and Zinc Division in Washington instead of the field offices as formerly required. (M-65)

SCHEDULED PRODUCTS: Manufacturers of marine diesel engines and main marine propulsion turbines and gears, whose production was frozen, no longer need file monthly delivery schedules unless specifically asked to do so by WPB. Plants operating under frozen schedules will be governed by these schedules for the period of the freeze, except as the schedules may be amended with consent of WPB. These changes will be limited to orders scheduled for delivery prior to June 30, 1946. In the case of turbine and gear plants, the freeze period continues for 12 months; for diesel plants, for 8 months. (M-293)

CIVIL TRANSPORT AIRCRAFT: Aircraft manufacturers will be given priorities assistance in obtaining new materials, where surplus materials cannot be obtained or used, for the production of commercial transport type aircraft for use by foreign flag air carriers. Foreign flag air lines now may place purchase orders with United States manufacturers for transport type aircraft upon obtaining export licenses approved by the Department of State. (P-47-a)

CMP REGULATIONS

MANPOWER: Producers applying for materials are no longer required to file a statement of manpower requirements (form WPB-3820) if they are in the less critical labor areas or will have a limited number of production employes. Direction 74 to CMP regulation 1 provides that the manpower statement will not be necessary when filing an application on form CMP-4B for controlled materials in either of the following cases: Where proposed production will be carried on in plants situated in groups III, IV, or unclassified labor areas; where, regardless of plant location, total number of production workers in the plant will not exceed 100 after application is approved without modification. Direction 2 to priorities regulation 11-B makes a similar provision for a producer filing an application on form WPB-2613. (No. 1)

CONSTRUCTION MACHINERY: A method by which manufacturers of construction machinery and diesel engines may continue to use military allotments of controlled materials and preference ratings they have received from their customers in production of these items for civilian use after the customer has canceled the order is outlined in direction 70 to CMP regulation 1, as amended. The direction previously gave instructions for a manufacturer's handling of military cancellations of class A civilian type end products. The amended direction applies only to the manufacture of the complete product listed below by CMP code number and not to the manufacturer of any component of such product: 308, construction equipment, tractor mounted; 309, construction machinery, specialized; 310, construction material mixers, pavers, spreaders, related equipment; 311, construction material processing equipment; 312, power cranes, derricks, draglines, dredges, shovels and related equipment; 313, scrapers, maintainers, and graders; 316, drilling, boring machinery (earth, rock and including water well drilling); 470, tractors (track laying); 750, diesel electric or diesel mechanical locomotives, under 600 hp. (No. 1)

PRIORITIES REGULATIONS

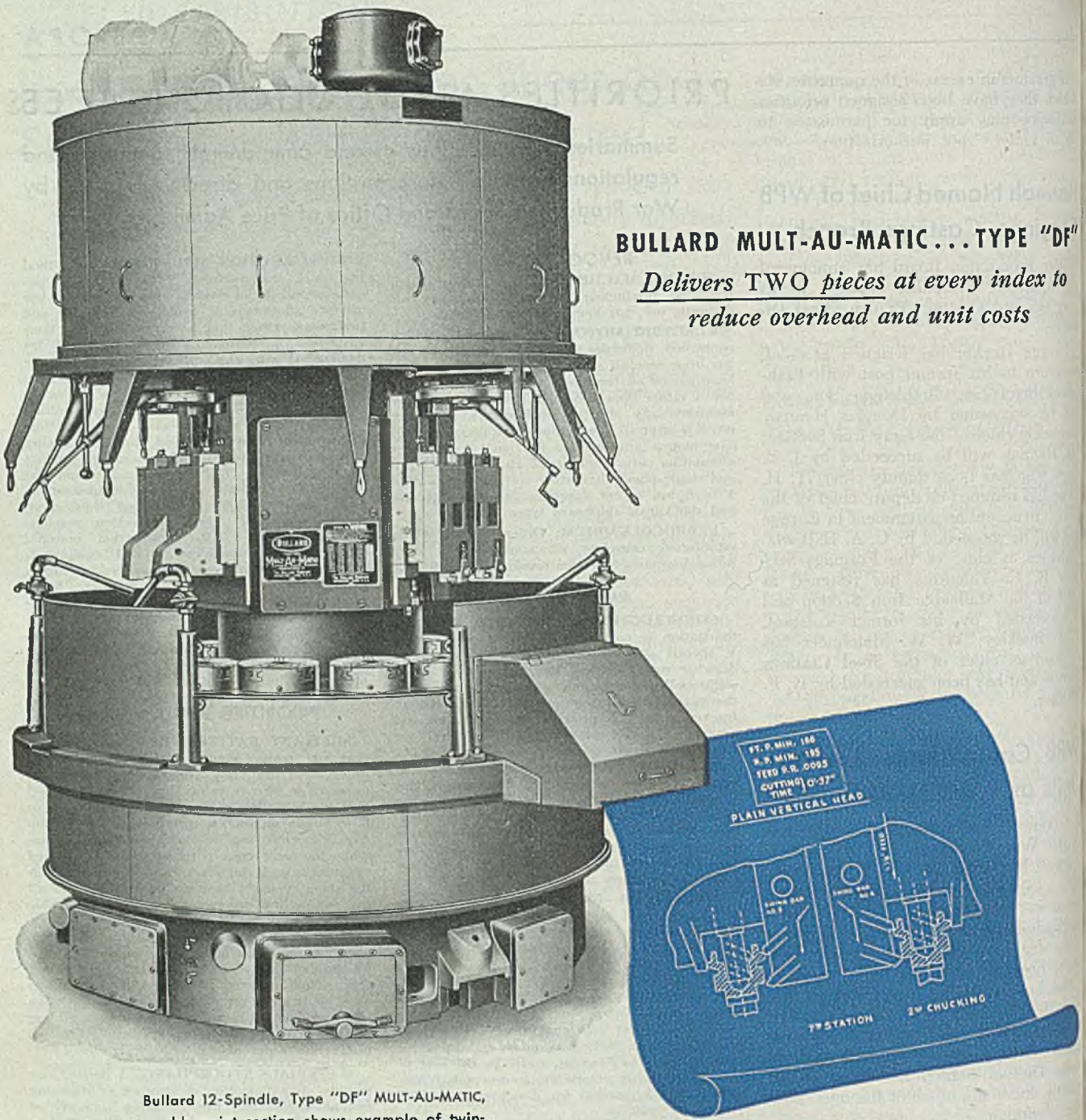
MILITARY RATINGS: PR-1 now provides that any person manufacturing a product on orders from the Army, Navy or Maritime Commission, or who is using the ratings identified by the CMP allotment symbols W, O, N, M, or C to obtain production materials may delay ten days canceling use of such preference ratings when the contract or purchase order is canceled or cut back. If he receives a rated order for the same product, he must promptly rerate all his outstanding orders to the rating applicable to the new order, if the new rating is lower. Such a manufacturer, during the ten-day period, may continue manufacturing the product covered by the canceled contract as though he still had the original contract. If at the expiration of ten days he has not received a rated order for the same product, he must promptly cancel all use of the preference rating and reschedule his own production in accordance with PR-1. (No. 1)

MATERIALS STOCKPILING: A person may receive, in anticipation of starting or resuming civilian production, the minimum quantity of material he would need during the first 30 days of such production, provided no priorities assistance is used to get such material. The 30-day quantity is a ceiling as far as advance stockpiling is concerned, and may not be considered as a "bonus" to be added to the quantity of any material that the producer expects to have available for making his civilian product. (No. 1)

NON-CMP MANUFACTURERS: A producer who is not obtaining materials under the CMP plan and who has received a rating on form WPB-2613 may produce in excess of his authorized production schedule in cases where he obtains all the material that he requires for the products that are produced in excess of schedule without use of preference ratings, or where the material was obtained for another purpose and can no longer be used for that purpose. Order PR-11B also has been amended to conform with the MM rating provisions of PR-29. It now provides that a manufacturer of unclassified products who has received a rating on form WPB-2613 may extend a rating of MM for delivery after Dec. 31, 1945, provided that no orders carrying AA ratings assigned to the authorized production schedule are outstanding for 1946 deliveries. If any such orders are outstanding, the AA ratings must be canceled before extending the customer's MM rating. (PR-11B)

BULLARD MULT-AU-MATIC . . . TYPE "DF"

Delivers TWO *pieces at every index to reduce overhead and unit costs*



Bullard 12-Spindle, Type "DF" MULT-AU-MATIC, . . . blueprint section shows example of twin-tooling at one station.

There is only one way to match the twin-spindle, twin-tooling output of the six or eight working stations of a Type "DF" Bullard MULT-AU-MATIC on work up to 8" in diameter and 10" in height . . . and that is to install two ordinary MULT-AU-MATICS. Yet the former costs only slightly more than *one* of the latter.

Consider how unit costs nose-dive when a twin-spindle MULT-AU-MATIC produces two finished pieces in the time of the longest single boring, turning, facing, threading, grooving or drilling operation plus the few seconds required for indexing.

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From government surplus lists of available equipment select the better machines to replace those obsolete models you've been using on secondary non-critical operations. Ask Bullard for information on these old models by serial number. The Bullard Company, Bridgeport 2, Conn.

From Government Machine Tool Surplus Lists select the better machines to replace obsolete models you've been using on non-critical operations. Ask Bullard for information on these models by machine number.

BULLARD

CREATES *NEW METHODS*

TO MAKE MACHINES DO MORE

By A. H. ALLEN *Detroit Editor, STEEL*

MIRRORS of MOTORDOM

Automotive manufacturers hopeful that all production quotas may be removed soon. Consideration being given to industry's requests for large expansion program designed to increase production capacity by 50 per cent

OPTIMISTIC echoes from what will probably prove to be one of the last, if not the final, meeting of top automotive executives with WPB officials in Washington, are distinctly heartening, and might even be interpreted as hinting the possibility of the removal of all production quotas before too many months have passed. Henry Nelson, WPB co-ordinator of automotive reconversion, presiding at the conference, has never been one to look at the gloomy side of things, possibly because of his youth and enthusiasm, and at the July 11 meeting he appeared to run true to form.

Careful consideration is being given by the agency to manufacturers' requests for permission to start a hefty plant expansion program at an early date, over and above the $150 million worth of construction requests already approved. This is the real postwar expansion program, leading to the 50 per cent boost in peak output the industry has been talking. Approval of the new program might go far toward absorbing the "tremendous layoffs" which Mr. Nelson said are expected in September when war production is slated for further sharp curtailment.

It is now believed within the realm of possibility to increase new car production quickly enough so that all rationing of retail sales can be ended in January. Ration controls over the 6000 new cars of 1942 vintage remaining in storage were removed last week. They can now be sold to anyone desiring to pay the price plus a 30 per cent markup to cover costs of three years' storage.

Easing of Materials Controls Pends

The WPB says it is in process of open-ending controls (M orders) over all materials except cadmium, tin, antimony, chromic acid and burlap and cotton linters, at the same time revoking such orders as L-2-b which banned the use of copper, aluminum, chromium or nickel on automotive bright work after Dec. 15, 1941. Of the materials still kept on full control, tin is the only one which seems to offer much of a challenge to the ingenuity of automotive engineers, since it is an important ingredient of some bearings as well as body solder. If the tin content of these materials can be reduced to a bare minimum, perhaps some way can be found to meet requirements.

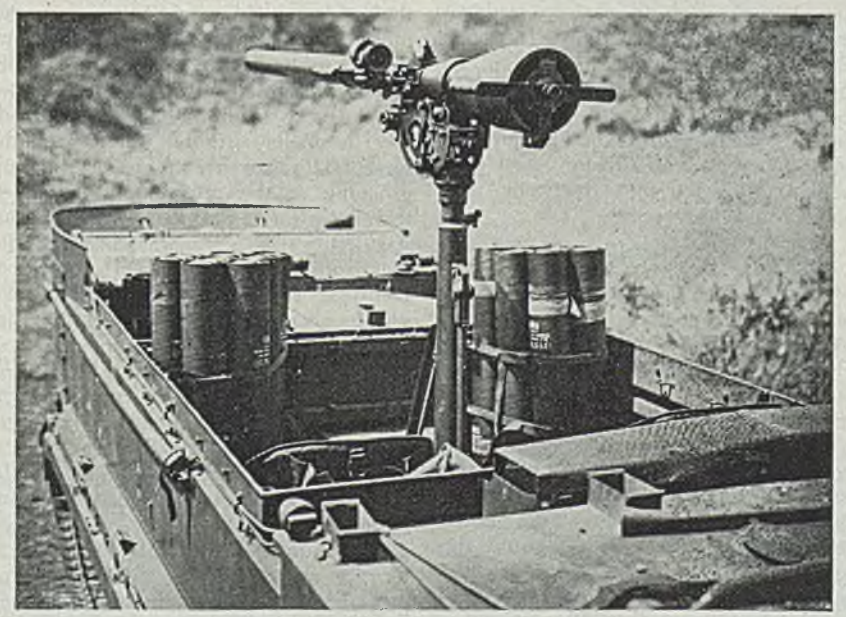
The restriction on chromic acid might be interpreted as ruling out chromium plate, and in fact this was the immediate reaction of many platers and automotive parts interests. Analyzing the matter a little further, however, there would appear no cause for any great concern over chromium plate. In the first place, the reason for the restriction on purchases of new chromic acid, covered by schedule 62 of chemical order M-300, are occasioned by the fact pure chromium metal, required as a constituent of various high temperature resistant alloys going into the turbo-jet engine program, must be obtained from chromic acid. However, it appears a relatively simple matter to work out a means for replenishing chromium plating baths with perhaps a chromate salt instead of the acid. This might mean a slightly more acid bath, but it could still be worked out. The chromate could be leached out of a chrome ore, which is in ample supply and over which there are no restrictive orders.

Thus any plating department which finds itself caught short on chromic acid might assign one of its chemists some wooden tanks and some chrome ore and instruct him to prepare some chromate. Not much is required, because chrome plate is only in the nature of a flash coating anyway, and many platers have maintained their chrome baths right along, requiring only small replenishments as parts are plated.

The encouraging aspect of the plating question is that sufficient nickel apparently is available and restrictive orders on its purchase for nonrated applications are being open-ended. In fact, it is understood that within the past few weeks, one of the motor company plating departments was able to buy 150,000 pounds of nickel cathode sheet for its plating tanks. Nickel for plating is usually purchased in one of three forms—ball or bar anodes ready for use; cathode strips for suspension in plating tanks, or cathode sheets which are melted down and cast into suitable anodes.

Of course, one difficulty with any wholesale change to a relatively makeshift method of restocking chrome plating baths is that it upsets the normal routine. Thus, while a large automobile company might be able to make the switch without too much trouble in its own plating department, that still does not answer the problem for all its suppliers of plated parts, some of which operate their own plating equipment, others letting the work out to job platers. While the latter realize they can use present stocks of chromic acid on nonrated business, they are fearful that they can buy no new stocks. This might result in their using up stocks of chromic acid on low-profit mass production runs for automotive parts, and forcing them to give up an attractively priced contract at a later date because of lack of acid.

But if the problem taxes the ingenuity of automotive production staffs, so what? They have certainly had tougher nuts than this one to crack and it would hardly appear reasonable to see them throw hands up in despair. This much



RECOILLESS RIFLE: The United States Army's new 75-millimeter recoilless rifle, recently announced, is shown here on a pedestal mount in a "weasel." Ammunition is held in place by quick-release straps. The gun is in firing position with telescopic sight in place. NEA photo

they know: The public wants chromium plating, and might easily balk at buying cars trimmed in nickel plate, which tarnishes quickly and has a decidedly yellowish cast.

Chrysler engineers would like to know how soon they will be able to obtain Amola steel from mills, a triple-alloy type steel which has been used extensively in gears, suspension parts and other elements of Chrysler automobiles for years. Developed originally by Chrysler metallurgists, Amola production has been restricted by WPB because it was thought if production were allowed an adverse effect would result on scrap supply for triple-alloy steels, particularly those in the NE group. It might so be observed in this connection that the NE steels carry a price extra of around 70 cents a hundred pounds against 35 cents for Amola.

Mills reportedly can now obtain WPB permission to process heats of Amola if they show no triple-alloy scrap will be used in the melt; and at least two licensees have indicated they are ready to go as soon as they get some orders. Actually, the Amola price situation now is anomalous, since it is a single-alloy steel and in view of the predominance of triple-alloy scrap resulting from war processing of the NE steels requires more careful segregation of scrap to eliminate residual amounts of nickel and chromium. Thus it probably should carry a higher extra than the NE steels, but actually is just the reverse.

General Motors metallurgists have gone on record as favoring the triple-alloy steels, because they are more "foolproof", that is, a single or dual-alloy type may still carry residual amounts of other alloys brought over from the scrap and show an erratic hardenability. It is felt most automotive applications can be filled by either high-manganese alloy steel or the triple-alloy NE grades. Incidentally, WPB figures show approximately 60 per cent of all alloy steel production to be of the triple-type, NE analyses and 4300 series.

Careful Scrap Selection Helps

In the field of the deep-drawing steel, not as much concern is being expressed as earlier over the "contaminating" effect of residual alloys. Here again careful scrap selection is one answer, although one steel company metallurgist has said he can turn out a good deepdrawing stock with as much as 0.15 per cent molybdenum, providing sulphur is kept under 0.20 per cent. Improved desulphurization in the open hearth requires the use of more limestone and somewhat longer time for heats, but probably does not add much more than 50 cents a ton to cost. The other alternative is to use aluminum-killed heats, but the extra involved on this material would appear prohibitive in automotive markets.

General Motors Research Laboratories, occupying a large ten-story building directly south of the General Motors

E. S. WELLOCK

For the past three years plant manager of Chevrolet's transmission division, Saginaw, Mich., and associated with the company since 1923, Mr. Wellock has been appointed assistant manufacturing manager in charge of Chevrolet's 11 assembly plants.

building, is readying plans for eventual transfer to an elaborate series of new research buildings to be erected on Mound Road, some 12 or 13 miles north and east of the city of Detroit, in the vicinity of Chrysler Tank Arsenal, Dodge Truck Division, Westinghouse Naval Arsenal and Rotary Electric Steel Co., but further north. Current concept of the new research area involves a separate building for each division of the corporation, co-ordinated by a central administrative center.

While the facilities will not be ready for occupancy inside of 18 months, some GM research employes are already groaning at the prospect of having to travel this far to and from work, and are wondering why a site was chosen so distant from the center of GM activities in Detroit. The present research building will be occupied by Fisher Body Division offices, according to the grapevine.

Ford is also contemplating a vast expansion of its research organization, with new buildings, equipment and enlarged personnel, while Chrysler has had a duplicate of its present engineering building on Oakland Avenue ready for construction for several years, awaiting executive approval. Plants call for its location alongside the older structure.

Board of Commerce surveys reveal there are approximately 225,000 fewer working people in Detroit area plants than at the work peak of November, 1943, most of the reduction occurring in the 16 months from that time to March 31 of this year. The decline was little noticed because it was occasioned principally by demands for men in the armed services and at the same time production continued to rise as the result of improved production methods and greater familiarity with jobs by workers.

Over the past three months, another 85,000 have been laid off, about one-third in each month. Nevertheless unemployment has not shown a marked rise, in terms of benefit checks which are averaging something over 21,000 weekly, against about 8000 in the last week of March.

A high percentage of those laid off have left the area, the board says, citing a check made by the USES claiming to indicate 50 per cent for the Willow Run bomber plant. Many women are leaving the area's labor force, while nonmanufacturing establishments are absorbing some of those displaced, though not nearly as many as they could use.

Looking to the future trends, the board asks two significant questions: How rapidly will materials for civilian output be available? and how co-operative will labor be?

Continental Aviation & Engineering Corp., Muskegon, Mich, has a signed $2,679,788 contract covering manufacture, development and research on intermittent-jet engines and metering units, counterparts of the propulsion unit of the German V-1 buzz-bomb, which Ford was building for a time.

In 40 months' operation of a 600-acre Ordnance proving ground at Utica, Mich., Chrysler Corp. has put 232 vehicles of 62 different types through their paces over 517,928 test miles, consuming 770,400 gallons of gasoline or 154,080 "C" tickets. Inclusive of vehicles, plus various attachments or assemblies, the proving ground completed 505 separate projects.

Ships 16,000th Airplane Engine

Chrysler also announces its Dodge Chicago airplane engine plant has shipped its 16,000th Wright 3350 engine, used to power the B-29 Superfortress, the production equivalent of 35 million aircraft horsepower in about 18 months.

At long last authorization has been granted by the WPB for production of 4000 "special purpose" taxicabs over the second half of this year, half by De Soto Division of Chrysler, and half by Checker Cab Mfg. Co. For the first quarter of 1946, another 5000 have been authorized, 2200 to Checker Cab, 2000 to De Soto, and 800 to Packard. Another authorization covers production of 1000 special chassis for hearses and ambulances in 1945 and a similar number in the first quarter of next year, divided between Packard and Cadillac.

Two government-owned plants at Detroit and Pontiac, Mich., are being offered for sale or lease by the Reconstruction Finance Corp. The Detroit plant is occupied by the Micromatic Hone Corp., producing abrading machine tools and honing accessory equipment. The Pontiac plant was occupied until recently by the Die Typing Corp.

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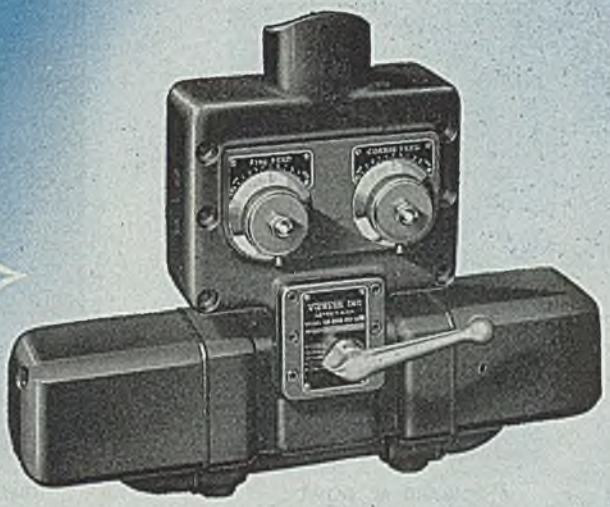

Double Solenoid Type Push-button Operation

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These panels provide self-contained, compact control units for automatic machine applications where the cycle is a combination of rapid advance, one or two feeds, and rapid return motions. The two feed rates are infinitely variable within their ranges, and adjustments can be made during feed. Applications include drilling, reaming, boring, turning, milling and swaging machinery.

The hydraulic circuit in the panel employs the well-known Vickers Flow Control Valve in a "metering-out" circuit which means a smooth and constantly maintained feed rate for any given adjustment regardless of fluctuations in cutting tool resistance or changes in hydraulic operating pressure.

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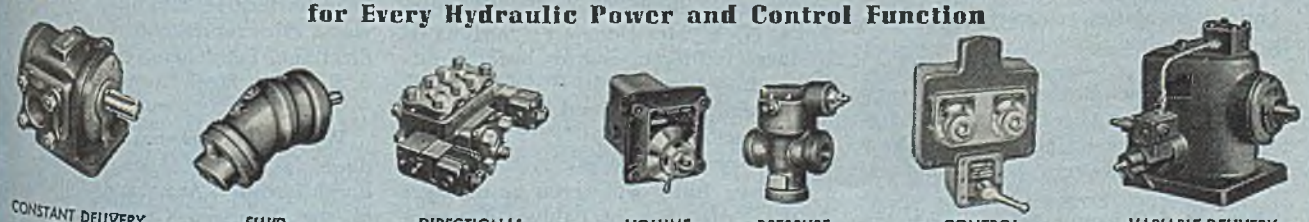

CONSTANT DELIVERY PUMPS | FLUID MOTORS | DIRECTIONAL CONTROLS | VOLUME CONTROLS | PRESSURE CONTROLS | CONTROL ASSEMBLIES | VARIABLE DELIVERY PUMPS

MEN of INDUSTRY

EDWARD M. DOWD

BERTON H. DeLONG

PAUL B. GREENAWALD

Edward M. Dowd, general superintendent, Lapointe Machine Tool Co., Hudson, Mass., was recently promoted to the position of executive assistant to **John J. Prindiville Jr.**, vice president. Mr. Dowd formerly served with the American Bosch Corp., Springfield, Mass.; Hendey Machine Co., Torrington, Conn.; and Springfield plant, Rolls Royce Co.

—o—

Oliver Iron & Steel Corp., Pittsburgh, has appointed **David H. Scott**, export sales manager, and **Jack L. Rosenfeld**, auditor and cost supervisor. Mr. Scott will make his headquarters in New York and Mr. Rosenfeld will be located in Pittsburgh.

—o—

N. J. Connors recently joined the Eastern Stainless Steel Corp., Baltimore, and is serving in its sales department. Mr. Connors formerly was in the New York sales office, Sharon Steel Corp.

—o—

Vanadium-Alloys Steel Co., Latrobe, Pa., announces the following appointments: **Lawrence Wood**, advertising manager and member of the sales committee; **W. R. Mau**, member of the sales committee; **Henry Hudson**, Boston manager; **Ridgway Cook**, Springfield, Mass., manager; **Frank Moberg**, works manager of the company's Latrobe plant; **Harry Good**, works manager, Anchor Drawn Steel Co., a subsidiary company; **Dr. George A. Roberts**, chief metallurgist; **Harry G. Johnstin**, metallurgical engineer.

—o—

Don H. Krey has been appointed sales manager, and **Elliott G. Johnson**, assistant sales manager, Homestead Valve Mfg. Co., Coraopolis, Pa. Mr. Johnson will continue his duties as director of advertising and public relations.

—o—

W. J. Sommers, Buffalo, has been made distributor, Briggs Clarifier Co., Washington. His territory includes western New York and northwestern Pensylvania.

—o—

Bennett S. Chapple Jr. has been appointed assistant to the vice president in charge of sales, United States Steel Corp. of Delaware, Pittsburgh. Mr. Chapple formerly was assistant manager of sales, New York district office, Carnegie-Illinois Steel Corp., and since February, 1944, has been assistant to the president, Firth-Sterling Steel Co., McKeesport, Pa.

—o—

Berton H. DeLong and **Paul B. Greenawald** were appointed directors and vice dents, Carpenter Steel Co., Reading, Pa., at a recent meeting of the board of directors. Mr. DeLong, who continues to supervise research and development, has been associated with the company since 1910, holding the post of chief metallurgist since 1916. Mr. Greenawald was metallurgical engineer for the company 21 years and is now in full charge of mill production.

—o—

F. J. van Poppelen, Fairfield, Conn., has been appointed vice president, Salem Engineering Co., Salem, O. For the past 11 years, Mr. van Poppelen has served in various executive positions with Remington Arms Co. Inc., Bridgeport, Conn., his most recent position being chief engineer, Military Division.

—o—

Norman-Hoffmann Bearings Corp., Stamford, Conn., announced the following changes in its home office sales executive personnel: **R. L. Miller**, sales manager; **E. M. Beers Jr.**, **G. V. Titsworth**, assistant sales managers; **C. L. Brown Jr.**, assistant to the sales manager and **W. G. Sargent**, manager of distributors' sales.

—o—

William H. Homeyer and **Francis J. Blake** have been named district sales managers, Carborundum Co., Niagara Falls, N. Y. Mr. Homeyer's territory is southern California and his headquarters are in Los Angeles; Mr. Blake's territory is northern California and his office is in San Francisco.

—o—

Thomas Butts will serve as manager in the Paris office of Baldwin Locomotive Works, Eddystone, Pa., which is being opened in September to provide coverage for the company's heavy m chinery in France, its colonies, Belgiu and Holland. **Col. Robert G. Allen**, ge eral manager of the Baldwin Southwa Division, has been elected to the boar of trustees, University of Pennsylvania Philadelphia.

—o—

L. C. Dubs has been elected vi president and general manager, Cante Stoker Corp., Canton, O. **J. W. Mill** Jr., has been named district manage New York territory with offices in Syr cuse, N. Y.

—o—

Howard A. Fitch Jr., vice presiden Kansas City Structural Steel Co., Kans City, Kans., has been elected gener manager to succeed **Howard A. Fitch**, w remains as president.

—o—

C. Russell Feldmann, president a chairman, International Detrola Corp Detroit, has been named chairman, Ro Aircraft Corp., Chula Vista, Calif. **F. H Rohr** and **J. E. Rheim**, Rohr Aircra Corp., have been elected directors, I ternational Detrola Corp.

—o—

Donald S. Jackson, sales engineer Peabody Engineering Corp., New Yor has been named that company's sal agent for the state of Connecticut. M Jackson also represents the Enterprise O Burner Co., San Francisco. His hea quarters are in New Haven, Conn.

—o—

J. O. Low Jr., recently was name assistant division manager for Illino Indiana and Iowa, Reynolds Metals C Louisville, Ky. Mr. Low will have h headquarters in Chicago. He former was a sales representative for Bethleh Steel Co., Bethlehem, Pa., and for Jon & Laughlin Steel Corp., Pittsburgh.

—o—

W. C. Perkins has relinquished h duties as district sales manager, Pitt burgh territory, American Chain Divisio of the American Chain & Cable Co Bridgeport, Conn., and will continue wi the company as a special representativ

G. A. CUSTER

A. R. ZAPP

GEORGE W. FRICK

with headquarters at York, Pa. W. M. Cusack, formerly district sales manager at Detroit, succeeds Mr. Perkins in the Pittsburgh district. C. A. Goldstrohm, recently returned from the War Production Board in Washington, has been appointed district sales manager of the southern district and will make his headquarters at York, Pa.

—o—

G. A. Custer has been promoted from chief engineer to general factory manager, Peninsular Grinding Wheel Co., Detroit. Prior to joining the company as chief engineer nine years ago, he was associated with the U. S. Rubber Co., New York, as manager of its Grinding Wheel Division.

—o—

T. C. Downey has been appointed assistant manufacturing manager, Oldsmobile Division, General Motors Corp. Mr. Downey was named manager for the Chevrolet assembly plant in Janesville, Wis., in September, 1941, and continued in that position at the time Oldsmobile acquired the plant for its shell production program until his present appointment.

—o—

Boyd K. Pond recently was named district manager in Michigan, northern Indiana and northwest and central Ohio, Bendix Radio Division, Bendix Aviation Corp., Towson, Md. Mr. Pond will make his headquarters in Detroit.

—o—

Southern Aircraft Corp., Garland, Texas, has re-elected the following officers: J. R. McLean, chairman of the board; Willis C. Brown, president; A. Eugene Pattison, vice president and treasurer; Frances H. Brown, secretary; H. C. Humphreys, assistant treasurer.

—o—

William C. Hunt has been named an assistant general manager and Harry V. Chase succeeds him as director of operations, explosives department, Hercules Powder Co., Wilmington, Del.

—o—

H. C. Mueller, general manager, Powers Regulator Co., Chicago, has been elected president, succeeding F. W. Powers, who becomes chairman of the board. J. W. Powers, sales manager, has been made vice president in charge of the Western Division, and C. T. Blackmore has been elected secretary and treasurer.

—o—

George W. Frick has been appointed general sales manager and A. R. Zapp, carbide products manager, Firth-Sterling Steel Co., McKeesport, Pa. Mr. Frick joined Firth-Sterling in 1929. Since 1941 he has been manager, Firthite Division. Mr. Zapp was appointed manager of the company's Firthaloy Division in 1932.

—o—

H. B. Pickering has joined the engineering firm of Morris & Van Wormer, New York. He formerly was chief engineer, U. S. Plywood Corp., New York.

—o—

Frank Klein, vice president, Worthington Pump & Machinery Corp., Harrison, N. J., has been elected president, National Association of Cost Accountants. He previously had served as vice president of the organization.

—o—

Henry A. Mullen, formerly welding supervisor, Willow Run plant, Ford Motor Co., Dearborn, Mich., has joined the sales department, Ampco Metal Inc., Milwaukee. Mr. Mullen will have his headquarters at the Detroit field engineering office where he will serve as resistance welding consultant.

—o—

H. O. Anderson, formerly general sales manager, Rockbestos Products Corp., New Haven, Conn., recently was elected vice president in charge of sales.

—o—

Francis J. Curtis, vice president, Monsanto Chemical Co., St. Louis, has been elected chairman of the American section, Society of Chemical Industry, an English organization of industrial chemists.

—o—

Harry E. Foster has been appointed treasurer, B. F. Goodrich Chemical Co., Cleveland. Mr. Foster, formerly general auditor, also becomes assistant secretary, B. F. Goodrich Co., Akron, O. Donald W. Fairbairn has been named manager of the Detroit district, Industrial Products Sales Division, B. F. Goodrich Co. Mr. Fairbairn succeeds Ralph McPeake who is retiring. Mr. McPeake has been with the Goodrich company since 1909. Dr. T. L. Gresham has been named director of organic chemicals research and Dr. C. F. Gibbs, director of polymerization research, on the company's research staff.

—o—

Kenneth W. Moore, formerly chief of the photographic section, Armour Research Foundation, Chicago, has joined the staff, Midwest Research Institute, Kansas City, Mo., where he will be in charge of the photography and optics department.

—o—

Edmund G. Krimmel, Philadelphia architect, has been retained by Addressograph-Multigraph Corp., Cleveland, as consulting architect.

—o—

Robert R. Miller has been promoted to sales manager, industrial trades, and W. J. Streicher to sales manager, distributor trades, in the Cincinnati territory, Minnesota Mining & Mfg. Co., St. Paul.

—o—

L. V. Schroder has been named merchandising manager in Spokane, Wash., for the Graybar Electric Co., New York. D. L. Llewellyn has been appointed to the newly-created position of personnel director. He will make his headquarters in New York.

—o—

Daniel E. Noble has been promoted to general manager, Communications and Electronics Division, Galvin Mfg. Corp., Chicago. He will retain his present responsibilities as director of research.

—o—

Russell J. Wittmer has been appointed Philadelphia district sales manager, National Malleable & Steel Castings Co., Cleveland, succeeding Edward O. Warner. Until now Mr. Wittmer

FRED A. EMM

Who has been appointed general superintendent, Rustless Iron & Steel Corp., Baltimore, as noted in STEEL, July 16, p. 102.

VAN H. LEICHLITER

Who is general superintendent, South Works, Worcester, Mass., American Steel & Wire Co., as noted in STEEL, July 16, p. 102.

J. F. JOY

Who is vice president in charge of engineering, Federal Machine & Welder Co., Warren, O., as noted in STEEL, July 16, p. 104.

has been sales agent in the southeastern territory with headquarters in Washington. His engineering and sales activities with government and foreign agencies will continue from the Philadelphia office. **William M. Blackmore** has been named southeastern district sales manager.

—o—

J. F. Campbell has been named chief development engineer, and **R. W. Phillips,** laboratory director, Weatherhead Co., Cleveland.

—o—

Capt. T. W. Jenkins, recently with the United Engineering & Foundry Co., Pittsburgh, has been appointed production officer, Naval Gun Factory, Washington.

—o—

William E. Brewster, assistant general superintendent, Wisconsin Steel Division, International Harvester Co., Chicago, has been appointed general superintendent, succeeding **L. B. Robertson,** who is retiring after nine years in that capacity and 26 years' service with the company. Associated with the company since 1910, Mr. Brewster has been assistant general superintendent since 1936. **Roy A. Lindgren,** who recently was advanced from superintendent of blast furnaces to second assistant general superintendent, now becomes assistant general superintendent.

—o—

W. O. Bates Jr., vice president, Caterpillar Tractor Co., Peoria, Ill., has moved to San Leandro, Calif., to serve as manager of the company's offices and plant there.

—o—

Robert F. Tucker, staff assistant to **Ralph C. Stuart,** vice president, Westinghouse Electric Corp., Lamp Division. Bloomfield, N. J., has been appointed manager of the recently acquired Ken-Rad Lamp Division, Owensboro, Ky. **Harry L. Huntley** has been named headquarters repair sales manager of the 34 plants of the manufacturing and repair department, Westinghouse Electric Corp. Mr. Huntley will have his headquarters in the Grant building, Pittsburgh. **Andrew H. Heywood** has been appointed manager of the corporation's motor application department, and **G. A. Hyland** has been named sales manager, Aviation Gas Turbine Division, South Philadelphia. Mr. Hyland succeeds **W. F. Boyle** who has resigned. **William A. Mechesney** has been named manager, contract termination department, for that division.

—o—

C. C. Hermann has resigned as general manager, Claude B. Schneible Co., Detroit. After a short rest he will be a consulting mechanical engineer specializing in foundry design and dust control.

OBITUARIES . . .

C. Austin Buck, 78, a director of Bethlehem Steel Corp., Bethlehem, Pa., and formerly a vice president, died July 13, in that city. Mr. Buck was graduated from Lehigh University in 1887 with a bachelor of science degree in chemistry, and in 1932 that university presented him with the honorary degree of doctor of engineering in recognition of his achievements in the development of raw materials for use of the steel company. He entered the steel industry in 1887 as an assistant chemist for the Bethlehem Iron Co., predecessor to Bethlehem Steel, advancing to the position of general superintendent of the Bethlehem, Pa., plant. In 1913 Mr. Buck was appointed vice president in charge of raw materials, which position he held until 1940 when he became consultant vice president to the raw materials department. He retired Jan. 1, 1942, remaining, however, as a director of the corporation. During his years of service with Bethlehem Steel, Mr. Buck also served as president of the following subsidiary companies: Bethlehem-Chile Iron Mines Co.; Bethlehem-Cuba Iron Mines Co.; Industrial Collieries Corp.; Iron Mines of Venezuela; Juargua Iron Co.; Mahoning Ore & Steel Co.; Penn Iron Mining Co.; and the Sunday Lake Iron Co.

—o—

E. Reed Freeman, 68, traffic manager since 1910 for the Perfection Stove Co., Cleveland, died July 16 in that city.

—o—

Myles F. Armour, 59, sales engineer, Smith Instrument & Equipment Co., Detroit, died July 14 in that city.

—o—

Henry Held, 67, president, Rundle Mfg. Co., Milwaukee, died July 13 at his home in that city. Mr. Held had been president of the Rundle company 20 years.

—o—

Leslie E. Davis, 60, manager of the priority department, Allis-Chalmers Mfg. Co., Milwaukee, died July 12 in that city.

—o—

Charles T. Wagner, 69, founder, Harrington Mfg. Co., Peoria, Ill., and for 20 years manager of the Huber Mfg. Co., Marion, O., died July 10.

—o—

Harry Bailis, 38, partner in the firm of Max Bailis & Sons, Philadelphia, died recently in that city.

—o—

E. Werner Fritzell, 44, co-partner with his father in the Phoenix Tool & Mfg. Co., Chicago, died July 10 in that city. He was a past president of the Tool & Die Institute of Chicago.

Aircraft Workers Released but Job Openings Numerous on Coast

Production of B-17 Flying Fortress terminated at Douglas plant, releasing 3000 workers by Aug. 1. War plants in southern California list 42,440 job openings. Of 67,060 job referrals in May only 35,495 applicants accepted positions

RELEASE by Aug. 1 of 3000 workers was predicted last week by officials of the Douglas Aircraft Co.'s Long Beach plant following halting of production of B-17 Flying Fortresses on orders of the Army Air Forces.

Termination of assemblies of the four-engined bomber was decided at a meeting of Air Technical Service Command, War Production Board, War Manpower Commission and company and union representatives. The cancellations also will affect somewhat Douglas "feeder" plants at Fullerton, Anaheim and Elsinore, making components for the plane, layoffs in these factories being included in the 3000 total.

According to Frederick W. Conant, vice president in charge of manufacturing for Douglas, mass production of C-47 transports and A-26 attack bombers at Long Beach will continue. "Despite the lay-off of Fortress employees, we are still desperately in need of workers at our other two southern California plants," Mr. Conant declared.

Some 1500 employees are needed at once at the parent plant in Santa Monica, Mr. Conant said, where C-54s are being turned out on the highest Army priorities. An additional 1100 are needed at the El Segundo plant for work on a $50 million contract for a new and secret Navy bomber and for making components for the C-54.

Seattle Plant Building Superfortresses

Three thousand Fortresses were built by Douglas under Boeing license, it was disclosed. The parent Boeing plant in Seattle is now concentrating on the larger B-29 Superfortress.

Job openings in southern California war plants total 42,440 as listed in United States Employment Service offices last week, according to a report by Ray Krah, acting state director for the WMC in the area.

The region's present manpower needs, Mr. Krah said, is for 5057 in ship repair, 2100 in new ship construction, 4412 in aircraft plants, 4500 in transportation, 675 in food distribution, 560 in heavy duty tire plants, 350 in iron and steel foundries, 252 in aluminum plants, 1500 carpenters and construction workers, 640 for the U. S. Maritime Service, 4290 in civil service establishments connected with the war effort, and 7213 workers in miscellaneous jobs.

Manpower requirements by skills are for 4828 professional and clerical workers, 2918 in service trades, 14,174 in skilled crafts, 8980 semiskilled and 11,540 unskilled.

Mr. Krah declared that southern California's manpower situation is unique in the nation. While employment has been reduced in many war industries due to change in production schedules, other activities are in serious danger of falling behind in production due to lack of labor.

He disclosed that during May, USES offices in the Los Angeles area referred 67,060 applicants to suitable employment although only 35,495 accepted jobs. Of the May placements 13,700 were women.

Mr. Krah called "puzzling" the whereabouts of workers who have terminated their jobs in war industries. Some are known to have returned to homes in other sections of the country, but this number does not account for all. Many are assumed to be in the area on vacations. Others, mostly women, have returned to their homes permanently.

Of workers who left war plants during the May 15—June 15 period, 58 per cent were men. It is estimated that 47 per cent of all layoffs are voluntary quits, 9 per cent were drafted into military service and 5 per cent were discharged for inaptitude or other reasons. The remainder of job terminations resulted from miscellaneous causes, including death or retirement.

New War Contracts Placed In Los Angeles Area

Fifteen new war contracts totaling $4,368,812 have been approved by the southern California WPB production urgency committee during the last two weeks for allocation in the Los Angeles area.

Among the group of contracts in Los Angeles is one to the Simpson Steel Co., 2065 E. 51st Street, for Army oil burning units, $975,000; to Clary Multiplier Corp., 1524 N. Main Street, fuses, $608,923; to O'Keefe & Merritt Co., 3700 E. Olympic Boulevard, power units, $569,853; to Standard Steel Corp., 5001 S. Boyle Avenue, steel cargo barges, $360,754.

The United States Flare Corp., San Fernando, was awarded a contract for navy rocket components totaling $243,355, and the American Pipe & Construction Co., South Gate, received an order for cargo barges costing $277,200.

Only Critical Construction Allowed at San Francisco

The War Production Board office in San Francisco has ruled that all except the most essential industrial and most necessary civilian construction will have to be deferred indefinitely because of the growing military construction volume in the San Francisco Bay area.

"Added strain on manpower and materials in this area for these command programs means that for the time being other construction can be approved only upon showing of a high essentiality and availability of workers and materials for each specific job," E. F. Halloran, chairman of WPB's urgency committee said.

New army command projects are expected to need more than 11,000 construction workers at the September-October peak.

Electron Equipment Corp. Plans for Postwar Market

Electron Equipment Corp., South Pasadena, Calif., manufacturer of electronic industrial equipment, is expanding its capital stock and enlarging its production facilities in preparation for the postwar market.

The firm is prepared to make deliveries on a wide range of electronic motor controls, electronic power rectifiers, and electronic frequency changers. Plans are in progress for nationwide distribution.

New officers of the company are: President and general manager, Harrison Matthews; vice president, William A. Godshall; secretary, Howard Burrell; treasurer, N. J. Redmon; assistant secretary-treasurer, Mrs. Florence E. Klingel; and chief design engineer, Dudley B. Clark.

West Coast Firm Setting Up Branch in Massachusetts

Harvill Corp., Los Angeles, die and pressure mold casting firm, is establishing a branch plant at Fall River, Mass., to lessen transportation problems and to improve service for eastern customers. The branch will be operated by Harvill New England Corp., a wholly owned subsidiary.

Harvill's West Coast personnel will go to Fall River to supervise installation of equipment and early stages of production. Operations are expected to start about Aug. 1. Harvill has established it as a permanent installation.

WING TIPS

American technical men working on series of standards for threaded parts for aircraft engines, fuel lines, control mechanism, instruments and miscellaneous applications to consolidate views in preparation for British-American-Canadian conference

TECHNICAL men from the Army, Navy and Air Forces, as well as from the automobile, aircraft, machine tool, electrical, and other industries met in New York recently under the auspices of the American Standards Association to work on a series of standards for the threaded parts that go into aircraft engines, pipes for aircraft fuel lines, aircraft control mechanisms, instruments, and miscellaneous industrial applications. A series of technical meetings running through several days covered these subjects and others.

Purpose of these meetings was primarily to consolidate the American point of view before the expected gathering of British, American and Canadian technical experts at Ottawa sometime this fall under the auspices of the Combined Production and Resources Board of which all three countries are members. It is expected that most of these American war standards will ultimately become regular American standards. The American Society of Mechanical Engineers and the Society of Automotive Engineers are joint sponsors of the ASA peacetime project on screw threads and are co-operating closely in the war work.

During the first World War, efforts were started to co-ordinate the screw thread practices of the Allies, but the work was dropped with the end of that war. At the start of the present war, great difficulty was encountered in filling lend-lease orders because of differences between British and American threads and while considerable progress has been made, differences in Anglo-American-Canadian engineering practice still call for further efforts toward unification.

In November, 1943, a British technical mission visited the United States to start work on the co-ordination of screw threads. This was followed in August, 1944, by a second series of international meetings in London. Meanwhile, industry committees in all three countries have been exchanging information, working over technical material and drafting standards in meetings similar to the ones held in New York.

Reviewing the highlights of the recent meeting, an American war standard on acme threads — used widely for the control mechanisms of aircraft and in vises and jacks — has been completed. The Canadians have already adopted this war standard as their own and the British are considering similar action.

Stub acme threads also came in for discussion. These threads have a shallower depth than the regular acme threads and are used mainly where the latter would take too much space, for example, when applied to tubular components with thin walls used in the aircraft industry. A proposed American war standard on stub acme threads has been drafted and sent to the British and Canadians for their consideration. At the meeting it was decided to put this draft, somewhat amended, in printed form for discussion at the Ottawa conference. Other developments covered:

Truncated Whitworth Threads — An American war standard for screw threads of truncated whitworth form, was completed and published in January, 1945. As a result of experience in actual war production, and following the London conference in 1944 between American, British, and Canadian experts, this American war standard is being revised in some details. The British are also revising their own standard, the purpose being that when the work is finished British and American specifications will agree in every detail.

A draft of the proposed American revision was agreed upon and it was decided that this should be set in printed proof form for further discussion at the Ottawa conference.

Instrument Threads — This work was started primarily to cover threads for fastening screws for aircraft instruments, but was later widened to include other types, such as optical instrument threads. A new subgroup was organized to deal with this subject and at its first meeting discussed threads for optical tubes and cells and tripod threads.

The subcommittee that has been working on threads for fastening screws has completed a tentative proposal for screws in sizes up to 0.060 inch, which will be ready for discussion at the Ottawa conference.

High-Duty Studs in Light Alloys — This project is of particular interest to the aircraft engine industry, where steel studs are inserted into aluminum and magnesium castings and forgings. Variations in the hardness of the different alloys used create a difficult problem of using such limits on the threads parts as will assure proper fit. The American and British aircraft industries have followed different practices with regard to high-duty studs. For example, the Americans use coarse threads for "metal" end of the stud while the British use a fine thread. The War subcommittee of the American Standards Association working on this subject, has developed a tentative proposal, which will be worked out further at the Ottawa conference.

Buttress Threads — These threads are used essentially to take up a high axial load — for example, in the breach mechanisms of large guns and for airplane propeller hubs. A draft specification prepared by the British, which includes a pressure angle of 7 degrees and a back angle of 45 degrees, was discussed at the meeting of the American committee. It was decided that this draft, with certain amendments, should be put into printed proof form for further discussion at the Ottawa conference.

Pipe Threads — In an effort to bridge certain differences between American and British pipe threads for corresponding nominal sizes, it was agreed at the London conference, 1944, that the Americans should prepare a series of pipe threads for 4-inch diameters and below, that

TROOP CARRIER: This is an artist's conception of the XC-99, huge troop transport being constructed for the Army Air Forces by Consolidated Vultee Aircraft Corp., San Diego, Calif.

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could be used interchangeably with parts threaded either to the American or British standard for pipe threads. A proposal has been completed by the American subcommittee, and the various recommended threads have been tested by being assembled with fittings having American or British pipe threads. This compromise thread, which has been tentatively named an "international" pipe thread, will be discussed with the British and Canadians at Ottawa.

Screw Threads for Compressed Gas Cylinders — Interchangeability between the valve outlet threads of gas cylinders of American and British origin is a matter of great importance to the military. Without such interchangeability it is impossible, for example, for the American armed forces either to use the contents of British gas cylinders, or to refill such gas cylinders. This matter has been handled on the American side by a technical committee of the Compressed Gas Manufacturers Association which has drafted a proposal including not only the threaded connections but also other details of the cylinder valves in order to secure a maximum degree of interchangeability. This proposal will be taken up with the British and Canadians at Ottawa.

Convair Building Huge Troop Transport for AAF

A huge troop carrier land-based airplane, designated XC-99, is being built by Consolidated Vultee Aircraft Corp., San Diego, Calif., for AAF. The long-range, high-speed transport is the military counterpart of Convair's recently announced model 37, a 204-passenger luxury airliner ordered by Pan American World Airways for postwar transoceanic service. The XC-99 has a wingspan of 230 feet, a length of 183 feet, and is powered by six pusher-type engines.

Under construction at Convair's experimental department, the XC-99 is a mid-wing, land-based transport, equipped with a tricycle landing gear. Because of its capacity, the new plane may be used as a heavy cargo or hospital plane, as well as a troop carrier. It will be readily convertible for any of these operations.

As a cargo plane, it will carry a payload of 100,000 pounds over a distance of 1500 miles. Loaded with 19,000 gallons of fuel, it will have a range with a reduced payload of approximately 8000 miles.

The 183-foot aluminum-alloy fuselage is completely double-decked, with two large ramps utilized in the bottom of the lower section for loading. Equipment includes monorails and electrically operated hoists to facilitate loading throughout the upper and lower decks.

The fuselage of the plane, which has been under secret construction for several months, is being made in two sections, and the 230-foot wing is being built in four sections.

Conveyor Belts in C-47s Make Possible Rapid Unloading in Combat Zone Flights

INSTALLATION of conveyor belt systems in Douglas C-47 cargo-carrying aircraft has decreased the time required for air crews to drop supplies to ground troops from 40 minutes to a few seconds, according to the Air Technical Service Command.

Working on the basis of reports from combat theaters, engineers at Wright Field set about to devise a method whereby the time element in dropping cargoes could be reduced. Loads approaching 6000 pounds represented the capacity of the cargo carrying aircraft, but only 600 pounds could be dropped by the old method at any one time. This meant that the plane, flying repeated passes at 110 miles per hour at altitudes of 150 feet or less, became a "sitting duck" to Jap riflemen.

Several ideas were tried out by ATSC engineers, who finally hit upon the conveyor belt as the ideal method.

The belt is similar to that used by industry. It is an endless chain-driven conveyor operated by a 3.87 horsepower electric motor. Power is derived from the plane's 24 volt system. Extending from behind the pilot's compartment to the rear door of the plane — a distance of 22 feet — the belt runs at a rate of approximately six feet per second, or from one end to the other in four seconds. The belt assembly terminates at a roller bearing platform mounted at the cargo door which launches the containers from the airplane.

Not only was speed in dropping achieved, but it was found possible to drop a load of 4000 pounds at one time, thereby reducing the number of passes over the target area.

Containers, another development of the ASTC, each holding up to 300 pounds of supplies, can be loaded two to three high on the conveyor belt. The belt itself is prevented from sinking with the load by means of rollers underneath.

The containers are made of strong cotton duck and webbing or fibre-board. Parachutes are attached along with static lines, and as the container reaches the door and is "nudged" out by means of the conveyor system, the static line automatically opens the chute.

Another feature of the new system is that it considerably reduces the drop area. This means the doughboy does not have to chase the parachute with its cargo over the landscape, thereby exposing himself to enemy fire. Ground wind conditions play an important part in this procedure. Confident that they can now unload quickly, pilots may concentrate on getting it "on the deck." The quicker it hits the ground, the less the cargo drifts.

There have been two outstanding examples of supply by air in this global war. When Patton's Third Army tanks outran their supplies across France, fuel was supplied them by Troop Carrier Command pilots who dropped clusters of five gallon cans via parachute.

During the Burma campaign, air cargo carrying really came in for its share of glory, with the Combat Cargo Task Force made up of fighter, bomber, and attack pilots flying C-47s, the "workhouse of the AAF."

Packing loads of 600 pounds, doormen were required to throw the 'chuted containers out. There were instances when sudden lurches of the plane pitched the doormen out, and there were other casualties resulting from numerous passes over the target, often exposed to Jap ground fire. Surprise, the best protection the cargo airmen could achieve, was possible only with one pass at the target. Repeated runs meant cutting down the percentage.

Solar Aircraft Co. Buys Precision Casting Division

EDMUND T. PRICE

Solar Aircraft Co., San Diego, Calif., has purchased the precision casting division of B. F. Hirsch Inc., New York, and will operate it on an expanded scale as a subsidiary known as Solar Precision Castings Inc.

The subsidiary will be headed by Edmund T. Price, president of Solar Aircraft, with B. L. Levinson, until now vice president and general manager of B. F. Hirsch, in a similar capacity in the new firm.

Since its entry into the industrial field of precision casting under Mr. Levinson's direction, the Hirsch concern has been known for its aggressiveness in expanding the field for this method.

STAINLESS SURFACE HARDENING Case History #3

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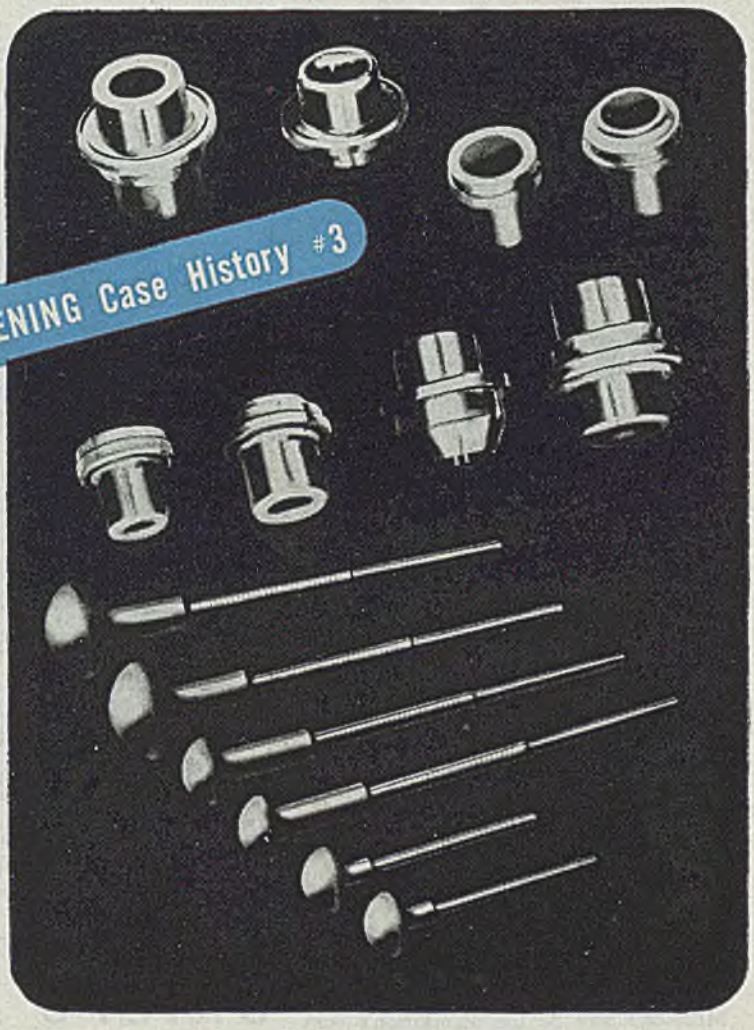

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Labor Shortage Biggest Problem Of Job Platers

Despite cutbacks in war contracts, job plating industry continues to operate at high level

CUTBACKS and terminations of war contracts have had little effect on the job plating industry, which is operating at practically the capacity of its plants and labor force obtainable, the Masters' Electro-Plating Association, New York, reports.

Greatest problem of the job shops now is the shortage of skilled help, the association points out.

One of the wartime activities of job platers has been the assisting of the Office of Price Administration in setting up price regulation 581, calling for ceiling prices or methods of calculating ceiling prices on electroplating and other industrial services. Helping the OPA were job platers from New York, Boston, Philadelphia, Cincinnati, Detroit, Chicago, and Los Angeles.

Tying in closely with operation under MPR 581 will be the association's continued study of education of its members in the practice of estimating and cost finding. During the past year, the association participated in a campaign to control business rents. Since then the New York legislature prohibited excessive increases in business rents.

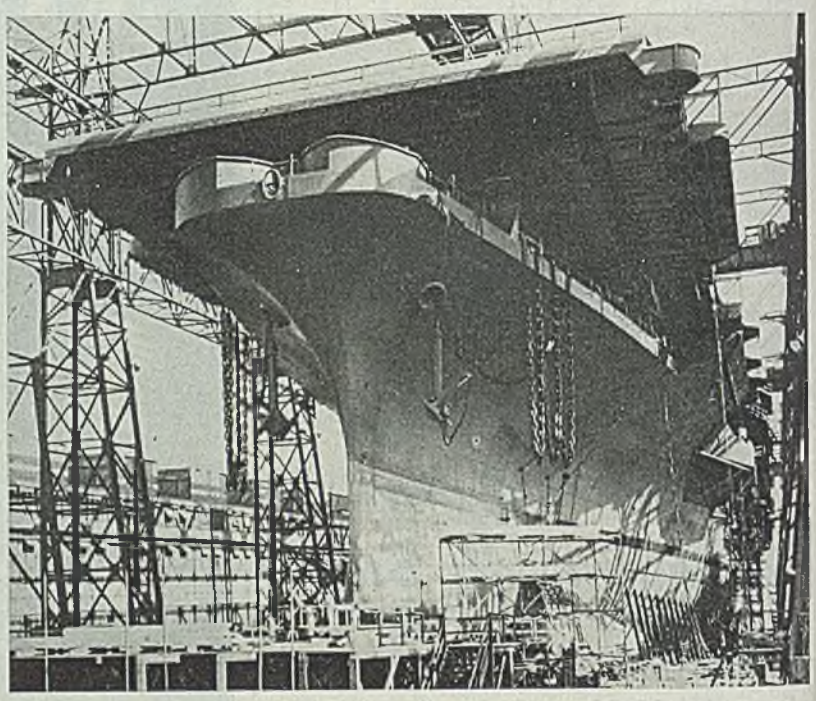
German Auto Being Built Under U. S. Army Direction

The volkswagen, low-cost automobile the German people were compelled to pay for but never received, is in production again—this time under supervision of U. S. Army ordnance experts.

Production of the prewar model of the car which Hitler's army had converted into its nearest approach to the American jeep was started a few weeks after a mile-long factory at Kdfstadt, Germany, fell into hands of the U. S. Ninth Army. Volkswagens now being produced will be for military and civilian uses under American and Allied direction.

After a survey showed that enough parts were on hand to permit resumption of operations, German officials were ordered to round up workers. Ten days after the war ended, the first volkswagens produced under American supervision rolled off the assembly line.

Although one-third of the plant was destroyed a year ago by low-flying bombers, production of the volkswagen was maintained.



NEW CARRIER: The new carrier *U. S. S. Princeton,* launched recently at the Philadelphia Navy Yard, will replace the carrier of the same name lost in the battle of Leyte Gulf. International News photo

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Construction Sales Co. Inc., Albany, N. Y., has opened a branch office at 105 South La Salle Street, Chicago 3, for the conduct of its iron and steel scrap brokerage business.

—o—

Foxboro Co., Foxboro, Mass., has reopened its branch office at Charlotte, N. C., with Samuel C. Alexander in charge.

—o—

American Car & Foundry Co.'s plant at Berwick, Pa., has turned over to the U. S. Army Engineer Corps the 10,000th bulldozer tractor produced at the plant within 14 months.

—o—

Central Steel Construction Co., Buffalo, is boosting production of bolted sectional steel fuel oil barges by 20 per cent as a result of increased Army demand.

—o—

Williamson Heater Co., Cincinnati, will build a factory near Madison, Ind., for production of a furnace for household heating. The firm will continue manufacture of heating equipment at Cincinnati.

—o—

W. B. Connor Engineering Corp., New York, has appointed the following to handle Dorex adsorption equipment and Kno-Draft diffusers: W. Wallace Neale Co., 16½ North Ninth Street, Richmond 19, Va.; D. R. Rippey, West building, Houston 2, Tex.; and Walter Cooke, 816 Howard Avenue, New Orleans. Appointed to handle Kno-Draft diffusers is Joe P. Dillard, 1011 Camp Street, Dallas 2, Tex.

—o—

Ampco Metal Inc., Milwaukee, has appointed the following new distributors: Cameron & Barkley Co., Charleston, S. C., for Florida; Mobile Welding Supply Co., Mobile, Ala., for northwest tip of Florida, southern half of Alabama, and several counties in southeastern Mississippi; Delta Oxygen Co., Memphis, Tenn., for western Tennessee and Kentucky, northern half of Mississippi and northeastern Arkansas; and Louisiana Welding Supply Co., Baton Rouge, La., for south central Louisiana.

—o—

Westinghouse Electric Corp., Pittsburgh, has purchased the lamp business of Ken-Rad Tube & Lamp Corp., Owensboro, Ky., and will operate it as the Ken-Rad Lamp Division and continue the Ken-Rad brand name.

—o—

Perfection Tool & Metal Heat Treating Co., 1740 West Hubbard Street, Chi-

cago 22, has issued a booklet *Fifty Facts,* showing how more than half of the tools in common use can be made to work longer and better through use of new and better ways of hardening soft steels, and a supplementary treatment for previously hardened, finished tools.

—o—

Blaw-Knox Co., Pittsburgh, is sending a special report to its more than 12,000 employes, explaining what was done with the $128 million received by the company on its 1944 business.

—o—

American Standards Association, New York, has published a new list of American standards and war standards approved to date.

—o—

Monsanto Chemical Co., St. Louis, will construct a $450,000 unit for producing Santocel, at its Merrimac Division plant near Boston.

—o—

U. S. Bureau of Standards, Washington, has made available copies of simplified practice recommendation R210-45, concerning carbon-brush terminals (electric), and miscellaneous publication No. 180, a guide-chart for carbon-brush terminals (electric).

—o—

Spencer Lens Co., Buffalo, has changed its name to American Optical Co., Scientific Instrument Division.

—o—

Reliance Electric & Engineering Co., Cleveland, has appointed Standard Electric Motor Works, Detroit, and C & G Sales & Engineering Co., Milwaukee, as distributors of motors, generators, and motor drives.

—o—

Philco Corp.'s Storage Battery Division, Trenton, N. J., announced shipments in the first half of 1945 were 32 per cent greater than those in the corresponding period of last year.

—o—

Lincoln Electric Co., Cleveland, announced its distributor, Alfred B. King & Co., has opened a new office at 211 State Street, Bridgeport, Conn.

—o—

Remington Rand Inc., Buffalo, is reconverting its Syracuse, N. Y., plant where production of its standard and portable typewriters will be concentrated. Production is expected to be under way in September, with capacity output to be reached as soon as possible.

—o—

Aro Equipment Corp., Bryan, O., has appointed the following as jobbers for its industrial pneumatic tools: C. S. Kegerreis Supply Inc., Elkhart, Ind.; Western Iron Stores Co., Milwaukee; General Supply Co., Kansas City, Mo.; and Overton & Ross Inc., Wichita Falls, Tex.

—o—

Bendix Aviation Corp.'s Radio Division, Baltimore, has appointed Peninsular Distributing Co., Detroit, as distributor in Michigan for the forthcoming Bendix radios and radio-phonographs.

WINS TWO AWARDS: Sidney J. Williams, general manager of the National Safety Council, holds an Admiral Land safety trophy with G. O. Griffin, safety director, following its presentation to Dravo Corp., Pittsburgh. On the same occasion, Commander Robert Hughes, supervisor of shipbuilding, at left, presented V. B. Edwards, Dravo president, right, with a new 5-star Army-Navy "E" banner, signifying the sixth occasion on which Dravo was cited for outstanding production

—o—

Houdaille-Hershey Corp.'s Houde Engineering Division, Buffalo, has received orders for shock absorbers for new passenger automobiles and production will start when delivery dates have been set by auto manufacturers.

—o—

E. C. Atkins & Co., Indianapolis, has conducted more than 75 classes since the government started the training within industry program.

—o—

Continental Machines Inc., Minneapolis 4, has changed its name to the Do-All Co.

AWARDS . . .

Excellence in manufacture of war materials has won the Army-Navy "E" award for the following:

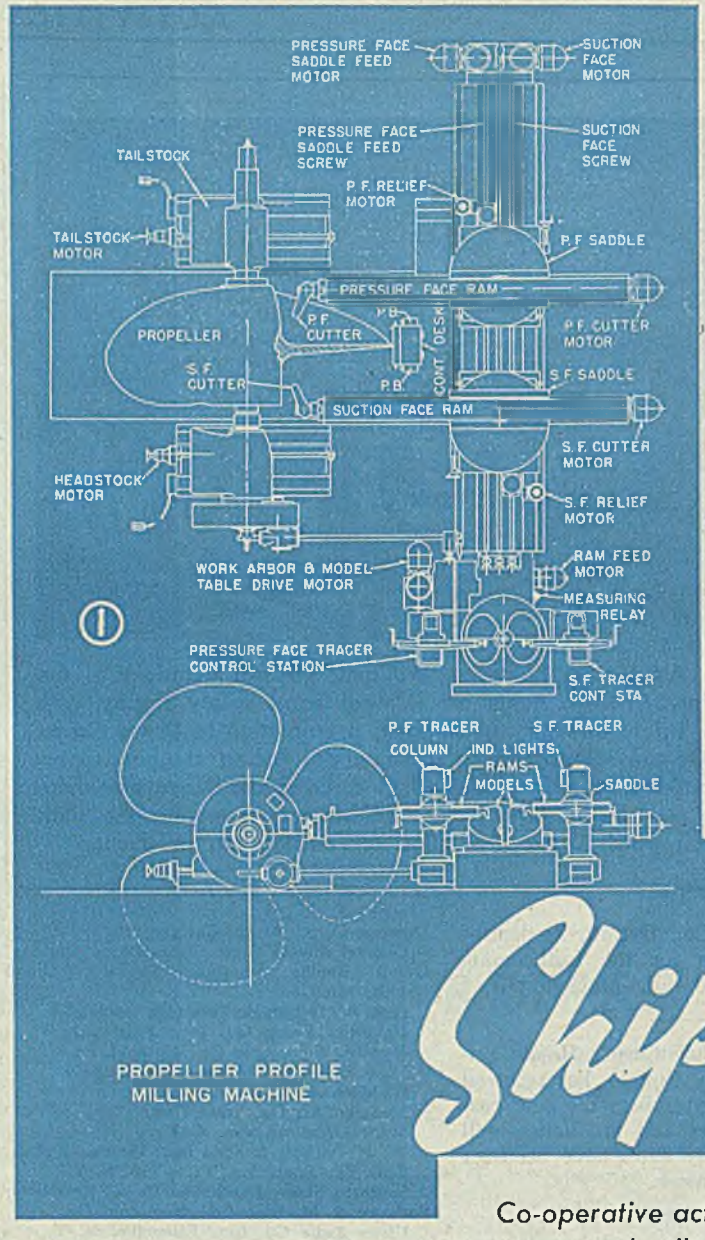
Alliance Mfg. Co., Alliance, O.
American Car & Foundry Co.'s shipyard, Wilmington, Del.
American Radiator & Standard Sanitary Corp., Chicago.
American Spring of Holly Inc., Holly, Mich.
Baker Bros. Inc., Toledo, O.
Allen D. Cardwell Mfg. Corp., Brooklyn, N. Y.
Carey-McFall Co., Tool Division, Philadelphia.
Champion Shoe Machinery Corp., St. Louis.
John L. Chaney Instrument Co., Lake Geneva, Wis.
Clifford-Jacobs Forging Co., Champaign, Ill.
DeKalb Commercial Body Corp., DeKalb, Ill.
Doak Aircraft Co. Inc., Torrance, Calif.
Fansteel Metallurgical Corp. and Tantalum Defense Corp., North Chicago, Ill.
General Motors Corp., Fisher Body Division, Grand Rapids Stamping Division, Grand Rapids, Mich.
H & R Machine & Tool Co., Euclid, O.
Hamilton Pump Co. Inc., Pittsburgh.
Hopkins Equipment Co., Hatfield, Pa.
Lake Erie Engineering Corp., Buffalo.
E. Machlett & Son, New York.
Medallic Art Co., New York.
Merit Ordnance Co., Chicago.
W. H. Nichols & Sons Inc., Waltham, Mass.
Penn Yan Boats Inc., Penn Yan, N. Y.
Southern States Equipment Corp., Henderson
Foundry & Machine Co., Hampton, Ga.
Ulster Knife Co. Inc., Ellenville, N. Y.
United States Magnesium Co., Pleasant Valley, N. Y.
Viking Air Conditioning Corp., Cleveland.
Volco Brass & Copper Co., Kenilworth, N. J.
Webster Chicago Corp., manufacturing division and electronics division, Chicago.
World Steel Products Co., New York.

Cutler-Hammer Broadens Management Organization

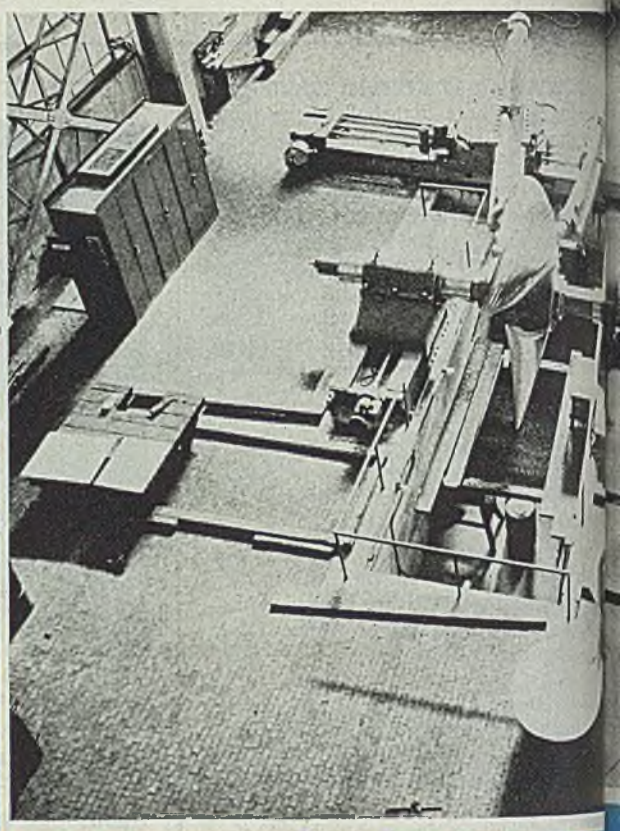
Management organization of Cutler-Hammer Inc., Milwaukee, has been broadened by its directors.

Recent action elected F. R. Bacon, chairman of the board; H. F. Vogt, chairman of the executive committee and vice president and treasurer; G. S. Crane, president; and J. C. Wilson, vice president and secretary.

Other vice presidents chosen are: P. B. Harwood, in charge of engineering; P. S. Jones, in charge of sales; Philip Ryan, in charge of manufacturing; E. W. Seeger, in charge of development, and assistant secretary. J. C. Springer also was elected an assistant secretary, and M. R. Fenno was named assistant treasurer.



PROPELLER PROFILE MILLING MACHINE



Ship Propeller

Co-operative action between electrical and mechanical devices on unusual milling machine has much significance. Guarantees swift, accurate generation of any contour on ship propellers

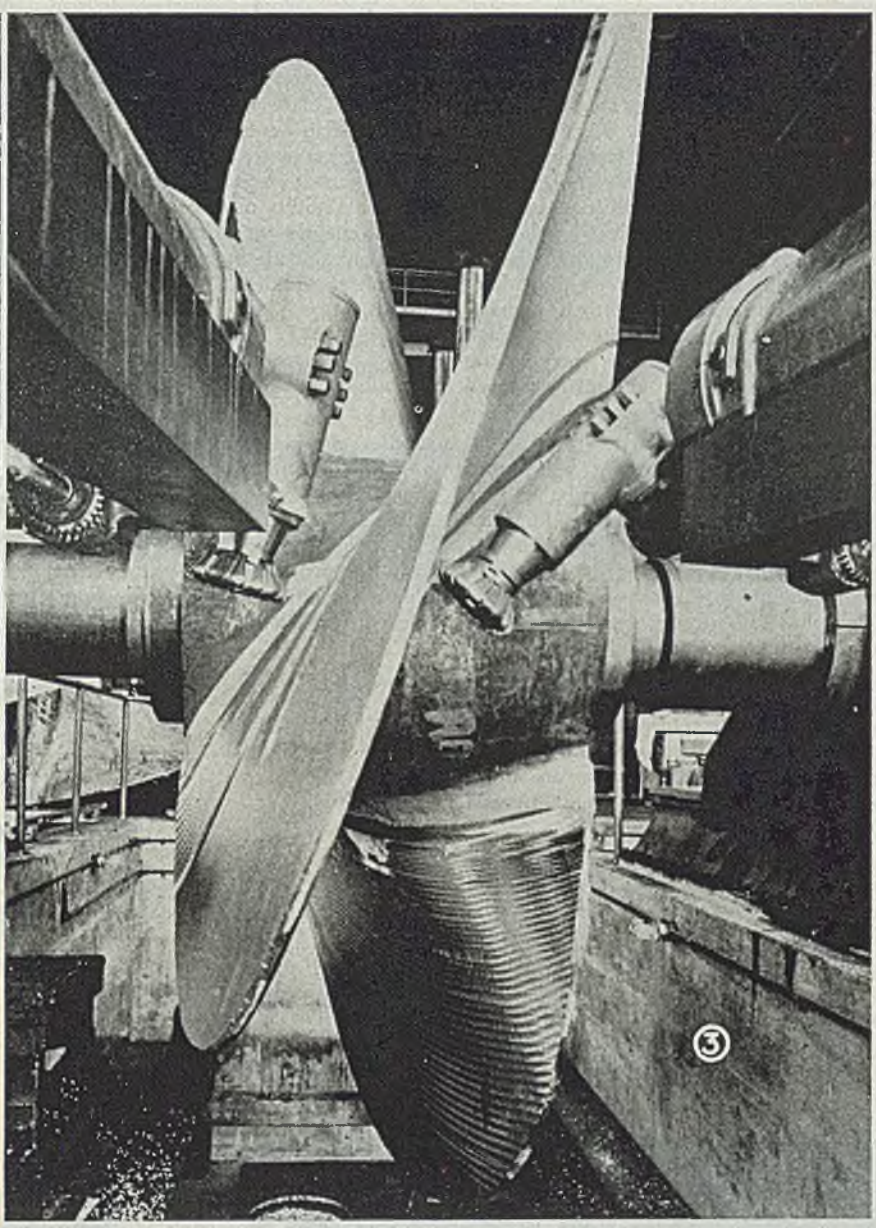
SHIP screw propeller, introduced a little over a century ago, now is used almost universally.[1] Large high-speed passenger and naval vessels of the present day use propellers as large as 22 ft in diameter. These screws must transmit very large amounts of power, which causes them to erode and pit rapidly. Erosion and cavitation can be minimized and the efficiency of power transmission increased by the use of smooth, accurately finished blades.

Methods used in finishing ship propellers did not keep pace with the art of machining metals and has been a laborious, time consuming job. The excess metal allowed on the rough casting to permit finishing to the desired contour was removed by hand chipping, grinding, and polishing. The large size, complexity and cost of a suitable machine tool undoubtedly long discouraged its development.

First attempts were made about 17 years ago, these being modified planers and shapers arranged to generate a helix. In 1937, the Morton Mfg. Co., Muskegon Heights, Mich., designed and built a special machine for shaping the pressure face side of propeller blades, and two additional machines of this design have been built since.[2] This machine generates the helix through the medium of pitch gears, the action being like that of a screw cutting lathe. While it does represent a big step beyond previous methods, it is not capable of machining the back or suction face side of the blade because this surface is not a true helix. Furthermore, it cannot be used on pressure face sides of blades on which the pitch is not constant from hub to tip.

Need for a machine that would generate any contour accurately and quickly, on the suction as well as on the pressure side, was emphasized by the rapidly expanding shipbuilding program growing out of World War II. In 1940, the Morton Mfg. Co. and Westinghouse Electric Corp. undertook the development of such a machine for the United States Navy.

This article is a condensation of the work of five authors. C. R. Hanna and W. O. Osborn, both of Westinghouse Electric Corp., East Pittsburgh, Pa.; and R. A. Hartley, Adel Precision Products Corp., Burbank, Calif., recently described the "Tracer Controlled Position Regulator for the Propeller Milling Machine" before the American Institute of Electrical Engineers, while "Application of Electrical Equipment for Ship Propeller Milling" became the companion subject as presented by H. Earl Morton, Morton Mfg. Co., Muskegon Heights, Mich., and Oren G. Rutemiller, Crosley Corp., Cincinnati.



Milling

Fig. 1—Side elevation and plan view of propeller milling machine giving names of various parts

Fig. 2—General view of machine as installed. Control cubicle is at left. Operator is stationed on pit balcony, where control desk also is located

Fig. 3—View from control desk, showing propeller being machined. Both cutters are in cutting position

The general arrangement of this machine is shown in the side elevation and plan view, Fig. 1, and in the photograph of actual installation, Fig. 2. The machine is equipped with two cutting heads so that it can be arranged to operate on both sides of a blade simultaneously, thus speeding up the operation and equalizing the pressure of the cutters to reduce the deflection of the work. This arrangement is shown in Fig. 3.

The machine is equipped with eleven motors and three motor-generator sets. Almost all of these motors operate in a definite sequence when the machine is performing in an automatic cycle. Full magnetic control is provided.

Position Regulators: Machine is of the form-following type, that is, one that reproduces contour of a pattern or model in metal of the propeller casting. This provides for machining any contour on either side of the blade and any number of propellers, with either right or left-hand pitch, from the same model. As all blades on a given propeller are exact duplicates, a pattern of only one blade is required, the propeller itself being indexed for machining each succeeding blade. Models are made of some soft material such as wood, so that they can be shaped easily by hand. For this reason, the form-following device can be permitted to apply only a very small pressure to the model. Because of the great size of the work pieces, it is desirable to use reduced size models. Machines of pantograph type have of course been built for machining airplane propellers, but the limitations of pressure and extreme complication of a magnifying pantograph for a machine of size required for marine propellers, makes such an arrangement impractical in the present case. Therefore, a position regulating system of the servo type is used on this machine.

In position regulators, a follow member not only must accelerate at the proper rate and move at the right speed, but also must be in the correct position. An electrical system using a fixed field motor whose armature is supplied with variable voltage from a generator, must have controlled current for proper acceleration, the voltage must be regulated for proper speed and the accumulated motion must at every instant be such as to position the follow member accurately. It should be apparent, therefore, that such regulators are of necessity more involved than most other regulators.

In a propeller milling machine such as that shown in Fig. 5, two identical position regulators are needed—one normally being used to control the suction face cutter drive motor, and the other the pressure face cutter drive motor. As illus-

trated by diagram, Fig. 4, each regulator consists essentially of a standard variable-voltage drive with the exciter for the main generator energized by a single-stage dc amplifier which derives its positioning stimulus from a silverstat tracer unit. The unidirectional output of the exciter is applied to the generator field in series with an independent constant potential so as to obtain a drive motor rotation that is continuously variable from a maximum in one direction through zero to a maximum in the opposite direction. Each motor drives a small saddle carrying the associated tracer unit and also a large saddle carrying one of the two milling cutter heads.

As the model table rotates relative to the tracer unit, the tracer probe will be deflected as it traverses the model. This causes a corresponding deflection of the tracer silverstat[3], resulting in a proportional change in the silverstat voltage. This voltage change is amplified by the amplifier and exciter and results in a change in generator voltage, which causes the drive motor to move the tracer saddle in the direction to return the tracer probe and silverstat to their original positions relative to the saddle. Errors are minimized and hunting is prevented by circuits which are described later.

The ratio of the tracer saddle speed to the cutter saddle speed is adjusted by means of gearing to equal the scale ratio of the model. Also the work arbor supporting the propeller is rotated in unison with the model table. Consequently, the milling cutters move proportionally across the blade faces, thus generating—strip-by-strip—contours similar to those being traced by the corresponding probes. The silverstat steps are sufficiently small and the stability of the regulating system is sufficiently great to produce continuously smooth and stepless motion of the cutter saddles.

Following each cutting stroke, the propeller blade and models are returned automatically at high speed to the starting position preparatory to the next cut. During this return traverse the main saddles attain velocities several times normal cutting speed, and although there is no requirement for accurate following during the return stroke, because the cutting tools are withdrawn from the work, it is necessary that the regulators retain control throughout this interval to avoid severe transient disturbances during reversals of direction at the ends of the strokes.

Tracer Unit: The tracer unit is illustrated in Figs. 6 and 7. It consists essentially of a small silverstat operated by a double-lever system. These elements together with the silverstat resistors are compactly assembled within a cylindrical steel case. A probe whose shape proportionally conforms to that of the cutting tool is mounted on the tapered nose of the primary lever.

The ratio of the lever system is adjustable so that the motion of the probe required to produce full silverstat deflection can be made to correspond approximately to the ratio of the size of the model to that of the propeller being machined. This adjustment in the tracer sensitivity provides means for maintaining the stiffness (defined as the force developed on the main saddle by unit main saddle displacement) of the regulator constant as the model ratio is changed.

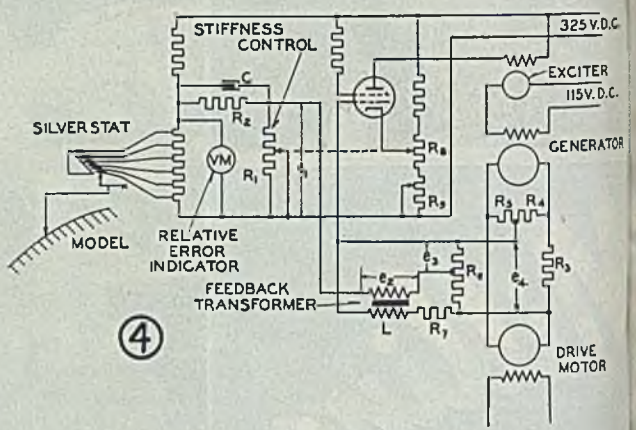
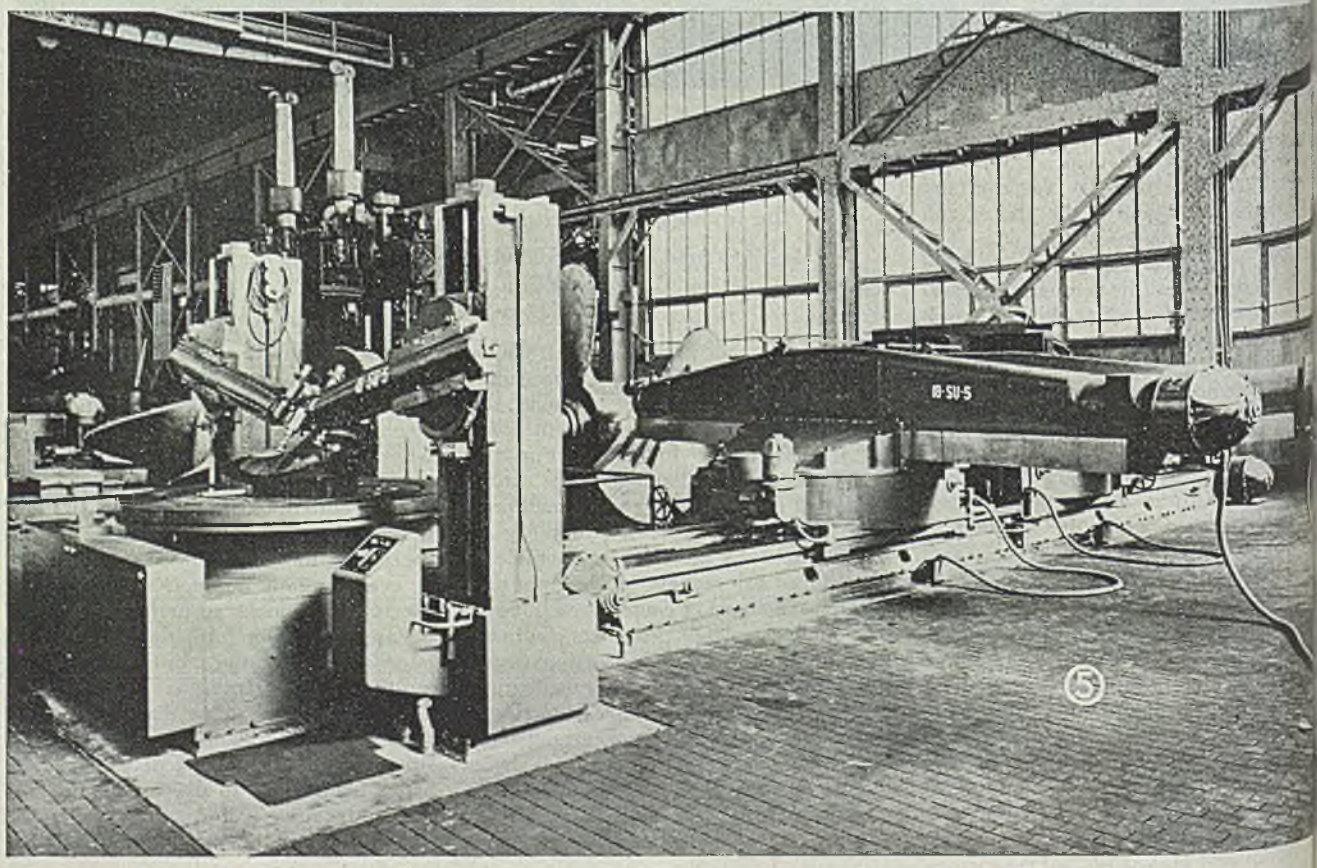


Fig. 4—Schematic wiring diagram of regulating system

Fig. 5—General view of propeller milling machine. Model table in left foreground. Propeller mounted on work arbor is about 12 ft in diameter



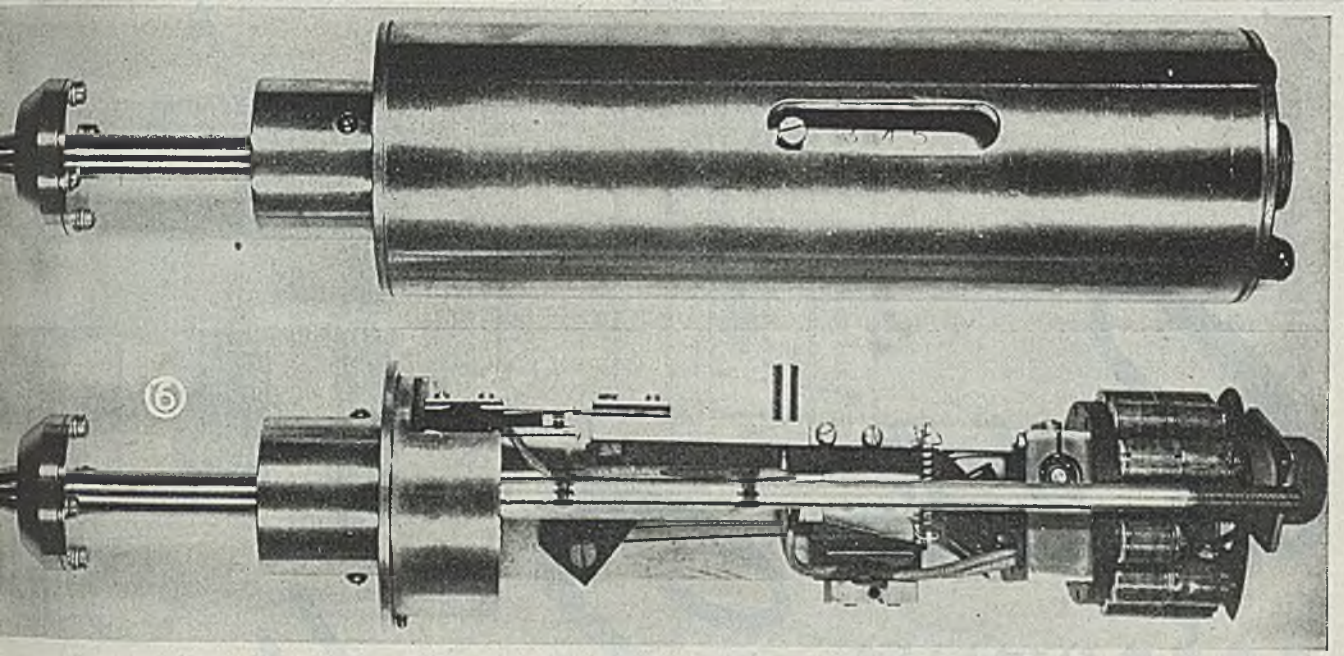


Fig. 6—Tracer units. Lower unit is removed from cylindrical housing

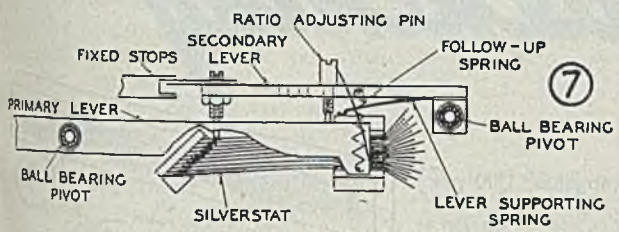


Fig. 7—Schematic diagram of tracer housing

In other words, when using a model of a particular size, the absolute magnitude of the error is independent of the model ratio, and a 24-ft propeller can be machined with no greater absolute error than a 10-ft one. As this adjustment affects only the magnitude of the error and does not of itself determine the model ratio, it does not need to be continuous. Accordingly, four positions of the ratio adjusting pin, corresponding to blade-to-model ratios of 2, 3, 4, and 5, provide adequate range.

Spring and gravitational forces acting on the levers are such that the maximum force on the probe need never exceed 2 lb. Thus, with probes of reasonable weight, the force exerted on the model is sufficiently low, safely to permit use of models made of easily worked materials such as plaster or soft wood. Ball bearing pivots provide definite fulcrums with minimum friction, serving both levers.

A pair of contacts built into the tracer unit serves as a limit switch to shut down the machine when the silverstat operating lever is deflected beyond its normal range. This feature protects the propeller blade, the tracer unit, the tools and the machine from damage due to mechanical or electrical failures. A time delay relay in the limit switch control circuit prevents shutdown during minor transient conditions which result in only moderately excessive accelerations. During such interludes, damage to the tracer is prevented by adequate overtravel provided in the lever system.

Performance: This propeller milling machine is capable of greatly exceeding the specified performance, which was that 200 sq. in. of blade surface should be milled per hour. This "plus-performance" is due both to the inherent cutting efficiency of the machine and to ability of the regulators to maintain a high degree of accuracy at speeds higher than needed. A practical cutting speed for face milling is of the order of 30 in. per minute, and at this speed the regulators hold the accuracy to better than plus or minus 0.004-in. at the work. During the high speed return stroke the velocity reaches 100 in. per minute and the corresponding error is of the order of plus or minus 0.012-in. As mentioned previously, there is no necessity for maintaining high accuracy during the return stroke, so that the latter figure has no particular significance in the operation of the machine. It is indicative, however, of the capabilities of the regulators.

Rates of acceleration and deceleration at the ends of the strokes are limited to values of the order of 10 in. per min per sec. During these intervals the error is held to well within the specification requirement of plus or minus 0.020-in.

In designing the regulators much consideration was given to features which insure reliability and ease of operation. No unusual skill is required either to operate or to service the equipment. Although this regulating system was developed specifically for the propeller milling machine, the fundamental principles involved are of such a general nature that they will find useful application in a wide variety of regulator problems.

Cutter Drive: Cutters are driven by adjustable-speed constant-voltage dc motors, which provide the speed adjustment necessary to suit cutters of different diameters. Motors are reversed by manually operated switches on the control panel so that either right or left hand cutters can be accommodated. The magnetic controllers do not provide dynamic braking. It is desirable to have the cutters continue to rotate from the momentum of the drive in case of a voltage failure, so they will cut themselves clear.

Relieving Mechanisms: Cutter saddles are each provided with relieving mechanisms. These move the cutters clear of the work at the beginning of the stroke, then back into position for cutting at the beginning of the cutting stroke. These mechanisms are driven by compound-wound, dc motors provided with full magnetic reversing control, in order that they will operate in the proper sequence during the automatic cycle. As just mentioned, at the beginning of cutting stroke, cutter is positioned with respect to the work by this mechanism. This positioning must be consistent and accurate. The relief drive motors drive the cutter saddles against a positive stop, at which time the motor stalls. Mechanism is self-locking in this position and the motor is de-energized by a timing relay.

Ram Feed Drive: The ram feed motion, that is, the motion of the cutter radially along the propeller blade, is accomplished by a constant-speed, constant-voltage, dc motor. This motor provides movement at traverse speeds during setting up of the machine, and also movement in definite increments to position the cutter into a new path for each successive cut

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By R. B. SEGER
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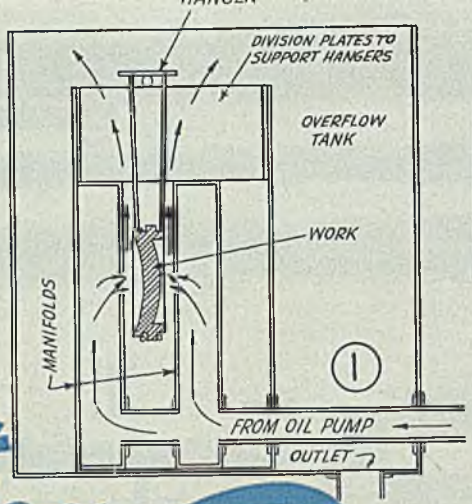

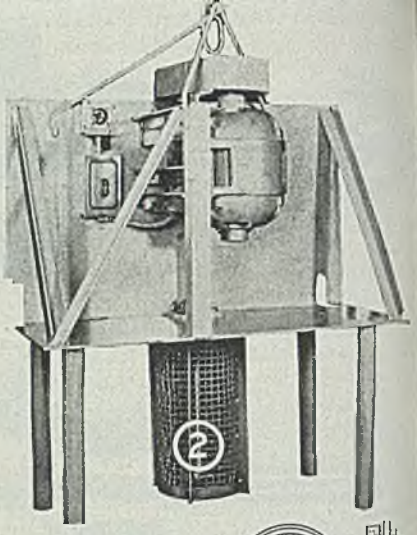

Agitation for EFFECTIVE Quenching

. . . produces uniform results in heat treating

FAILURES in heat treating often result in hours spent investigating cause of such things as soft spots, distortion, size-change and inability to reach maximum hardness. Investigations may be conducted along the following lines: What is hardenability? How much decarburization is present? To what temperature were parts heated? How long were they at this temperature? What was the heating rate? However, much time is wasted because there is no investigation of quenching procedures.

Heat treaters using salt baths at elevated temperatures for quenching realize that it is necessary to agitate the bath as well as the part being quenched in order to produce uniform results. Otherwise, heat is not dissipated rapidly enough throughout the salt bath, and the salt immediately surrounding the pieces raises the temperature far above that which the pyrometer indicated. Therefore, it is realized that the quench is not at the required rate.

In quenching in oil or water, the same situation prevails, except that these liquids turn to vapor at a much lower temperature. If this vapor is not removed rapidly enough by means of agitation, it adheres to the surface, forming a coat of insulation which prevents surrounding coolants from reacting in the desired manner. Thus, on rough-machined parts, resulting recesses tend to encourage formation of vapor bubbles, retarding the cooling rate in those localized areas, and causing excessive distortion or soft spots.

As an example of the troubles caused by vapor pockets, there was a problem of treating shear blades 33 in. long, 6 in. wide, and 2 in. thick, made from tungsten shock steel of the following analysis: Silicon, 0.25; carbon, 0.50; manganese, 0.30; chromium, 0.90; tungsten, 1.00 per cent.

It was found that ordinary agitation produced a condition around the entire perimeter for a distance of 1 in. from edge to center testing rockwell 58-59 C, the balance being quenched to 38-42 rockwell C, which is very low. Soft areas of blade are indicated in Fig 4. According to laboratory data, maximum rockwell obtainable on a 2 in. section was 58-59 C. However, this data was obtained by treating a cube of 2 in. dimensions, and the critical cooling rate was affected by quenching the six sides. Also, because of the small areas, the tendency to form vapor pockets with ordinary agitation was greatly reduced.

Again, examination was made for decarburization, soaking period, etc. Finally, it was found that vapor pockets had formed and were not removed rapidly enough by ordinary hand agitation. This was proved by incorporating a flush of oil upon the center section at the rate of 90 gal per min (See Fig. 5). Needless to say, future shear blades were treated to a uniform hardness of 58-59 rockwell C.

Another instance was one of treating parts decarburized during forging to a depth of approximately 0.10 - 0.030 in. These parts were made from NE 8642, with diameter of about 7 in. and maximum cross-section of 2 in. With normal agitation, hardness of 220 brinell was obtained in very center of part shown in Fig. 3, whereas objective hardness was 275-325 brinell. Ultimately, by directing a flush quench of about 40 gal per min at the center of the parts, hardness of 525 brinell was obtained. Diagrammatic sketch, Fig. 1, shows method.

In treating rounds longer than 4 in., it is extremely difficult to remove vapor pockets. Hardening leader pins used in die sets is a production job and, naturally, cannot sustain the cost of exacting treatment accorded expensive tools. Although parts were quenched individually and allowed to pass through 8 ft of brine before coming to rest at bottom of the basket

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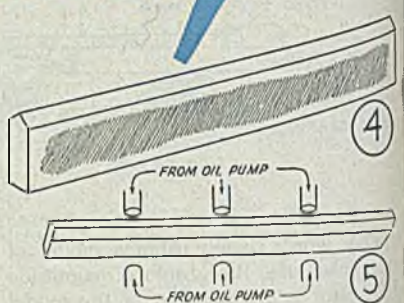


Fig. 1—Cross section of special quenching setup for part in Fig. 3, where it is hung between oil outlet holes in two manifolds so that force of oil flow removes air pockets

Fig. 2—Homemade agitator consisting of special frame, 5 hp motor, and motor boat propeller, for quenching leader pins

Fig. 3—Normal hand-agitated quenching was incapable of eliminating soft spots in this NE 8642 steel part because of its "pockets"

Fig. 4—Softness indicated around perimeter of blade is due to inadequate quench

Fig. 5—Part reached maximum hardness when submerged in oil quench with three streams of oil directed at each side as shown. Rate 90 gpm

Engineering NOTES

World's Biggest Welders

The jet propulsion aircraft engine program probably is being expedited more than any other one at present. Three huge resistance welders, probably the largest in the world, now are being rushed to completion for joining the turbine wheel and shaft. These welders have an overall height of 22 ft 9 in. and exert maximum upset pressure of 850,000 lb. The shafts are 3¼ in. in diameter and are welded to a hub which projects about 2 in. from the wheel. The welders are rated at 1200 kva.

★ ★ ★

Removing Tips From Tools

Westinghouse engineers have worked out a new method for removing copper-brazed cutting tips from tool shanks which utilizes nitric acid and water. Solution is 80-90 per cent nitric acid and 10-20 per cent water. Temperature should be held between 80 and 90° C. Minimum volume of 100 mls. per average size tool is satisfactory. These points should be noted: (1) Do not immerse cold tools but heat in water or the solution to the operating temperature. This prevents violent boiling or foaming. (2) Position tools so that tips can drop out when the join has been dissolved. (3) The smallest possible section necessary to cover the point should be immersed.

Tips may be removed from three sets of tools with the same solution although contamination slows down the third operation. Larger tools take up to 1½ hr, smaller ones 30 min. Shanks are left clean and no machining is necessary.

★ ★ ★

X-Ray Identifies Elements

Elements of an unknown liquid, solid or gaseous chemical substance now can be identified by measurement of their absorption of X-rays. In the initial experimental setup at General Electric's research laboratories, the solid or liquid sample is placed in a glass cell 3/4-in. in diameter and 6 in. long. For gases a 2-ft cell is employed. Cell is placed in a vertical position above the X-ray tube, and a narrow beam of energy passed through it. Rays then strike fluorescent material painted on a glass phototube of the multiplier type. Resulting phosphorescent light falls upon a sensitized surface within the tube that emits electrons. These pass through several stages of amplification until the energy can be measured with an appropriate meter. Amounts of light with energy equal to 1/10,000,000,000-w can be measured accurately. Filters made of various metals can be placed in the X-ray beam to secure radiation of different wavelengths.

This system affords a method for counting and indicating the kinds of atoms which are being absorbed. The count is unaffected by whether the atoms are free or have been combined to form any type of molecule, and regardless of the substance's hot, cold, solid, liquid or gaseous state.

★ ★ ★

From Fine to Superfine

Pintle type diesel injection nozzles must have center holes ground to 0.1-mm (forty thousandths of an inch) in diameter. The work is done on a special machine, with the grinding medium an India oilstone, medium grit, produced by Behr-Manning Corp. Division of Norton Co., Worcester Mass. The stone is trued to a sharp point and mounted on an air turbine spindle driven at 64,000 rpm. Accuracy limits are 0.003 to 0.005-mm (twelve to twenty hundred-thousandths of an inch). For visualization of work, operator requires high magnification.

★ ★ ★

Watertight Adhesive

An adhesive containing synthetic rubber, Pliobond, helps to provide Allied armies with land mines that cannot be detected by ordinary searching devices. The mines are made entirely of glass or porcelain. They explode when a bellows of flexible synthetic rubber, cemented to the body of the mine by the new adhesive, is compressed. The adhesive, made by Goodyear Tire & Rubber Co., affords a watertight and flexible bond at temperatures from minus 70 to plus 140° F.

★ ★ ★

Bushing Life Tripled

Helical coils of stainless steel, inserted in the spark plug bushing of radial aircraft engines, are reported to have bushing life in airline service. Originally, the bushings lasted only 700 hr, but use of the inserts lengthened their life to 2000 hr. These Heli-Coil inserts, made by Aircraft Screw Products Co. Inc., are used in maintenance and field-servicing applications as well as in original installations in the engines of Army, Navy and commercial aircraft. In repair and maintenance work, old threads are drilled out, new ones tapped, and the insert installed. Crankcase castings valued at $500 apiece have been salvaged by this apparently successful method.

★ ★ ★

Bi-Metal Tubing

Another interesting wartime development of the aircraft industry which may be useful in many other industries after the war is a bi-metal, bi-wall tubing fabricated of Monel strip plated on both sides with a thin layer of copper. This tubing for aircraft engines is rolled into a double-walled cylinder with the copper between the two walls. The copper then is fused into a permanent bond with the Monel by heat treating. It cannot be separated up to 2400°F, and it is designed for pressures ranging from 65,000 to 95,000 psi. Bi-metal tubing made of admiralty brass with a strip of Monel silver-brazed along one side also has been used for evaporator tubes designed to be self-descaling. The effect of variations in operating temperatures on the difference in expansion of the two metals breaks off deposits on the sides.

★ ★ ★

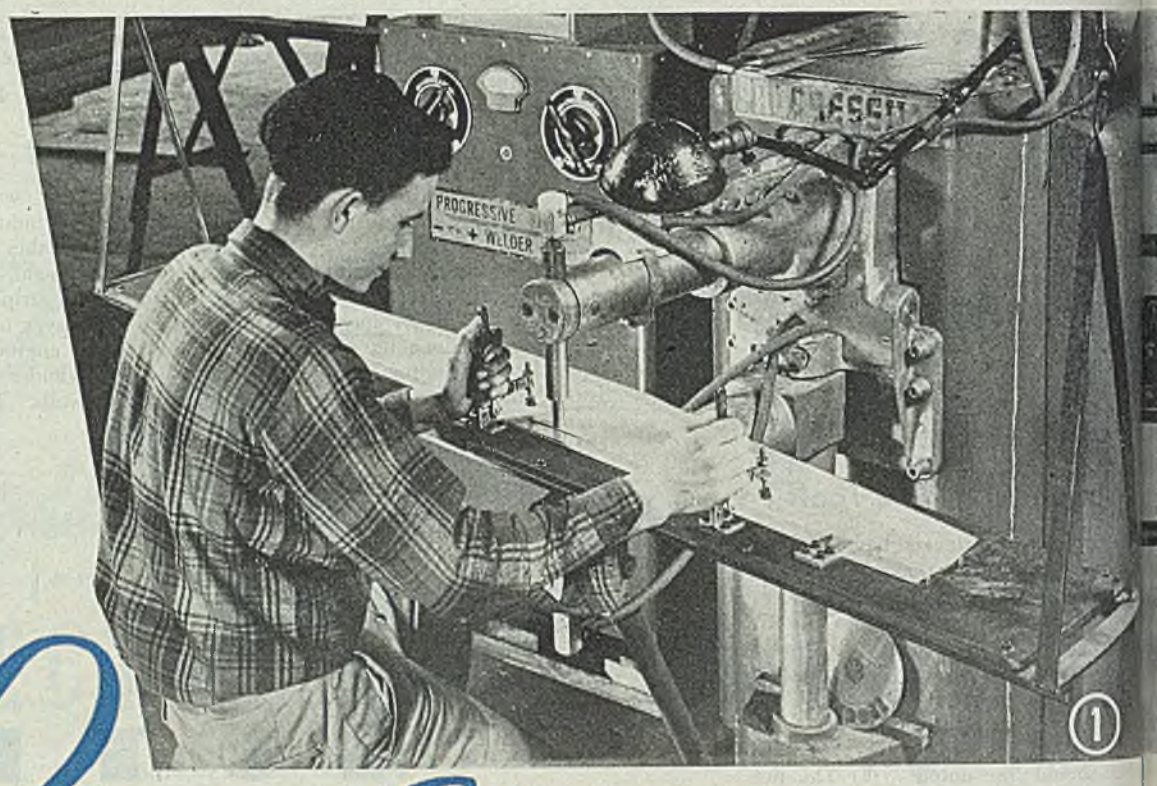
Needle Mends Plexiglas

Broken noses of bombers are being mended by electrified darning needles especially developed for aircraft production lines. When cracks or flaws develop in noses, domes or other Plexiglas surfaces of bombing planes, a small Nichrome wire is inserted in the crack, and both ends are connected to electrodes. A low voltage current then is turned on and the wire drawn along the crack. The Plexiglas welds immediately behind the wire. One electrode is disconnected and the wire drawn out at the end of the crack.

★ ★ ★

"Oil-Canning" Saves Metal

A new design of shell container eliminates the internal suspension rings and grips the shell by means of three rows of 4 indents per row. Metal does not flow when the indents are formed but simply is pushed into a new position, as when one pushes in the bottom of an oil-can. Result is container has amazing strength. And, elimination of the rings saves much steel.



Resistance Welding with Storage-Battery Power

Use of special storage batteries and direct control of large welding currents are expected to greatly expand field of spot, seam, flash, butt and upset or "forge" welding, for these advances no longer limit welding currents to those available from the power system serving the plant

CAPACITY of power lines and substations need no longer limit metalworking plants in small towns and outlying locations. Formerly, more than one plant has found that it could not install resistance welding equipment of sufficient capacity to handle the work at hand simply because the power company serving the plant did not have line and substation capacity that would handle the heavy peak loads imposed by conventional equipment. The cost of providing the required capacity would have been prohibitive in such a case.

Proponents of storage-battery power for resistance welding see it making possible such new fields for resistance welding as the flash butt welding of large pipelines in the field, a portable engine-generator set supplying the charging current; erection of prefabricated houses; and the welding of railroad rails, in place. Many similar striking and unusual applications of heavy duty resistance welding are opened up by this equipment, for the power available can be whatever the job demands.

Power Unlimited: Fred Johnson, president of Progressive Welder Co., Detroit, points out that the very factor heretofore limiting the use of large resistance welding equipment—the fact that the line load consists of a series of peaks separated by intervals of no current draw whatever—enables a storage-battery powered installation to operate at a very low line load. The intervals between welding "shots" provide the extra time required to recharge the battery at a much lower current since charging is continuous. In fact, it makes it possible for small power lines to carry sufficient current to do extremely heavy welding jobs.

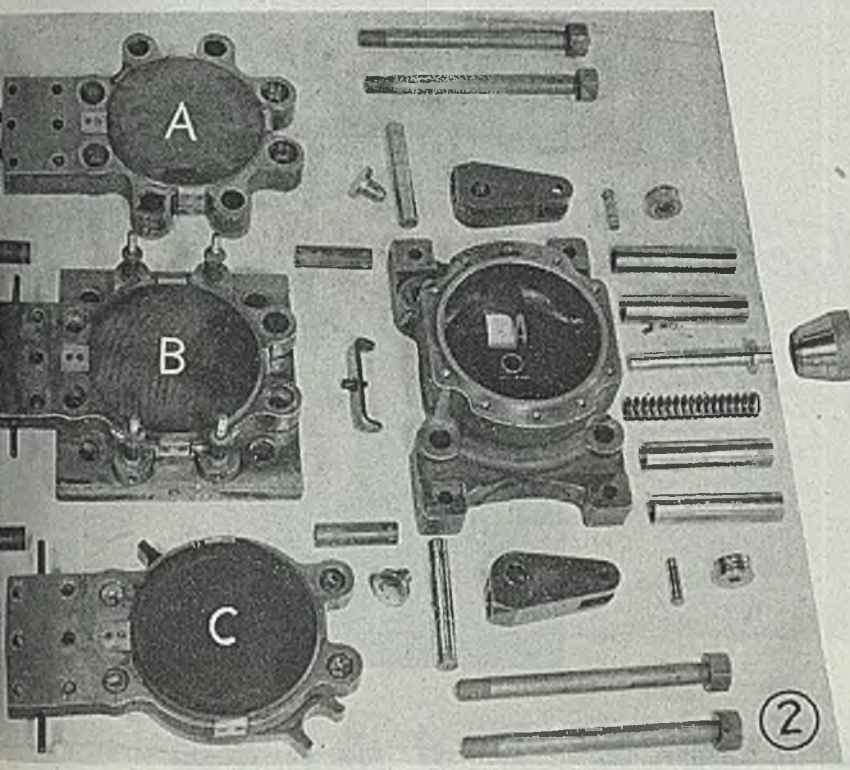
Already 32-cell battery units make available 50,000-amp welding currents. And there is no reason why a number of such units cannot be connected together to deliver welding currents of several hundred thousand amperes if wanted.

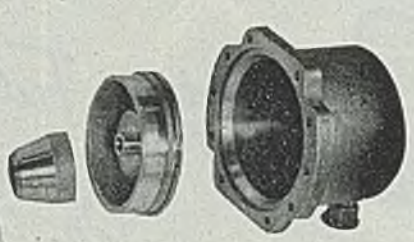
Mr. Johnson points out another factor, also of great importance. All resistance welders utilize a single circuit for flow of current or part of a B-phase supply. That means conventional heavy duty welders load only a single phase of the 3-phase power line or else load a 3-phase supply intermittently. This not only puts a heavy intermittent load on the line, causing voltage fluctuations and seriously affecting the efficiency of other equipment, but it also unbalances the lines and causes disturbances throughout the entire power system.

This problem is so serious that it has long been standard practice to serve large resistance welders by installing special power lines direct from the power station to a substation at the welder. This obviously involves great expense. And if the plant is located in a small town or outlying district, there is a good chance that the available power facilities are not capable of doing the job at all.

Balanced 3-Phase Load: When welding with storage-battery power, the line load is balanced, because power from the full wave of each phase is fed through a transformer and rectifier to be utilized in recharging the battery. The rate of charge is adjusted so that the battery is recharged at about the same

By G. W. BIRDSALL
Associate Editor, STEEL





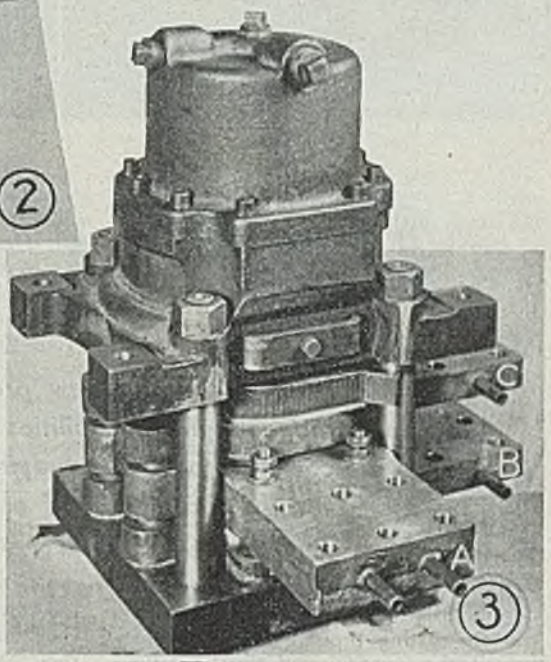


Fig. 1—Typical storage battery welder setup. Battery is in welder case at right; charger in the case at left. Note counterbalance fixture for holding work

Fig. 2—Disassembled view of carbon disk contactor. A is centrally positioned disk, C and B are upper and lower disks respectively. Springs keep contacting surfaces apart except when welding current is wanted. Air piston operates contactor

Fig. 3—Carbon disk contactor is "heart" of successful battery-powered welder. Head contains air cylinder and piston which forces contact disks together. Current travels from outer disks, B and C, to central disk A

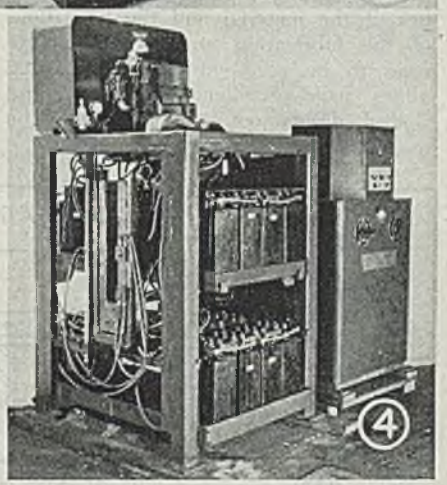


Fig. 4—This 32-cell 50,000-ampere welder has covers removed to show location of cells on the two shelves, the contactor at top, the rheostat at left. Charger in its case is at right. It is operated automatically by special controller that adjusts charging rate to keep battery up

rate the welding operation consumes energy from it. Thus, the load on the power lines is a continuous balanced full-wave 3-phase load.

As an example of how this works, assume a power line has just enough capacity to supply power to weld a certain job at a rate of one weld every second. If still larger welds are to be made, the welding power can be doubled with the same line load simply by adding 1 sec to interval occurring between welds. And a 4-sec interval thus will permit again doubling the welding current. It is this feature that enables storage batteries to supply almost any amount of welding current desired, even when served by a power line of limited capacity.

26.7 KVA Does 150-KVA Job: It is interesting to see exactly how these factors work out in an actual installation. In one plant where a conventional 150-kva welder had difficulty in making spot welds between two thicknesses of ⅛-in. structural steel, a storage-battery welder was found to do the work perfectly with a total load on the power line of just 26.7 kva.

In this installation, a 12-cell battery supplies 20,000 amp of welding current to make 240 spot welds in each assembly at the rate of almost six assemblies per hour. Total output for two 10-hr shifts is around 29,000 welds. Welds are grouped in closely spaced rows, so a continuous or automatic repeat cycle is utilized. As long as the operator holds down the foot treadle, the timer allows an interval between welds just long enough to shift to the next weld position—about ¼-sec. Total work cycle is about ½-sec per weld.

This entire production is handled by power fed to the battery from an automatic full-wave 2-rate copper-disk type rectifier that draws a miximum of 70 amp, 3-phase.

High Power Factor: An important advantage of such a welding setup, in addition to continuous balanced 3-phase loading, is that the power line is loaded at a high power factor. This means that practically no extra current must be supplied other than the actual power fed to the batteries through the rectifiers.

In contrast, conventional resistance welders may operate at power factors down to only 25 per cent, may thus require heavy additional magnetizing cur-

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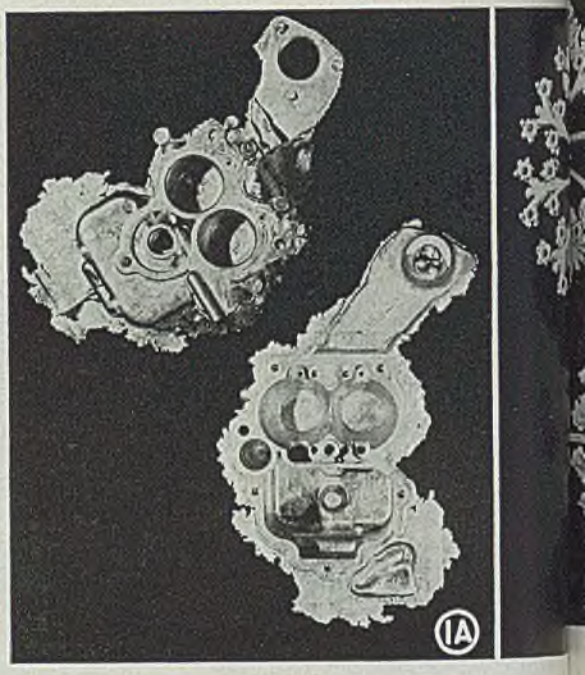
Consider These Factors in Designing Products for DIE CASTING



Before launching plans for new products, manufacturers can take advantage of the possibilities and avoid the limitations of the die casting process by studying these fundamental data assembled by the technical staff of the New Jersey Zinc Co.

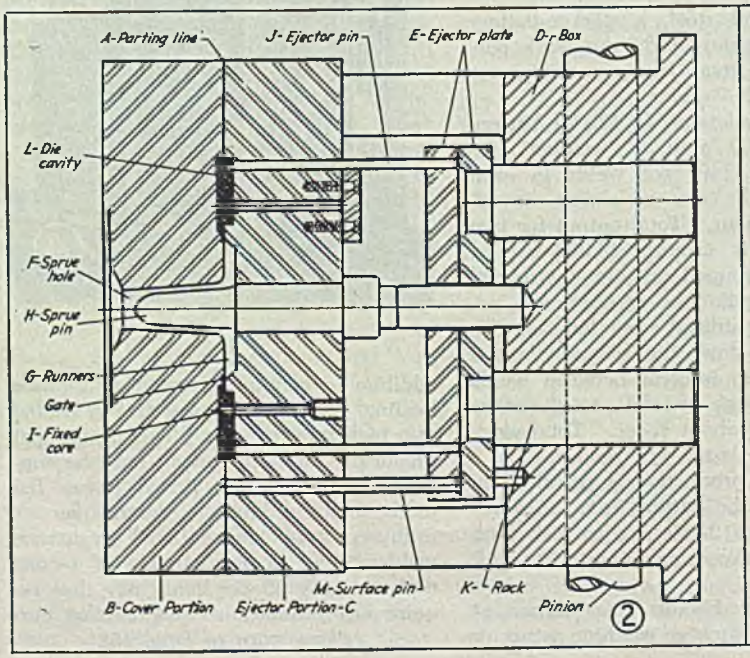
AMONG the basic considerations in designing products for production by the die casting process are the properties of the material and the limitations of the fabricating and finishing processes to be used. Modern die casting alloys have excellent properties, and skillful design consists in making the most of these favorable properties.

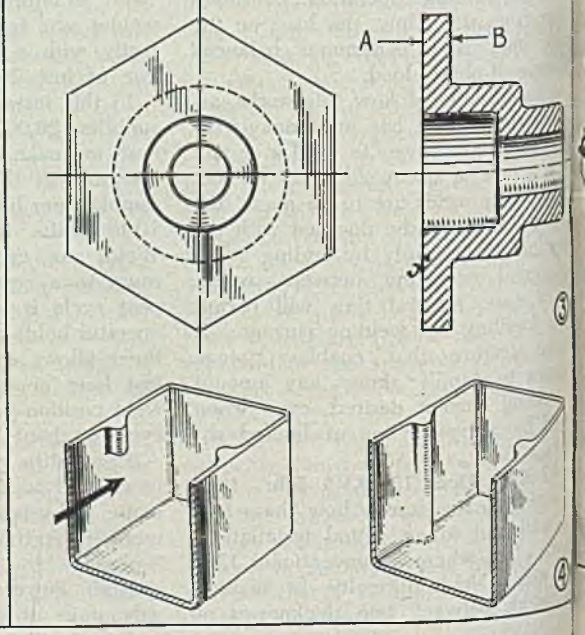
Die casters are ingenious in designing dies and producing castings, but they are subject to limitations in what they can do. The better the designer understands both the possibilities and the limitations of the die casting process, the more fully he can take advantage of its possibilities and the more often he will avoid its limitations.

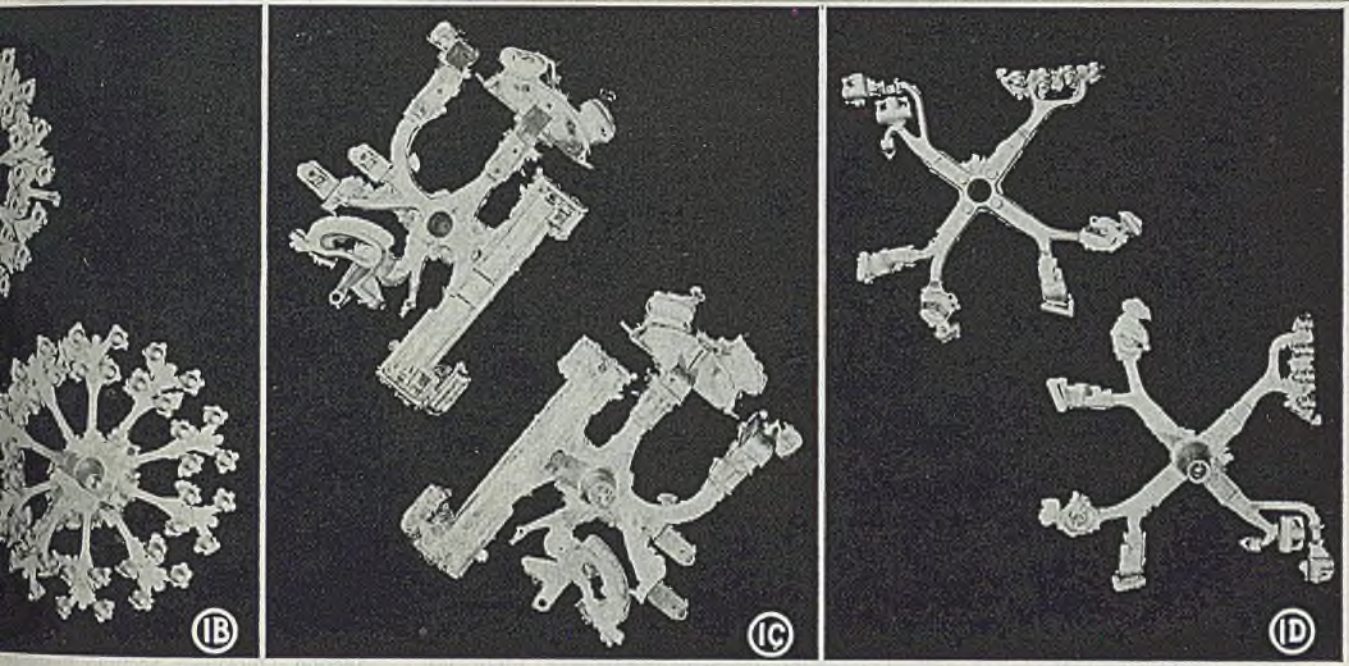
Quality of die castings may be influenced in two important respects by details of design: First, by the soundness and the mechanical properties, and second, by the character of the surface. Cost, too, may be influenced to a very important extent by skill in adapting the design to the die casting process.

Limitations imposed by the die casting process should be considered in the design before it has advanced so far that changes may prove to be impossible or impractical. Such early consideration is the surest way to realize the full advantages of the economies inherent in the process of die casting.

Typical Die Casting Die: Success-



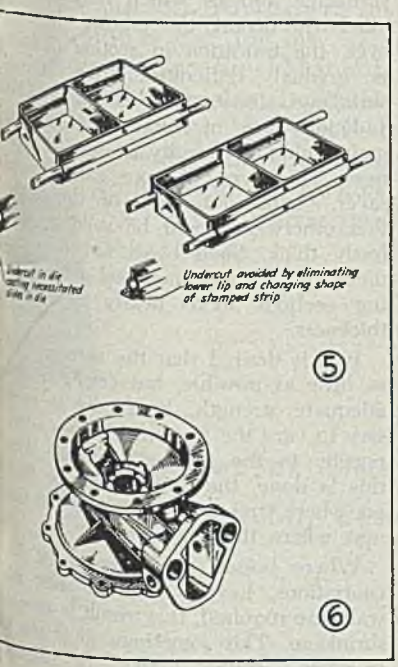




designing for die casting must be based on a working knowledge of the basic principles of the die casting process. Hence we preface all design and considerations with an understanding of the construction of a die casting die.

As all die casting is done under heavy pressure and the die must, in consequence, be closed and securely locked and subsequently opened to remove the casting, it follows that the die must be made in at least two sections. The two sections come together at what is called the "parting," as at A, Fig. 2, which is preferably a plane surface but often has to be an irregular surface. Practically all modern machines are so designed that the die parting comes in a vertical plane or is only slightly inclined. In general, the front or cover portion, B, of the die is fixed to the front plate or platen of the machine on the side toward the metal pot or cold chamber. The rear or ejector portion, C, of the die is arranged to be drawn away from the cover portion when the die is opened and usually contains the major part of the cavity which gives the casting its shape. Usually, the ejector section is not placed directly against the movable platen of the machine, but is spaced away from the latter by a hollow casting, variously termed a "box," "base" or "housing," D.

The box is made hollow to provide room for an ejector plate, E, which must have space to move relative to the ejector portion. When the die is closed, the ejector plate and movable cores are held positively against motion, but when the die is opened, or immediately thereafter, the ejector plate is advanced so that the pins or sleeves which it carries, and which project through the ejector portion to the die cavity, can force the casting out of the cavity and off the fixed cores.



Types of Dies: A large proportion of casting dies have a single cavity for making one casting per "shot." This is true particularly of large or extremely complex castings, when the single cavity die is mandatory.

But when the parts of favorable shape and size are required in large quantities, it is advisable to employ several die cavities. If the cavities are all duplicates, the die is commonly referred to as a "multiple-cavity" die. When dies have cavities of different shapes, it is usual to refer to them as "combination" dies.

Parts required in differing quantities are often produced with economy in what are called "unit" dies. These are small dies, usually having one or two cavities per die, made to fit a standard opening in a die holder. The unit die is essentially the same as any die of the same dimensions, but is adapted for use with one or more other unit dies which are fitted in the same holder. In effect, such an assembly of dies constitutes a combination die, but the individual die blocks can be changed as needed to meet varying production requirements.

It frequently is found that, when one part can be die cast with economy, several other parts of the same assembly simultaneously can be cast. It is in such circumstances that the combination die is used. Since the same or nearly the same production rate can be maintained for casting several parts as for a single part, the economy realized is considerable even though separate flash removal on each casting in the group is required. Combination dies should be used wherever cost can be lowered and other conditions can be met by this means.

Not all castings can be produced in unit dies or in combination dies, as both types impose certain limitations both on size of castings and on the number and position of cores that can be employed. The chief utility of unit and combination dies is for small, simple castings.

Fig. 1A shows gate and castings from a single-cavity die; those in B are from a multiple-cavity die; those in C from a combination die; and gate and castings in D are from a unit die.

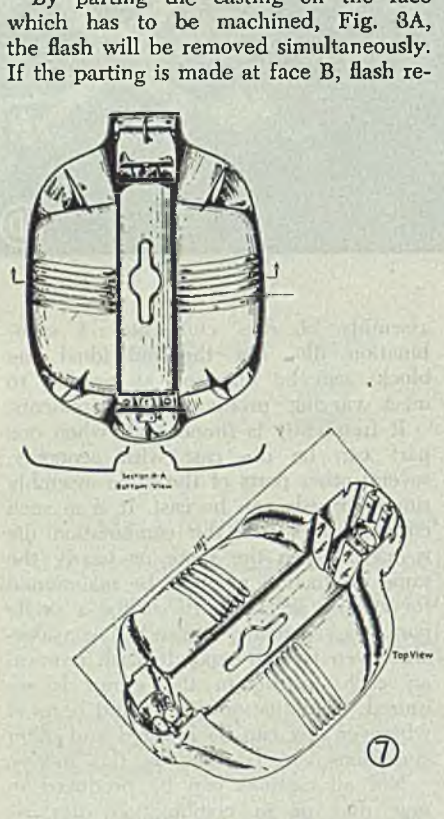
Die Parting: The die parting usually must come at the maximum diameter of the casting. Although the designer of the casting may not design the die, he should visualize the casting in the die and should shape the part to facilitate its removal. Such visualization will aid in determining where the parting will come and where the resulting flash will have to be removed.

Frequently, a bead can be placed at the die parting to bring the flash where it is most easily removed. As the bead forms a narrow convex surface, the flash will come at its high point, where it can be cut off without leaving unsightly marks on the casting. If the surface is kept flat, it may be difficult

to shave or grind the flash away without leaving tool marks on adjacent areas.

Die costs and flash removal costs are commonly minimized when the parting is in one plane at right angles to die motion. There are many castings, however, in which irregular partings are required, even though die and piece costs are thus increased. If the designer of the casting is not familiar with die construction, he should consult the die casting engineer in an effort to insure castings of minimum costs, without sacrificing other advantages.

By parting the casting on the face which has to be machined, Fig. 8A, the flash will be removed simultaneously. If the parting is made at face B, flash removal will have to be a separate operation.



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⑧

Ejector Pins: All pins should be so located as not to leave objectionable marks on the finished casting. Since the designer of a die casting seldom designs the die, he may not know where ejector pins will come. He can specify, however, that the marks left by ejector pins shall not come on certain surfaces where such marks would leave disfiguring blemishes. If there is any doubt in this regard in the designer's mind, he should discuss the subject with the die casting engineer. Once a die is built, it may be costly to change ejector pin locations.

Principles for Designing: These can never be hard and fast, that is, unvarying in their application. But general rules can be formulated and, if followed with judgment, can go far toward realizing a design that is both logical and helpful in attaining low cost. Rules here given are not universally applicable, and it should be understood that there are sound reasons for exceptions in particular cases. Reasons for the rules and, in many cases, examples of their application are given in the belief that this will help them to be remembered and observed. A careful check of any given design of die casting against the rules is quite likely to reveal some shortcoming of the design or some opportunity for economy or other improvement. Although many of the rules may seem self-apparent, even experienced designers sometimes fail to heed what should be obvious, and nothing is lost even though a quick check of such points does not reveal oversights or indicate desirable changes.

Size of Casting: Size should be kept at a minimum consistent with other requirements. In general, the smaller the size, the lower is the cost of both die and casting. Increased size always involves more metal in the casting and consequently a higher metal cost, while machining costs may also go up and casting rates may be reduced. Frequently, however, a single large die casting costs less than two smaller ones cast separately and then assembled, provided the shape is not unduly difficult to cast.

Maximum size of zinc alloy die castings probably depends largely upon the maximum size of die and of die casting machine that it is economically expedient to produce. No limit on minimum size is known to exist. Zinc die castings weighing 1/300-oz or less are in regular production. Table lists present approximate dimensional and weight limits for die castings in various alloys commercially produced in quantity. It is quite likely that castings outside these limits can be produced if demands for them warrant.

There are many cases in which combination dies (having more than one cavity of different shapes) or multiple-cavity dies (having two or more duplicate cavities) are most economical. In such instances, parts of minimum size may make it possible to gain a given production more rapidly than otherwise, another point in favor of the smaller size of casting.

Section Thickness: Sections should be of minimum thickness consistent with ease of casting and with adequate strength and stiffness. This rule not only tends to minimize the weight of metal required, but its application also helps to accelerate cooling in the die and thus tends to increase production rates. Furthermore, thin sections are stronger **in proportion to thickness** than thicker ones, because the skin forms a larger part of the total thickness in a thin section. Because of the more rapid cooling rates of thin sections, casting speeds can be higher, and surface smoothness is likely to be better.

Sections should be made as nearly uniform in thickness as possible. Where variations in section thickness are necessary, the transition should be gradual rather than abrupt.

Since thin sections cool more rapidly than thick ones, unequal contraction takes place where sections are not of uniform thickness. The result is to cause shrinkage stresses which may warp or otherwise distort the casting. If, however, the transition in section thickness is gradual, difficulties from unequal shrinkage stresses are usually avoided. Judicious use of cores often aids in maintaining uniformity in section thickness. That type of core called "metal saver," cores out parts of the casting that otherwise would be solid or needlessly thick. Such cores not only save metal but are a pronounced aid in keeping sections more nearly uniform in thickness.

If it is desired that the casting weigh as little as possible, but consistent with adequate strength, it usually is necessary to vary the section thickness in proportion to the stresses imposed. When this is done, the casting will be thickest where stresses are greatest and thinnest where they are lowest.

Where bosses, or similar metal concentrations, heavier than adjacent thin walls are required, they result in unequal shrinkage. This sometimes gives rise to so-called "shrink marks" or "sha[illegible]

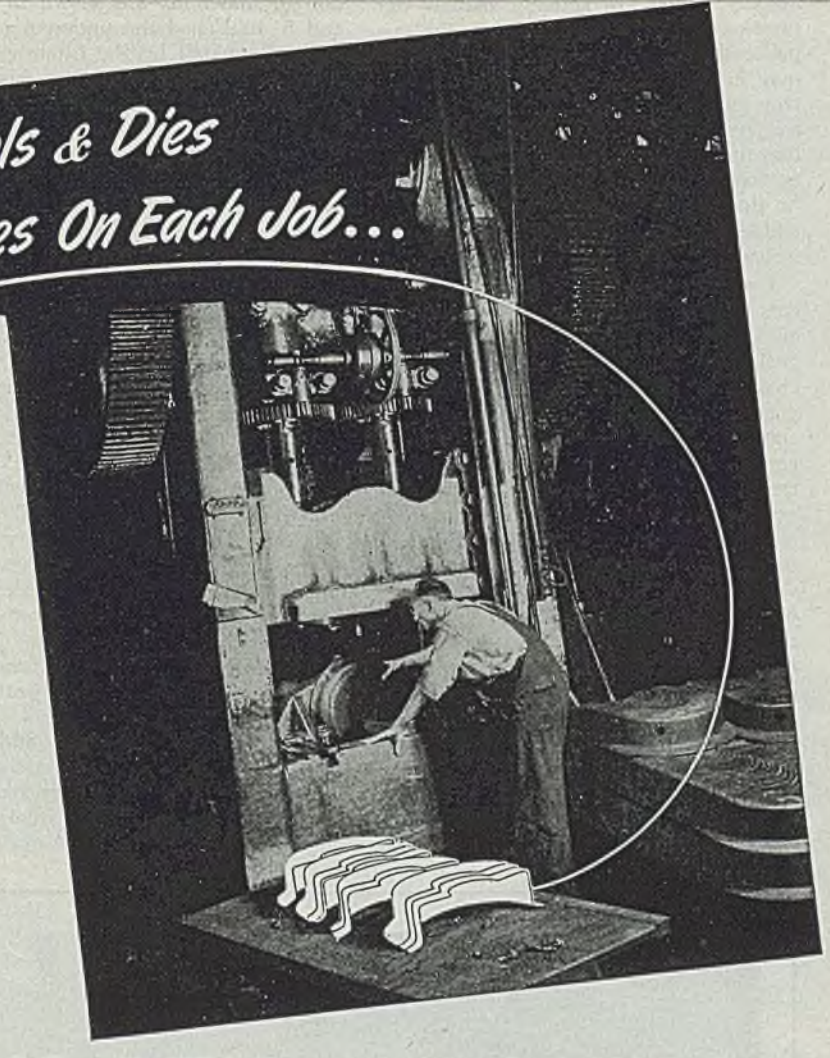
APPROXIMATE DIMENSIONAL AND WEIGHT LIMITS FOR DIE CASTINGS IN DIFFERENT ALLOYS

(Data apply to average conditions. For exceptional conditions, larger castings, closer dimensional limits and thinner sections may be feasible)

TYPE OF ALLOY (Base Metal)	Zinc	Aluminum	Magnesium
Maximum weight of casting, pounds	35	20	10
Minimum wall thickness, large castings, inch	0.050	0.080	0.080
Minimum wall thickness, small castings, inch	0.015	0.050	0.050
Minimum variation from drawing dimensions per inch of diameter or length†	0.001*	0.0015*	0.0015*
Cast threads, max. no. per inch external	24	24	16
Cast threads, max. no. per inch internal	24‡	none	none
Minimum draft on cores inch per inch of length or diameter	0.003	0.010	0.010
Minimum draft on side walls inch per inch of length or diameter	0.005	0.010	0.008

*Depends on conditions. †Larger variations may be anticipated across die partings or where fits of slides or cores are involved. ‡Where cheaper than tapping.

How To Make Your Tools & Dies Produce EXTRA Pieces On Each Job...



Getting tools and dies that produce more pieces on each set-up isn't a matter of luck. Here's a practical way to get *extra output* from each tool by reducing machine down time. Use this 3-step *job analysis* plan to save money in tool making, heat treating and all along the production line.

1. Plan Tool Performance At The Start

Here is a tried and proved way to get the extra output you want from your tools. With the Carpenter Matched Set Method you can actually plan tool performance before tools are made. For example, when you need greater toughness or more wear resistance in a tool, the Matched Set Diagram points to the tool steel best suited for the job. To cash in on its advantages ask for the 167-page Matched Tool Steel Manual. Its handy index quickly shows the way to the proper tool steel to meet your needs. For your free copy, drop us a note on your company letterhead.

2. Follow Up With Heat Treating "Know-How"

You know that proper heat treatment will back up your work in making tools that stay on the job. And here is how Carpenter can help you get better heat treating results. The Carpenter Heat Treating Guide provides complete, correct heat treating information in easy-to-use form. It gives you forging and normalizing heats, annealing and hardening treatments, recommended drawing ranges for all of the Matched Tool Steels. It gives tips on quenching, drawing and furnace atmospheres. For tools that will stay on the job longer and produce extra pieces, ask for your free Heat Treating Guide.

3. Check Each Tool's Output On The Job

How many pieces does it produce between grinds? Did it fail too soon in service? Answers to those questions give you a yardstick to use in boosting output from each tool. Start today to check tool and die performance for more output, lower costs. And whenever you want personal help with a tooling problem, call your nearby Carpenter representative. He'll be glad to work with you.

The Carpenter Steel Company
139 W. Bern St., Reading, Penna.

Carpenter MATCHED TOOL STEELS

pressions on the face of the casting opposite the thickened section. Such marks may be unsightly, especially if the surface receives a lustrous finish. The effect can be minimized by making the variation in thickness as small and as gradual as conditions permit. Shadow marks can be masked by ribs or low-relief designs and seldom occur on sections over 0.100-in. thick.

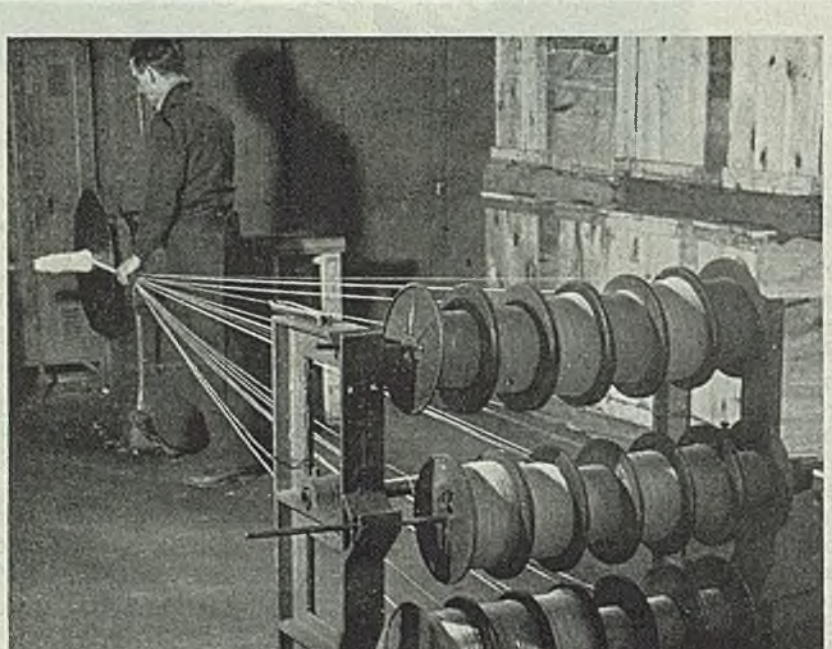
Undercuts: Avoid the use of undercuts except where advantages offset disadvantages. Since die costs often are increased greatly and casting rates decreased because of cast undercuts, the general rule of designing to avoid undercuts is justified. Cautions against undercuts are usually based on the well-recognized fact that, if they exist on the exterior of the die casting, slides or movable cores that substantially increase die cost are needed as, otherwise, the casting cannot be ejected. Undercuts on the interior of a die casting commonly require the use of a loose piece that is withdrawn from the die with the casting and must be replaced in the die for subsequent castings. The die casting engineer can frequently be of service in suggesting expedients to avoid undercuts, with considerable cost savings to the user.

Two examples illustrating the elimination of undercuts are shown in Fig. 4 and 5. In Fig. 4 the undercut in A has been eliminated by the extension of the boss to the bottom of the casting, as shown in B. Fig. 5 illustrates another undercut. A casting made as shown in this sketch, with undercut grooves for rods, requires extra slides in the die. By altering to avoid an undercut, as in sketch at right, the die is simplified and its cost much decreased.

As opposed to these examples, where undercuts have been avoided successfully, there are hundreds of cases where undercuts are effectively used to save metal and reduce machining operations which more than compensate for extra die and production costs. Such exceptions need to be kept in mind by the designer.

When the quantity of castings required is large, a costly and complex die may be fully justified by even a small net saving per casting. Fig. 6 shows a fuel pump body which, despite its complex shape, has a comparatively uniform section, attained by the judicious use of cores and slides that form undercuts. But the metal saved justified the extra die cost.

Ribs: The possibility of adding ribs to thin wall castings for strengthening purposes should not be overlooked. Ribs assist in keeping castings from deforming when hot, serve the same purpose



WIRE SALVAGE: Pittsfield Works of General Electric Co. utilizes a small winding lathe to salvage both the rejected wire destined for remelting and the spools on which it is wound. Two steel bars, 14 in. long by 1½ in. wide and ½-in. thick, are welded to the winding machine head so as to make a slightly tapered arbor 1½ in. square at the head. Holes are spaced around the head plate so that a tie wire can be laid along the arbor and held out of the way when unreeling. Upon completion of the bundle, tie wire is twisted around it to hold it together. Alternate spools, mounted on spool rack, revolve in opposite directions to prevent over-run of wire and consequent tangling in case winding machine stops suddenly

quent operations and stiffen as well as strengthen the casting in service, while adding comparatively little extra weight.

Ribs or beads discreetly placed at the thin sections where trimming is required, and where the casting is to be gated, diminish the chances for warping and reduce the trimming costs.

Addition of ribs is often a good way to increase strength as well as stiffness without making a significant change in section thickness but, in such cases the rib thickness should not exceed that of the area it adjoins, and ribs should never be placed where they complicate removal of the casting from the die.

Ribs often are joined to bosses at which load concentrations come and help to distribute this load over a larger portion of the casting. Ribs or beads also are employed in some instances for decorative purposes. Ribs often provide extra passages through which the metal can flow to fill out a thin section not so readily filled otherwise.

By skillful use of ribs it is often feasible to use a lighter casting than can be employed if no ribs are applied, thereby effecting important economies in metal required. Many die castings are as thin as stampings, yet can be produced in shapes that cannot be duplicated by some other methods. Die cost is relatively low. See Fig. 7.

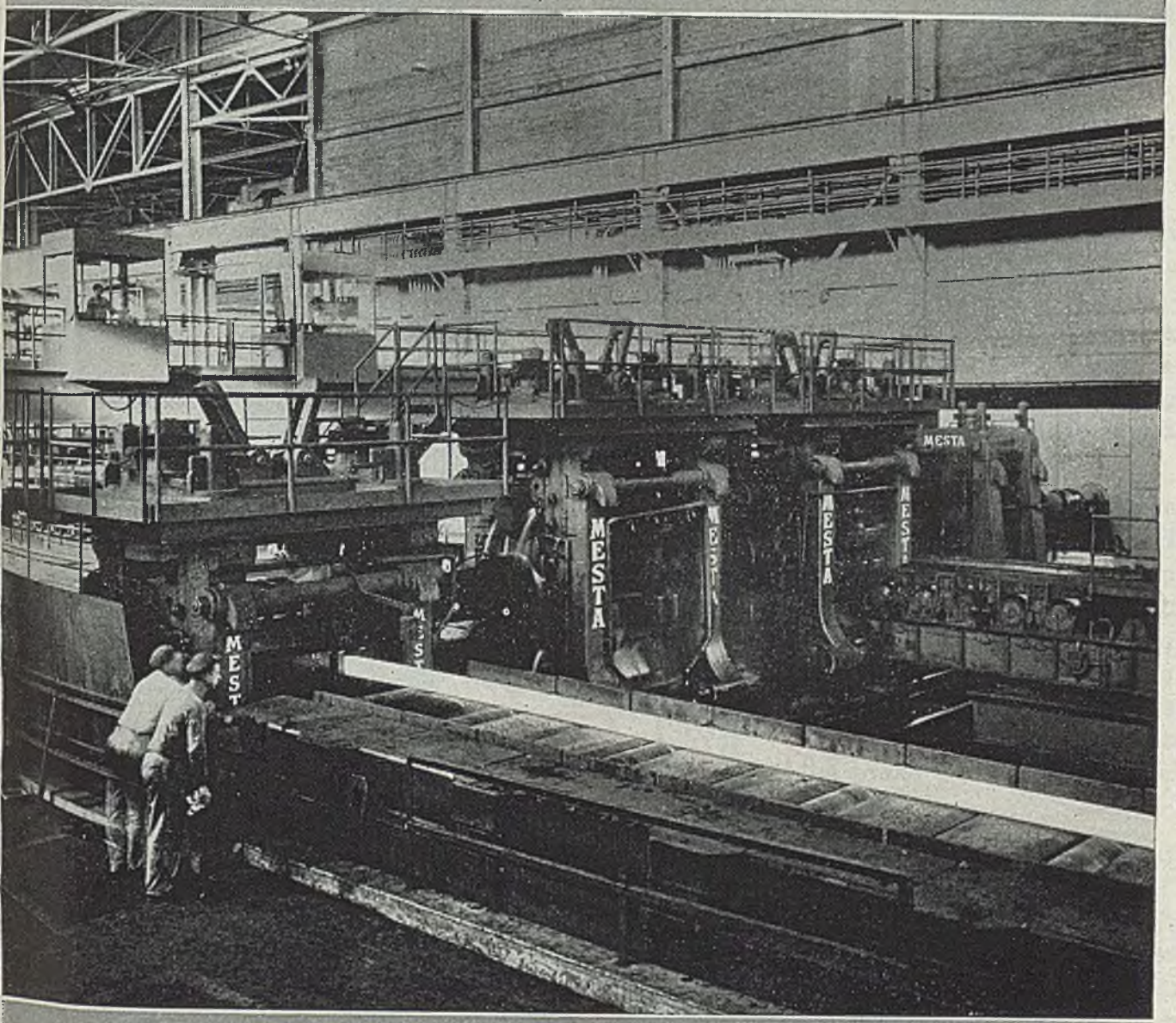
Fillets: Sharp corners are always a source of weakness and, therefore, should be avoided through the use of fillets. Even the smallest fillets have an appreciable strengthening effect. A radius of 0.015-inch minimum is suggested in place of sharp corners and larger radii are desirable when conditions permit their use. Fillets of 0.015-in. radius are barely noticeable even on outside edges and, in fact, an 0.030-in. radius is seldom evident except on close inspection.

It is common die practice to use a fillet having a minimum radius of 0.060 in. on inside edges. A slight radius on outside corners of castings reduces die cost and promotes the durability of any subsequent finish. Buffing or polishing is apt to cut through the finish at sharp outside edges, and organic finishes tend to thin out and give inadequate protection along sharp edges.

Studs: Studs formed as an integral part of the casting usually cost less than inserted studs and, in general, constitute a highly economical means for fastening a casting to a mating part. Production rates are seriously impaired when separate inserts must be placed in the dies prior to each cast.

Integral studs should not be so small in diameter as to be fragile or easily damaged in handling. If such studs are made at least 1/4-in. in diameter, little trouble in this respect is experienced. With small, light castings, proportionately smaller studs can be used with safety.

Plain integral studs cost less than those threaded after casting, but studs having their axes in the die parting can have cast threads, though such threads must



ROLLING KAISER SHELL STEEL

ON MESTA 29" STRUCTURAL MILL

Mesta 29" Structural Mill, showing Traveling Tilting Table, installed at Kaiser Company, Inc., Iron and Steel Division, Fontana, California.

ARMY E NAVY

MESTA MACHINE COMPANY . . PITTSBURGH, PA.

have to be chased if close fits are required. Slender cast studs that are threaded have reduced impact and bending strength, especially under shock load, because of the notch effect produced by the threads. Short studs may have a thread, but their length should not greatly exceed their diameter.

Speed nuts and clips are used to advantage on unthreaded studs and may well be considered where rapid application of fastenings is contemplated.

All studs should have a liberal fillet where they join the body of the casting proper. It is a good practice to allow 1/8-in. between the end of the thread and the base. When a full length thread is required or when the radius at the base of a stud interferes with a square edge in the hole of the mating part, the radius can be formed in a recess at the base of the stud.

Many studs cast integrally are used in place of separate rivets and are headed, spun over or struck with a staking tool to effect secure and permanent assemblies to the parts which are being mated.

Bosses: Tapped bosses are stronger than threaded studs because external threads cause a notch effect under shock loads. For this reason tapped bosses are always preferable, and sometimes as economical as threaded cast studs. However, precautions must be taken to allow tap and chip clearance beyond the last thread of the tapped hole, or a through hole must be provided. Holes to be tapped usually should be countersunk 1/32-in. larger than the thread for ease of tapping and assembly, especially when the hole is cored.

Threads: Cast threads should be specified wherever their use reduces cost over that for cut threads.

By following this rule, another unique advantage of the die casting process can be taken. There are, however, limitations governing the use of cast threads and there is no point in providing them when they cost more than cut threads. The latter is true of most internal threads as at B, Fig. 8, and they are never cast in alloys having higher melting point than the zinc alloys. Cast internal threads are occasionally useful for very steep pitches and, whatever the pitch, the thread can be carried right down to a shoulder or to the bottom of a blind hole. All holes requiring fine threads are tapped, and cast interior threads under 3/4-in. diameter are rarely economical.

Most external threads can be cast as at A and C, Fig. 8, and it is common practice to cast them when they are coarse and over 3/4-in. pitch diameter provided they are located at a die parting. Threads that come at a parting have a flash that is usually removed by the trimming die, but chasing is sometimes employed to produce a true thread.

All die castings can be tapped readily. Zinc alloy die castings can be cored to tapping size. It is wise to discuss the feasibility of forming threads by casting with the die casting engineer before deciding whether to cast or cut threads.

(To be continued next week)

Enameled Steel SEGMENTS

are developed for airport markers and commercial signs

IN the belief that permanent, easily seen and easily read signs or ground markers would be of great help to private plane pilots and airline passengers, the Market Development Division of Carnegie-Illinois Steel Corp., Pittsburgh, has designed a series of porcelain enameled steel segmented sections which can be assembled into letters, figures, or symbols, as desired. The segments also appear to have possibilities for commercial signs.

Civil Aeronautics Administration has investigated extensively the subject of marking for air travel and has made good progress with painted markers. However, it has not attempted as yet the development of permanent signs. Color recommendations call for black background and chrome yellow characters as most visible, or white characters for ground markers. With porcelain enamel, any color desired may be used.

As suggested by CAA, signs may designate a town's name, latitude and longitude, direction and distance to nearest airport, or identify a factory or important landmark, indicating route to airport. Location should be such as to provide good visibility from all angles at an elevation of 3000 ft. Air markings now may be installed anywhere in the United States except in a strip 150 miles inland along the West Coast, designated a restricted area by the Army and Navy.

Typical segments, letters and figures for signs made up according to the system devised by Carnegie-Illinois are illustrated. These enameled steel segments can be manufactured by any porcelain enamel plant and shipped in compact boxes, each containing segments for a letter or character, with detailed directions and the necessary screws and washers required for assembly.

The finished product is bright in color, weatherproof, fireproof, sturdy and permanent. Temperature variations will not affect modern porcelain enamels, nor are they likely to chip or scratch. They are stainproof and moistureproof, and are easily kept clean by occasional washing with soap and water. The high reflective value of such a surface makes it ideal for use as a marker, particularly when it is illuminated as an aid in night navigation.

Height of letters, sizes, colors, shapes and widths of strokes in the proposed segmental porcelain enamel markers conform to CAA suggested standards presented in the authority's book "Air Marking". Assembly is simple. Three, four or six ¼-in. diameter holes are punched in the corners of each segment before enameling. Segments are attached to a roof by means of screws inserted through lead or cup washers, thence through hole in segment, through mastic felt washer or pad, and on into the roof. Investigation indicates that these aero signs will be comparable in cost with temporary painted signs, when all factors are considered.

A BIG Brake for Large Motors

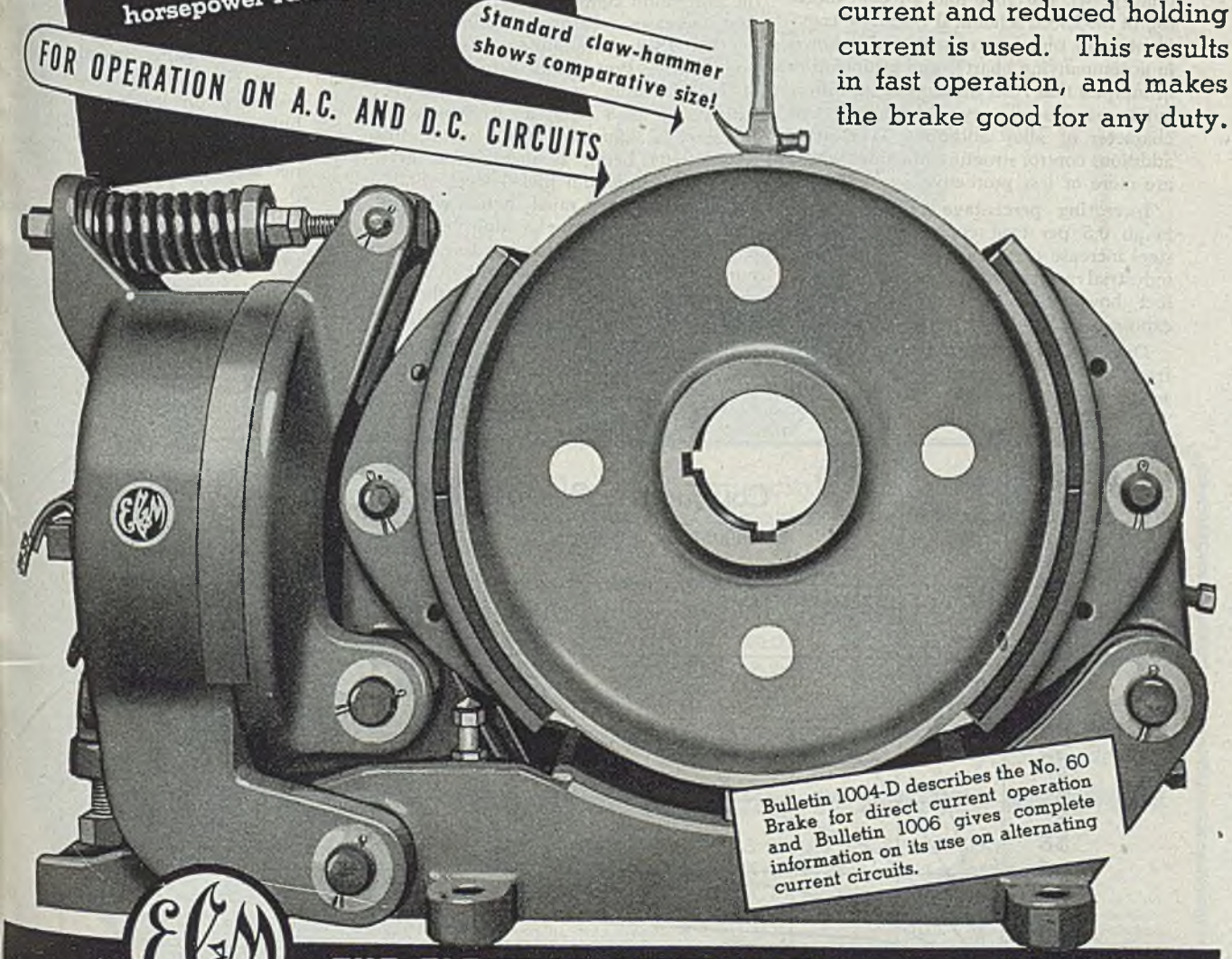
THE NEW EC&M NO. 60 WB BRAKE Rated At 7200 lbs./ft.

For ore unloaders . . . blast furnace skip hoists . . . mine hoists . . . and similar installations using motors of large horsepower rating.

FOR OPERATION ON A.C. AND D.C. CIRCUITS

This No. 60 Type WB Brake is designed for large motor applications where high torque is required to stop and hold the load. Its construction includes features such as—(1) a welded steel frame, (2) super-oilite, self-lubricating bearings, (3) case-hardened steel bearing pins, (4) moulded brake blocks, ¾" thick, which wear down slowly.

The direct current No. 60 Brake is furnished as standard with shunt-wound operating coil and protective resistor. For high speed operation giving fast release and quick set, an automatic relay to allow high releasing current and reduced holding current is used. This results in fast operation, and makes the brake good for any duty.



Bulletin 1004-D describes the No. 60 Brake for direct current operation and Bulletin 1006 gives complete information on its use on alternating current circuits.

THE ELECTRIC CONTROLLER & MFG CO.

2698 E. 79th ST. ★ CLEVELAND 4. OHIO

Comparative CORROSION RESISTANCE

Of Steels in Marine Atmospheres and in Sea Water

STUDY of experiments conducted by the British Iron and Steel Institute, and of other unpublished data, indicates that the sulphur dioxide contaminated atmosphere at industrial locations has caused more corrosion of metals than the sea salt deposited on specimens at any marine site.

Results of tests at Kearny, N. J., where the United States Steel Corp. Research Laboratory is located, in atmosphere essentially industrial although close to Newark Bay, have been compared with results of experiments in marine atmosphere at Kure Beach, N. C., by C. P. Larrabee of Carnegie-Illinois Steel Corp's laboratory. Mr. Larrabee told a recent meeting of the Electrochemical Society it is evident from time-corrosion curves (shown in accompanying chart) and examination of samples that rusts developing on different types of steel vary with amount and character of alloy additions. The alloy additions control structure of oxides which are more or less protective.

Increasing percentage of phosphorus in an 0.5 per cent copper open hearth steel increase corrosion resistance in both industrial and marine atmospheres. Effect, however, is not as great in marine exposure.

Duration of total protection derived from use of zinc coating on steel depends upon amount of coating and the atmospheric conditions. Near the ocean, and in absence of sulphur dioxide, a white coating appears on zinc, which under certain conditions is protective. There also is evidence that the intermediate iron-zinc layer is more resistant to salt than is zinc, according to Mr. Larrabee.

In rural and clean semi-industrial atmospheres, stainless steels remain untarnished for many years. After long exposure in severe industrial atmospheres, they become covered with a tarry soot, but any actual attack is of a very minor nature.

Based on exposure tests near water at Kure Beach, it appears that increasing the chromium content from 12 to 17 per cent, increases corrosion resistance slightly. The 18-8 chromium steel is attacked but slightly. Presence of 2 to 3 per cent of molybdenum greatly improves resistance of 18-8 steel, as it does when the steel is immersed in sea water, this type (316) being as resistant as even the 25-20 chromium nickel steel. Stainless steels perform much better when in contact with sea water at high velocities, e. g., over 5 ft per sec, as in the case of pump impellers in fairly continuous operation, and of tubes and piping through which sea water flows continuously at high velocity.

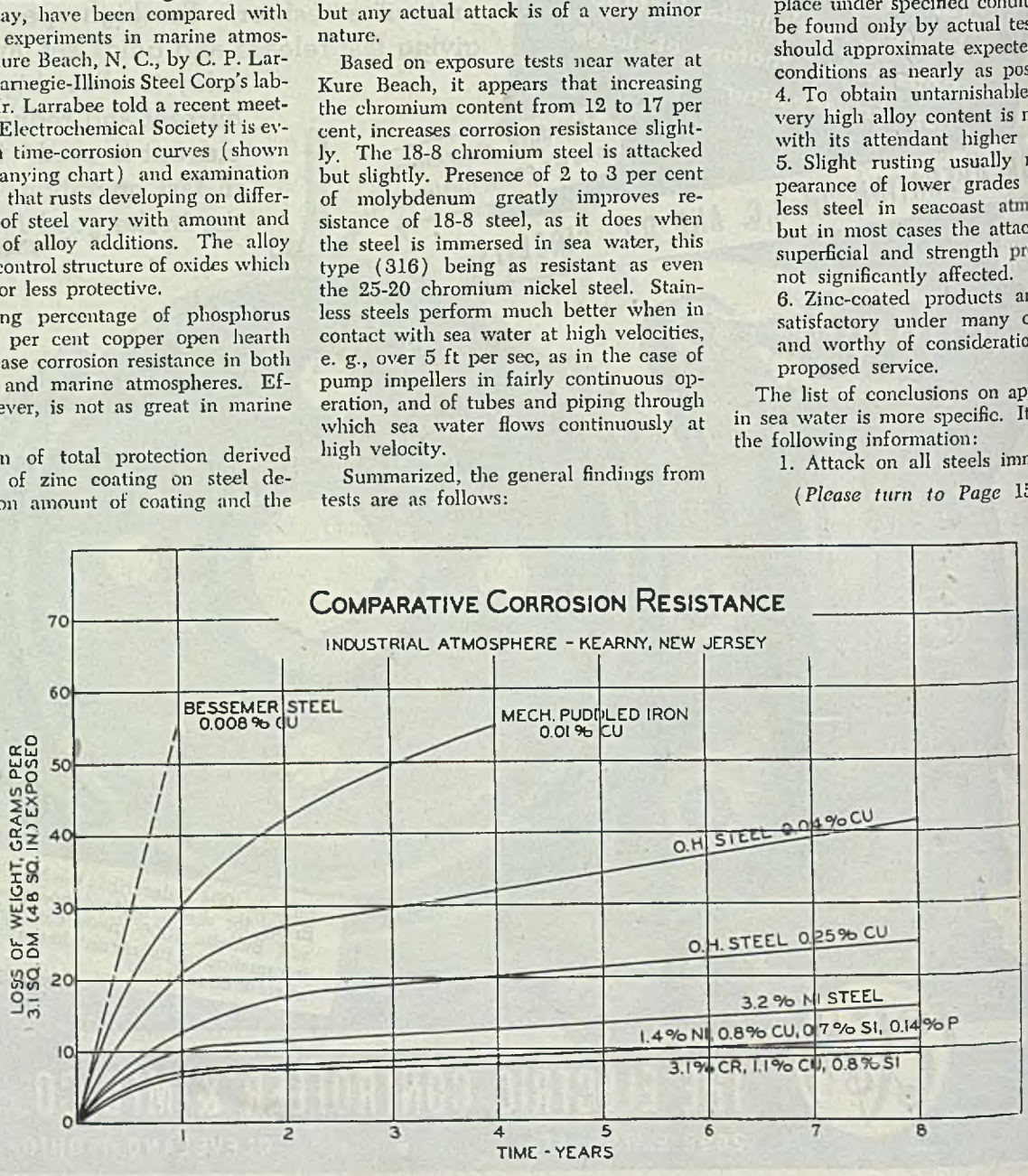
Summarized, the general findings from tests are as follows:

1. Under representative test conditions, and at any given locat... corrosion rate of an unprotecte... steel is dependent on compositions
2. Low-alloy high-strength steel... with superior corrosion resistance... in industrial atmospheres, also ar... more resistant in marine atmo... spheres, but to varying extents.
3. Exact degree of superiority ... any alloy over a plain steel, with re... pect to corrosion resistance at an... place under specified conditions, ca... be found only by actual tests whi... should approximate expected servi... conditions as nearly as possible.
4. To obtain untarnishable steel, ... very high alloy content is necessar... with its attendant higher costs.
5. Slight rusting usually mars t... pearance of lower grades of sta... less steel in seacoast atmosphere... but in most cases the attack is ex... superficial and strength probably ... not significantly affected.
6. Zinc-coated products are high... satisfactory under many conditio... and worthy of consideration in a... proposed service.

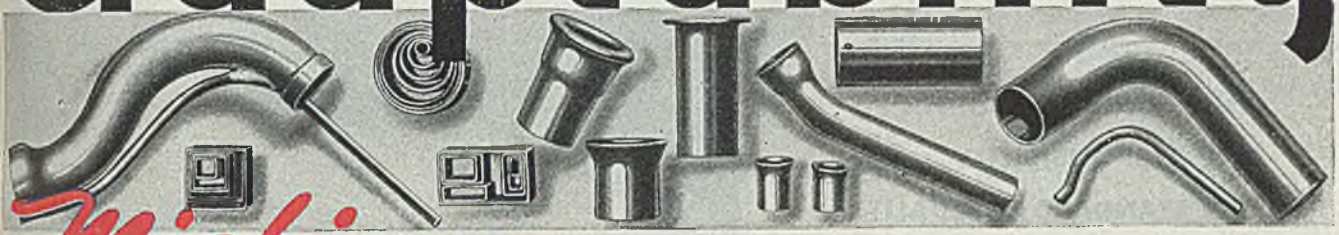
The list of conclusions on applicatio... in sea water is more specific. It include... the following information:

1. Attack on all steels immersed ...

(*Please turn to Page* 157)



Adaptability



Michigan Welded Steel Tubing

SIZES: ¼" to 4" O.D.
GAUGES: 9 to 22

Available in commercial mill lengths or cut to specified lengths, shaped and fabricated ready for assembly.

Michigan welded steel tube can be flanged, expanded, cold drawn, fluted, flattened, bent, coiled, upset, beaded, grooved, rolled, spun, threaded, tapered, and shaped to meet every manufacturing demand.

Engineering advice and technical help in the selection of tubing best suited to meet your needs.

Michigan STEEL TUBE PRODUCTS COMPANY

MORE THAN 25 YEARS IN THE BUSINESS

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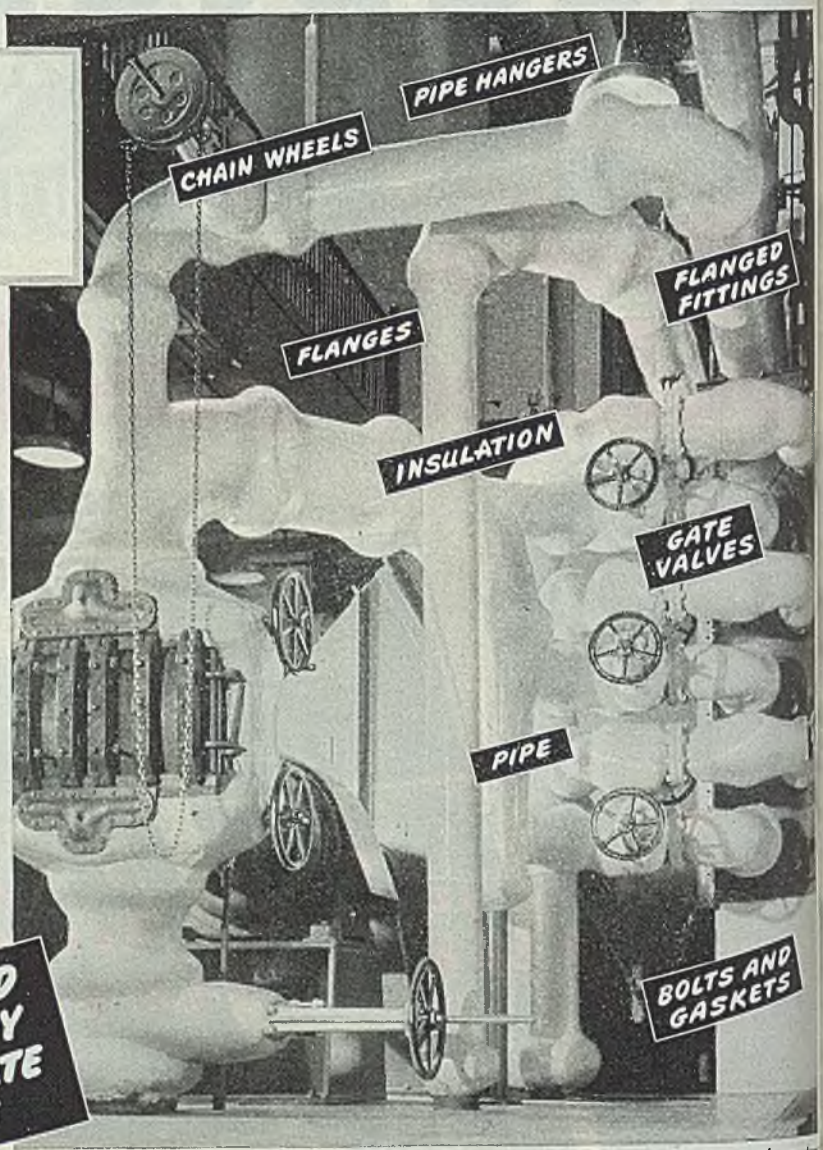
DISTRIBUTORS: Steel Sales Corp., Detroit, Chicago, St. Louis, Milwaukee and Minneapolis—Miller Steel Co., Inc., Hillside, N. J.—C. L. Hyland, Dayton, Ohio—Dirks & Company, Portland, Oregon—James J. Shannon, Milton, Mass.—Service Steel Co., Los Angeles, Calif.—American Tubular & Steel Products Co., Pittsburgh, Pa.—Strong, Carlisle & Hammond Co., Cleveland, Ohio—C. A. Russell, Inc., Houston, Texas—Drummond, McCall & Co., Ltd., Toronto, Canada.

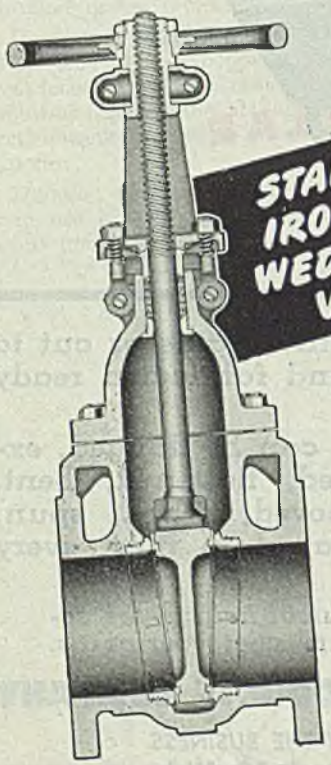
How the Complete CRANE Line Simplifies Piping Replacement Work

ONE SOURCE OF SUPPLY
ONE RESPONSIBILITY
ONE STANDARD OF QUALITY

The unusual completeness of the Crane line is of distinct advantage in "converting" piping systems. See the service recommendations below for Standard Iron Body Gate Valves. Here's a typical Crane solution to many deferred valve replacements. Your Crane Branch or Wholesaler supplies all your piping requirements from the world's greatest selection in brass, iron, and steel equipment. One standard of quality in all materials and one responsibility for them help insure the best installations. Crane Co.'s 90-year manufacturing experience insures long-lasting dependability.



Water piping to air cooler



STANDARD IRON BODY WEDGE GATE VALVES

SERVICE RECOMMENDATIONS: **Crane Standard Iron Body Wedge Gate Valves** are suited for many services in factories and power plants, at all working pressures up to 125 pounds steam. Brass trimmed valves are recommended for steam, water or oil lines; all-iron valves for oil, gas or fluids that corrode brass but not iron. Made in O.S.&Y. and Non-Rising Stem patterns. See page 101 of your Crane Catalog.

Working Pressures

Size of Valve	Screwed or Flanged End Valves		Hub End Valves
	Saturated Steam	Cold Water, Oil or Gas, Non-Shock	Cold Water or Gas Non-Shock
2 to 12 in.	125 pounds	200 pounds	200 pounds
14 and 16 in.	125 pounds	150 pounds	150 pounds
18 to 24 in.	*	150 pounds	150 pounds

*For steam lines larger than 16-in., Crane 150-Pound Cast Steel Gate Valves are recommended. (For sizes under 2-in., use Crane Clamp Gate Valves.)

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CRANE

VALVES · FITTINGS · PIPE
PLUMBING · HEATING · PUMPS

English Blast Furnacemen Study

CARBON BRICK for HEARTH LINING

Investigation of carbon brick for lining blast furnace hearths stresses the importance of accuracy of shape and size. Use of preformed carbon for lining iron and slag runners holds promise. Patching hearth lining with carbon brick eliminates breakouts at that area

FREQUENCY of blast furnace breakouts at Appleby-Frodingham Steel Co. Ltd., Scunthorpe, Lincolnshire, England, and in particular the breakout on No. 9 furnace led to the conclusion that a hearth brick must be developed that would stand up to slag and metal better than even the best 42 per cent alumina refractories.

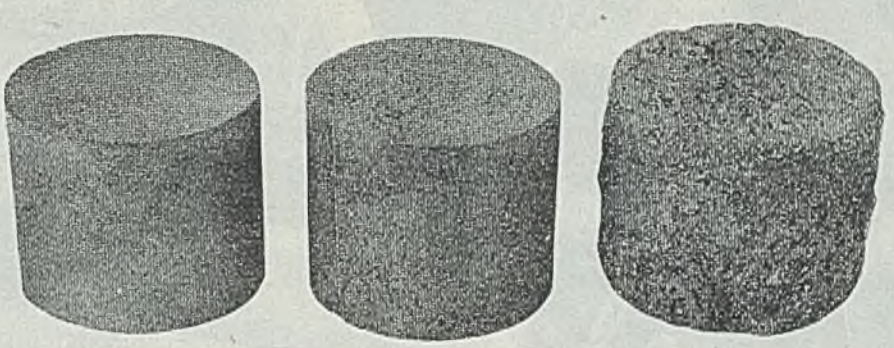
Work was in hand during the spring of 1941 on improved methods of preparing coke-tar ramming material for use in slag and metal runners. This material also had been employed as a packing between the firebrick lining of the hearth and the water-cooled steel jacket. The object of its use in this position was to provide a cushion between the bricks and the casing and, in addition, a last line of defense against molten metal. In the course of this work it was noted that the properties of the fired test-pieces were usually better than the best figures given for German and Russian carbon bricks.

It was felt that a further development of this work offered the best chance of solving the breakout problem, and Messrs. Thos. Marshall & Co. (Loxley), Ltd. and Morgan Crucible Co., Ltd. were asked to co-operate in working out detailed methods of brick production. The results obtained were most encouraging, and so a plant was designed to produce carbon bricks. This has now been built, and the first carbon-brick hearth linings to be made in Great Britain are now available.

Certain tentative specifications were agreed upon—for example, that the bricks should have a bulk density of at least 1.35 grams per cubic centimeter and a crushing strength of at least 3000 psi. These have been easily met, as will be seen from the accompanying table, the properties given being considered at least equal to those of any carbon brick available. The bulk density is about 1.50 grams per cubic centimeter, the porosity less than 25 per cent, the permeability about 0.04 units, and the cold crushing strength over 5000 psi. Even better figures have been obtained, but the foregoing are considered typical of what may be expected from bulk deliveries.

Particular attention has been paid to the question of accuracy of shape and size. Fortunately, the firing shrinkage is low; this, and the peculiar suitability of the batch for molding, make the problem of accuracy far less than that for fireclay. Even so, great variations in finish occur with different manufacturing methods, a point which is well illustrated by the photographs of experimental batches shown in the accompanying illustration. Grinding of the fired blocks, a normal procedure on the Continent, perhaps will be completely unnecessary.

Fundamental studies on the graphitization during firing also have been made. X-ray studies have provided interesting data, but more quantitative results have been obtained from electrical conductivity measurements. Thus it is found that an unfired brick has a resistivity of about 1 ohm per centimeter cube, bricks fired at 600° C a resistivity of 0.050-ohm, and the fully fired product a resistivity of only 0.006 to 0.007-ohm per centimeter cube. All bricks are fired to a standard schedule, although slight variations in the firing temperature have a relatively small effect on the final properties.



Carbon brick test pieces showing marked improvement in finish obtained by proper grading and firing. Sample at left has excellent finish as drawn from kiln. One at right requires regrinding

Research is also in hand on the reaction between carbon and other refractories. This is of interest, not only because carbon bricks will be used in contact with fireclay bricks, but also because it is possible that even better results may be obtained with carbonaceous cements if oxides are included that can react to form refractory compounds, e. g., silicon carbide.

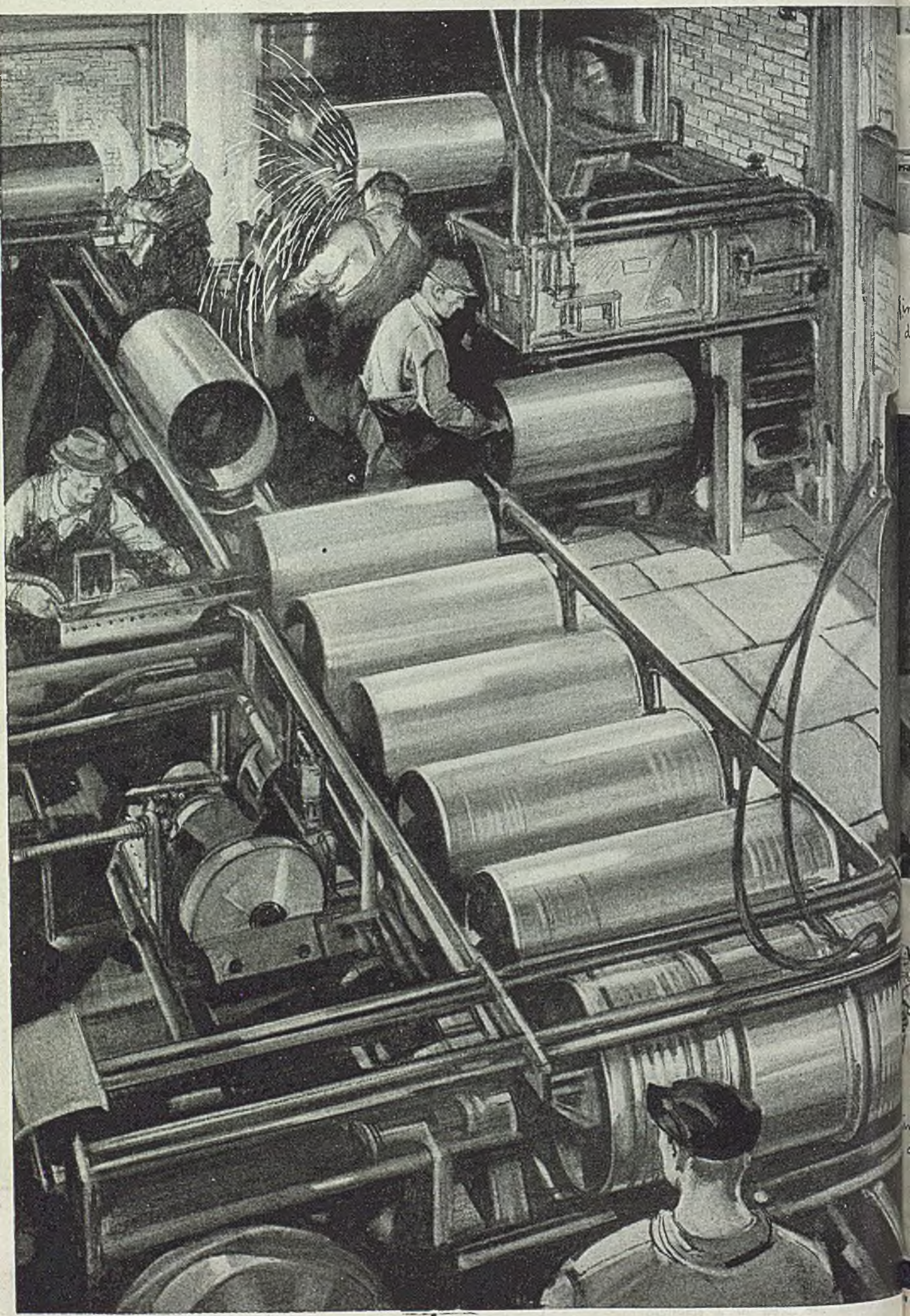
Interesting results were obtained in laboratory tests on carbonaceous cements by jointing together 2-in. cubes of carbon brick with a layer of cement about 1/8-in. thick. The electrical conductivity across the joint and also the shearing strength then were measured after various firing treatments. When the temperature was sufficient to promote good graphitization, the electrical conductivity increased almost to that of a 2 x 2 x 4-in. block.

Runner Trials. Experimental use of preformed carbon as a blast-furnace runner lining has been attended with a large amount of success, and it is believed that carbon can be used for the purpose with advantage. The only danger in using carbon is that the bricks may burn, and this can only take place to any extent in the few minutes when the bricks are cooling down after the iron or slag has ceased to flow over them. This burning can be almost entirely eliminated by brushing the bricks with a clay wash immediately after the iron has ceased to flow. This clay wash forms a thin protective coating on the bricks and prevents oxidation. The use of clay-washed cast-iron troughs for runners never has been successful, as it has been found impossible to get an ad-

PROPERTIES OF CARBON BRICKS

Source of Data:	British	German[1]	Russian[2]
Apparent porosity, per cent	21.8	30-32	25-30
Bulk density, g. per cc.	1.50	1.35	1.35-1.50
Apparent specific gravity	1.92	.....	1.9-2.1
Cold crushing strength, psi	5110	2700-4500	2700-3750
Permeability (perpendicular to 9 x 3-in. face through one skin). C.g.s. units	0.044	.....	.....
Refractoriness-under-load (rising) temp. test, 50 psi	No deformation at 1710° C.	.....	.....
Spalling resistance index	30	.....	.....
Thermal expansion (20-1000° C.) %	0.65	0.58	.....
Electrical resistivity. Ohms per cm. cube	6.9×10^{-3}	.....	.....
Thermal conductivity (350° C. mean temp.). Btu	15.7	.....	.....

[1] Singer: *Metals and Alloys*, 1939, vol. 10, April, p. 104.
[2] Uralow and Bereshnoj: *Ukr. Inst. Ogneup. Kislotoup, Kharkov*, 1934, No. 81.



...g welding burrs
...rum shell seam

...g heads to shell
...steel drum

STEEL DRUMS FOR WAR WILL SERVE PEACE, TOO

The conversion of steel sheets into sturdy drums for the safe, economical packaging and shipment of vital replacement parts and an ever-increasing variety of manufactured products other than the familiar liquids — gasoline, oil, chemicals — is another of those serviceable applications of this most versatile of our metals that has contributed mightily to the winning of the war and that holds such useful promise in the peaceful world before us.

Skilled men manning machines of ingenious design carry this operation through from flat steel sheets to finished drums at a pace that would make the old-time cooper blink with amazement. By the millions, steel drums, barrels, other containers come off the lines of the J&L Steel Barrel Company and other barrel plants. Here is production of handmade quality with machine speed; the steady rhythm of progress that is a symbol of American ingenuity and enterprise.

JONES & LAUGHLIN STEEL CORPORATION
J & L STEEL BARREL COMPANY
PITTSBURGH, PENNSYLVANIA
CONTROLLED QUALITY STEEL FOR WAR AND PEACE

J&L STEEL

ORIGINAL DRAWING AND SKETCHES MADE AT J&L STEEL BARREL PLANT AT BAYONNE, N. J. BY ORISON MACPHERSON

WAR DRUMS

"Canning" airplane engines for shipment is becoming commonplace practice. Starters, generators, instruments and cylinders are among the items now packed with desiccants in hermetically sealed steel drums to afford complete protection against breakage, dust and moisture during shipment by sea or air, or storage in transit. This new technique, developed by J&L Steel Barrel Company with Air Technical Service Command, has become of increasing military importance, now that total war has moved into the salt-laden humidity and heat of the Pacific climate, which, overnight, breeds sporadic growths of fungi and mildews.

Other "canned" war items for which J&L Steel Barrel Company has made special containers are bagged powder, smoke pots, 75mm. shells. The barrel company also developed a large, smokeless powder box and produced them in quantity. Bomb fins and bomb fin crates are other war products of J & L barrel plants in addition to their regular line of products.

Mortar shell program was speeded by J&L Steel Barrel Company's development of new mass production precision technique for making base discs for 4.2-inch mortar shells, at half cost of handmade discs.

Army chapel seats, oil drums with planks laid across them, in a tent, held many personnel on the European Front, until the boys built a church with salvaged materials, wrote Maj. J. H. Cook to LIFE magazine.

Empty drums for GI bathtubs are popular in S. Pacific, also for heating stoves and, locked end to end, as storm culverts.

How to retain glycerine, which has a genius for seeping out of tightest coopered wooden barrel, was answered about 1906 by appearance in Europe of a steel barrel built along bulgy lines of familiar wooden barrel. American petroleum industry, with products having a highly seepy nature, was quick to adopt new container. But the bulge or "bilge" shaped barrel soon had a formidable rival, the drum type barrel, with straight sides, embossed hoops, to strengthen and make rolling easier.

Demand for "one-trippers," or containers that need not be returned, opened wide a door to endless new uses for the light-weight, inexpensive steel drum, as the bilge type steel barrel must be made of heavy steel to maintain its barrel-like contours.

Barrels from strip mills, as well as from forests, from steel barrel plants, as well as from cooperage shops is the course barrels have traversed in 40 years. Today barrels made of steel sheets are produced with special presses and machinery (see illustration), as against the method of skilled coopers, building each barrel by hand. J&L Steel Barrel Company has plants of most modern type in Bayonne, Cleveland, Kansas City, Lake Charles, New Orleans, Philadelphia, Port Arthur, St. Louis.

herent clay wash. As much as 40,000 tons of iron has passed over carbon runners without the runners having any attention beyond the clay washing. At the end of all the tests carried out, less than half of the brick had been worn away—the carbon always has had to be taken out because of trouble in the adjoining lengths of clay or sand runner.

The advantages of using carbon as a runner lining are obvious. If the use of sand in runners can be avoided or considerably reduced, a cleaner iron will be delivered to the melting shop. The amount of cleaning up after the cast is correspondingly larger in sand runners.

This low scrap production is largely due to the peculiar nonwetting properties of carbon. With normally good basic iron and an average amount of fall on the runner, no scrap is left except for a few beads of metal which can be brushed off. Iron draining from a carbon runner is exactly like mercury draining from a sloping desk. If the iron is cold and of high sulphur content, a skull does form in the runner, but it is always loose.

Sand is the usual runner lining and from most viewpoints is an undesirable material. If the use of sand can be reduced or largely eliminated, the iron will be cleaner, there will be less work for the furnacemen and it will be easier to keep the plant tidy. It is also probable that the substitution of carbon for sand will save money.

What has been said with regard to iron runners applies equally to slag runners. When it is realized that most of the sand used in runners finds its way into the slag and metal ladles, there is considerable advantage to be gained by dispensing with sand.

Hearth Trials. Carbon bricks have been used to patch furnaces. On No. 9 furnace, which had broken out, the patch replaced the original bricks; on furnace No. 10, the patch was applied on the outside of the casing before the breakout had occurred, at a point where the metal was known to be dangerously close to the case. Both repairs have been in service for nearly 2 years without any trouble having been experienced. In view of the severity of the conditions and the fact that on the No. 10 furnace the metal is known to have passed through the hearth jacket into the patch and then stopped, the results are considered most encouraging, and it has been decided to install a carbon-brick hearth in the next relining of the South Works furnaces.

Germany has comparatively poor refractory clays, and there are recorded instances of some disastrous hearth breakouts at plants formerly in operation there. In 1939 over 70 per cent of German pig iron was made in carbon hearths, presumably because the fireclay refractories available were not good enough. Russian practice also tends towards the use of carbon hearths.

Among the British firms known to have suffered from breakouts, it may be significant that most are producing a phosphoric iron. This grade of iron forms only a small percentage of the total iron produced in the United States, but it represents almost all the iron produced in Germany. It is believed that the phosphorus content of the iron is an important factor in breakouts.

From a special report No. 30, "Ironmaking at the Appleby-Frodingham Works of the United Steel Companies, Ltd.", Iron and Steel Institute, 4 Grosvenor Gardens, London, S.W.1.

—o—

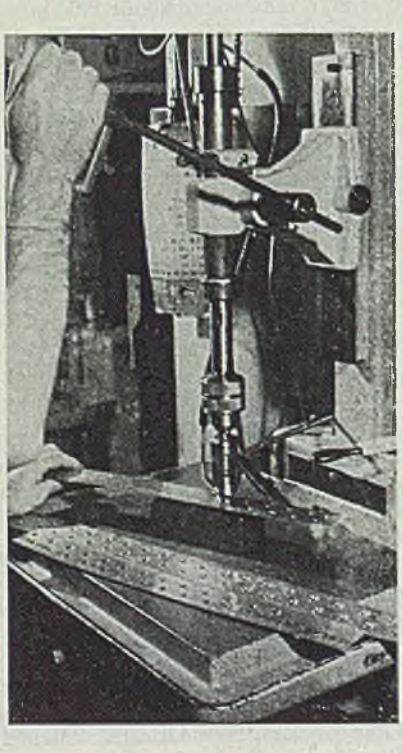
The value of soap-and-water cleanliness in preventing and controlling cutting oil dermatitis in industry is reaffirmed by the British dermatologist, E. Collier, in the *British Journal of Industrial Medicine* (1:110, 1944). He reports that the commonest type of oil dermatitis seen by him during a 3-yr period has been oil acne caused by lard oil or by lard oil plus paraffin oil. The best treatment of such dermatitis, he states, is soap-and-water washing and application of 1 per cent gentian violet.

Dimpling Sheet Metal

Tool fitting standard drill press forms dimple by spinning metal rather than pressing it into shape, with exact centering insured by tip fitting inside diameter of rivet hole

DIMPLING of hard and brittle sheet metals such as Reynolds 301-T, Alcoa 75-ST and the new lightweight magnesium alloys, thus extending their range of usefulness to the aircraft industry, is made possible by a new tool. This tool is known as the Martin Spin Dimpler and was developed by Hermann E. Veit of the engineering department of Glenn L. Martin Co., Baltimore. He is known for his pressure pad dimpling tool for 24-ST and softer alloys.

The new tool is used in a standard drill press and forms the dimple by spinning the metal rather than by pressing it into shape. In experimental use at the company's plants, perfect dimples have been formed in both 75-ST and R-301-T in from 2 to 5 sec per dimple and also in cold AMC-52-SH in from 5 to 9 sec per dimple. The same tool was used for both aluminum and magnesium alloys, but a lubricant was used with the former and omitted with the latter.

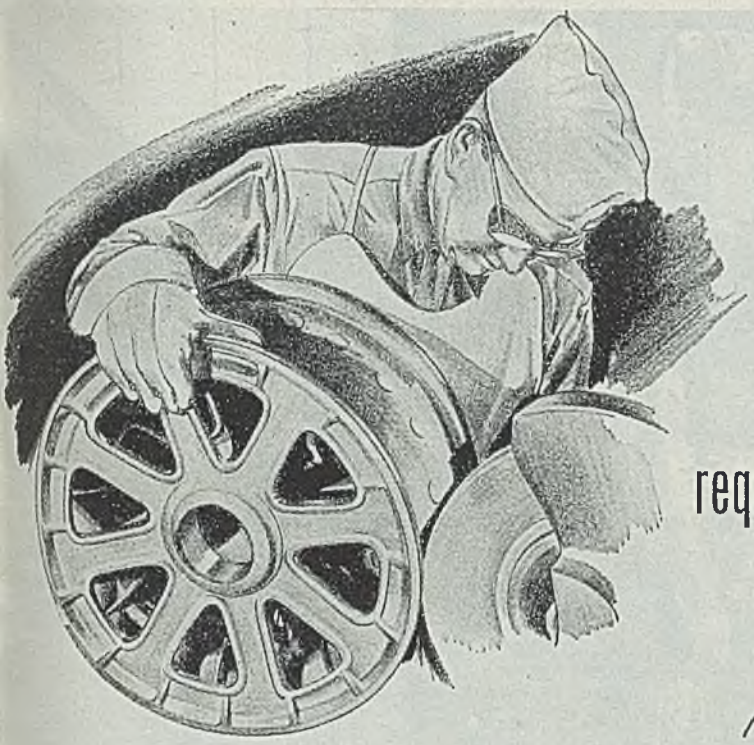


The spin dimpler consists of four main parts: A female die, similar to that used with a pressure pad dimpler, into which the metal is spun; a male spinning tool; a trimmer cutting edge to remove any metal which extruded upward during the forming of the dimple and tool; and a pressure pad assembly for holding the sheet in place during dimpling. The spinning tool, itself, has several projections which are rounded off to eliminate machining of the metal from the inside of the dimple. To permit easy replacement, it screws into the pressure pad assembly shaft.

In operation, the spin dimpler has been used on a single spindle Allen drill press, as shown in the accompanying illustration, but is equally adaptable to any drill press capable of supplying 1500 rpm rotation, and presents no undue problems for the unskilled or semi-skilled worker. Exact centering of the dimple is assured by a tip on the spinning tool exactly fitting the inside diameter of the rivet hole.

Dimples formed by the spin dimpler feature a sharp edge similar to a machine countersink, leaving no void around the rivet head as in the case of the ordinary pressed dimple. Despite the fact that the cladding of the sheet is partially removed by the trimming edge, comprehensive laboratory tests have demonstrated that the spun dimple resists corrosion as well as a machine countersunk hole.

The spin dimpler has been used at Glenn L. Martin Co. to form 100-degree dimples for 3/32, 1/8, 5/32 and 3/16-in. diameter rivets used in both aluminum and magnesium alloys varying from 0.020 to 0.064-in. in thickness. In the case of aluminum, Tycol-655 was used as a lubricant.



Fabricating magnesium —like other metals— requires only simple precautions

Good housekeeping— plus established magnesium shop practices— keeps production moving

Getting best results in magnesium fabrication has been a highly productive Dow research program for a good many years. Not only in Dow's own complete shops, but also in the many other plants that use magnesium as a standard production metal, operations are speeded by following simple, well-defined shop procedures.

This largely involves "good housekeeping"—the type of plant practice that modern manufacturers observe as a matter of course: machines and floors should be kept reasonably clean; sensible clothing should be worn; approved fire extinguishers should be kept on hand.

Beyond that, specific techniques—quite similar to those used with other metals—expedite the manufacture of magnesium products in the full variety of common fabrication methods.

These procedures . . . as they apply to magnesium fabrication in your own shop . . . are available to you from Dow technicians thoroughly versed in the field. Call the nearest Dow office for consultation.

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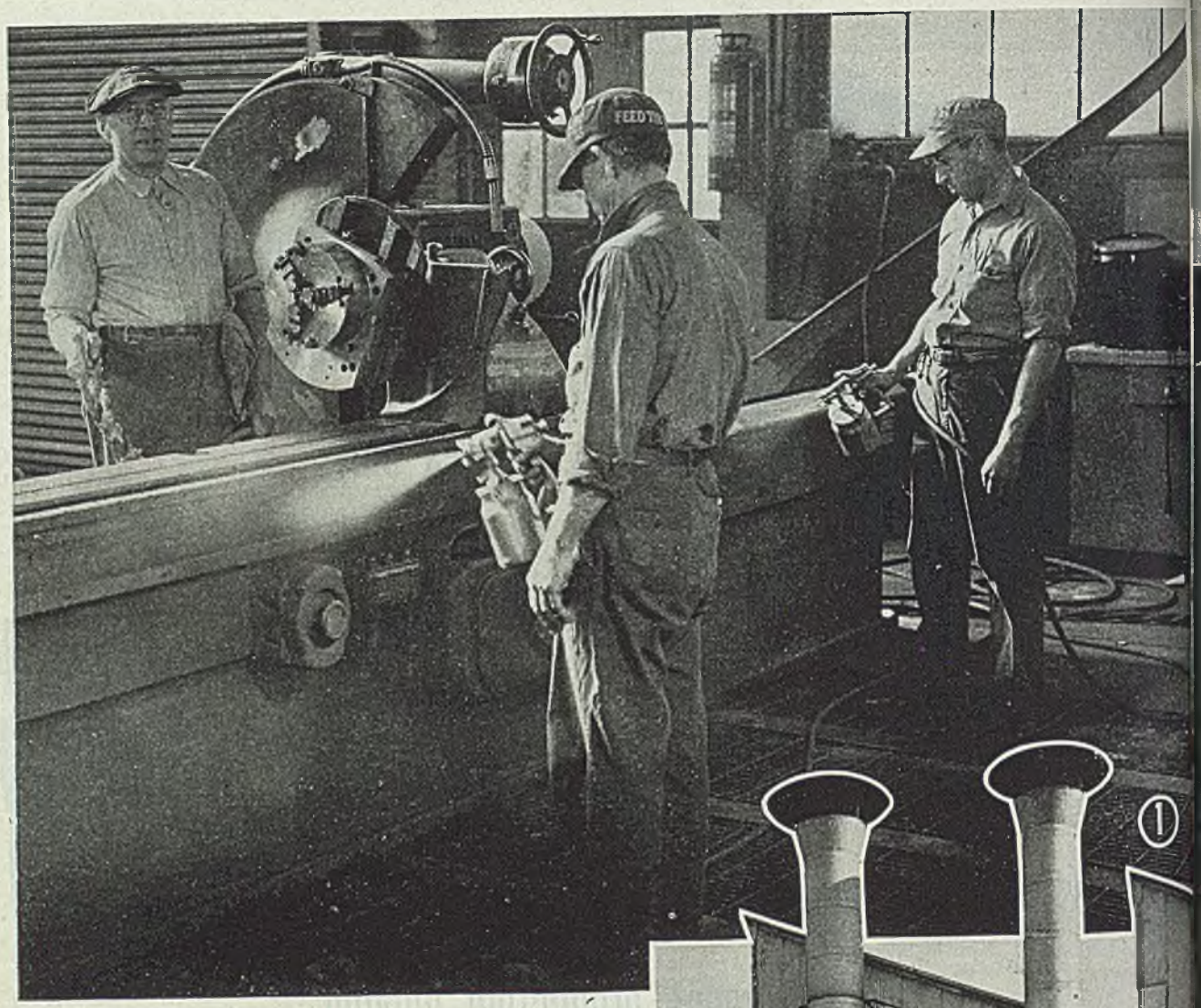
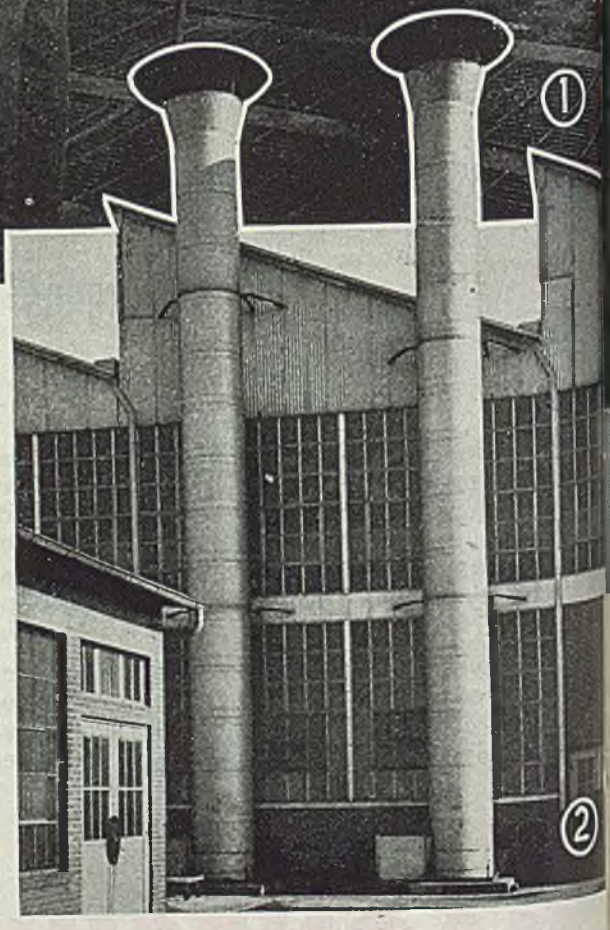




Finishing MACHINE TOOLS

APPLICATION of paint and lacquer finishes to metal products has always presented a problem because of fire and health hazards arising from excess spray. The problem has been attacked in several ways over a period of years, including the use of enclosed spray booths, water curtains and the electrostatic method introduced recently.

For the Landis Tool Co., Waynesboro, Pa., a number of special considerations were involved when it built a new plant addition at the outset of the war, since the items requiring finishing range all the way from large grinders to small covers and panels for machines. In addition, it was desirable, to locate the finishing department at the end of the assembly line and close to the shipping platform without interfering with craneways needed for handling heavy machines. Landis engineers finally decided to install a downdraft exhaust system which adequately meets these conditions, plus elimination of fire and health hazards.

Spray operations are conducted over a grilled opening in the

Fig. 1—Landis Tool Co. applies "splatter" finishes to small items as well as large machines over this grating. Excess spray is pulled downward by air exhaust system. Note operators wear no masks

Fig. 2—One exhaust stack serves each of the two units. Fans are located at the base of the stacks

"WHEN YOU PUT IT ON A *Milwaukee*"

YOU KNOW IT WILL BE MILLED WITH SPEED, PRECISION, PROFIT

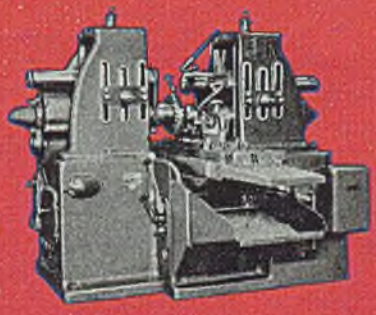
The straddle milling operation on this 1236 Milwaukee Duplex Milling Machine requires flexibility in spindle positioning because the milling cuts are at different levels. . . . Independent spindle speeds are necessary because the job required the use of two diameters of cutters. . . . "Anchoring" the spindle quill with the quill support mounted on the overarms, insures vibration-free operation in either "out" or "in" position.

KNOWN as "production type" machines the Milwaukee Duplex series of milling machines offer important advantages:

— automatic trip table mechanism provides for continuous cycles of table movement.

— adjustable nut for *climb milling* eliminates backlash in the table feed screw. This feature permits machining a workpiece ordinarily difficult to hold for milling operations — results in increased feeds, improved finishes — anchored quill construction securely supports the quill behind the spindle nose in all positions.

These features plus the compact rigidity and sturdiness designed and built into the machine assure fast, precision production at less cost. Write for new Bulletin No. B20, giving complete details on the Milwaukee Duplex and Simplex Series of Milling Machines.



1800 Series Milwaukee Duplex Milling Machine

ARMY (E) NAVY

KEARNEY & TRECKER CORPORATION

MILWAUKEE 14, WISCONSIN

Milwaukee Machine Tools

floor, as shown in Fig. 1. Machines are positioned directly on the grating and small parts are placed on stools for the convenience of the operators. The downdraft installation comprises two closely adjacent but separate units which may be operated singly or simultaneously. Each unit has a 9 x 12 ft open spraying area. Air is exhausted through each unit at the rate of 22,400 cfm at a velocity of approximately 220 fpm. The lacquer-laden air is cleaned by the water-wash method which prevents discharge of residues outside the building.

The cross-sectional diagram of one of the units shown in Fig. 4 provides a more accurate description of the construction of the system. The air is drawn directly downward through the grating, through the water screen and out the exhaust stacks outside the building (Fig. 2). The exhaust fans are located at the base of the stacks, being V-belt driven by 230 v, dc, 1750 rpm, 5 hp motors. The stacks are 42 in. in diameter.

Water is supplied to the water screen in each unit by a 230 v, dc, 3500 rpm, 5 hp motor driven pump delivering 144 gpm at an 80 ft head. The water is pumped from the pit to the screen and the entrapped lacquer and paint sludge is carried back to the pit. The pumps are equipped with brass impellers, stainless steel shafts and flexible couplings.

The photograph, Fig. 3 was taken with one of the gratings removed and shows the flood of water carrying residue down the inclined concrete apron into the pit from which accumulations are removed about three times a year. The installation was designed by the DeVilbiss Co., Toledo, O.

Under wartime restrictions, Landis is obtaining a satisfactory finish for its machine tools by applying a "splatter" finish developed by Lowe Brothers Paint Co., Cincinnati. This finish is made by thinning filler with lacquer-thinner. A spray gun nozzle is used which applies the mixture in small particles. After drying, a coating of machine-gray lacquer is applied. Of course, all moving parts, such as ways, are carefully masked before the finish is applied.

With this finish method, small irregularities which are unavoidable in cast iron machine bases are filled and the machines are given an overall pleasing appearance.

As can be readily appreciated, production in the average machine tool plant is not likely to create conditions requiring a continuous painting operation. It takes a long time to build machines which can be spray finished in a few minutes. Thus, there is another advantage in that the unit is out of the way, and when inactive, frees floor space for other operations. When the downdraft system is not being used in conjunction with painting, grinding and other dust and vapor-producing operations can be brought to the location. Throwing an electric switch is all that is needed to make the exhaust system function. When that operation has been completed, machine is moved to its next station and the area again is free for any purpose desired.

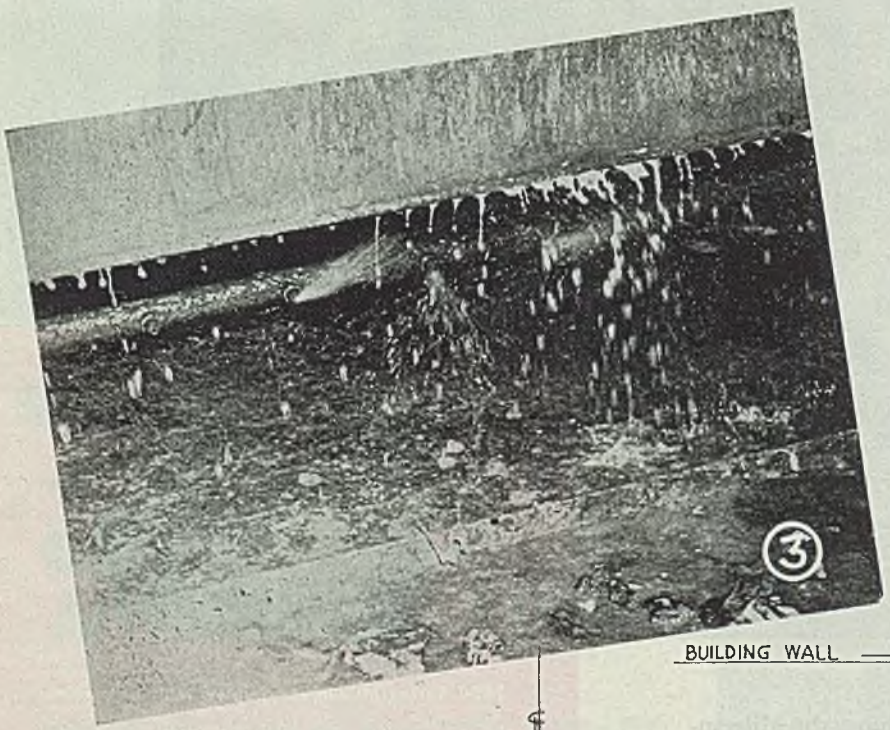
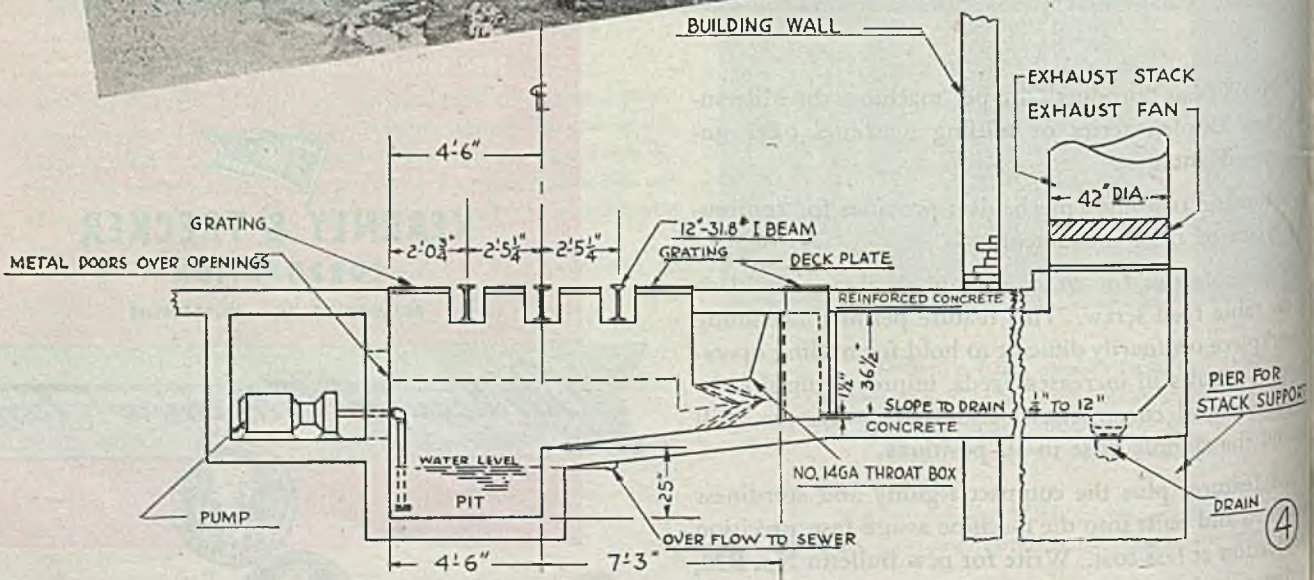


Fig. 3—This view through an open grating shows excess spray being removed by a water screen and flushed down an inclined apron into the water pit. Pit is cleaned three times a year

Fig. 4—This cross-sectional diagram shows how the Landis downdraft spray-finishing system functions. Lacquer-laden mist is pulled downward by strong air blast through a water screen which removes sludge. Clean air is exhausted outside the building. Sludge is trapped in the pit



Full production will need full power . . .

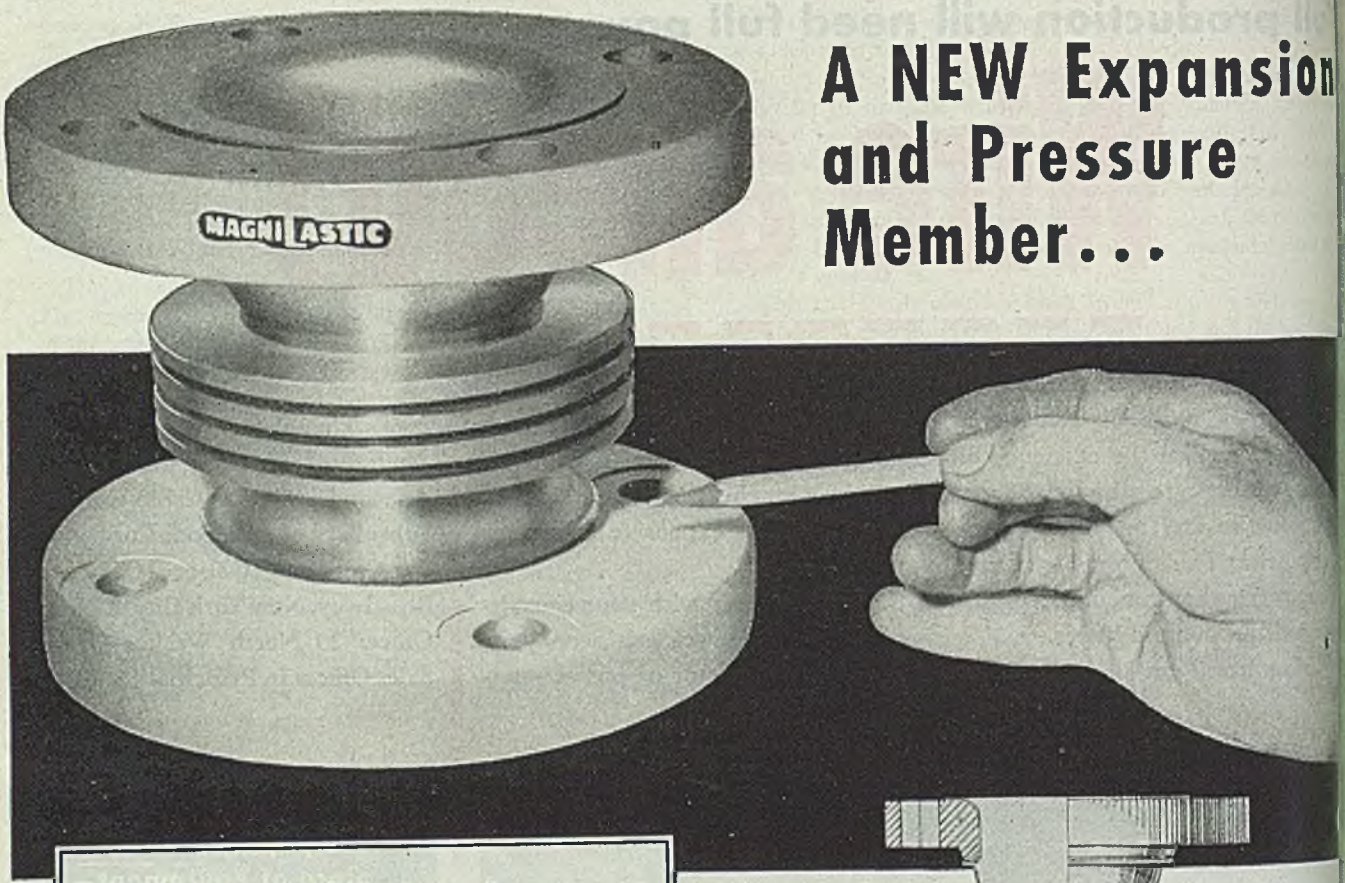
Wire ahead!

DO YOU KNOW how badly inadequate wiring can reduce the efficiency of advanced electrical equipment? From twenty-five to fifty per cent! Check your postwar plans now. Make sure wiring, service equipment, keep pace with your production hopes.

Wiring based on past standards won't do it. Wiring based on future power needs *will* do it. Certainly it will be a lot cheaper to change blueprints than face expensive alterations later.

Talk that over with your consulting or plant power engineer—your electrical contractor or power salesman. They'll confirm the logic of *foresighted* wiring in postwar plans. Anaconda Wire & Cable Company, Subsidiary of Anaconda Copper Mining Company. General Offices: 25 Broadway, New York City 4. Chicago Office: 20 North Wacker Drive 6. Sales Offices in Principal Cities. 45807

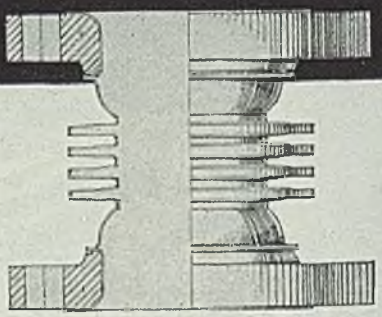
A NEW Expansion and Pressure Member...



Specifications

1. End flanges 150 lbs. standard forged steel ASA requirements. ASTM and ASME specifications.
2. Van Stone lap, slip style, for self alignment of end flange bolt holes.
3. Face to face dimensions 6" O.A. free length.
4. For vacuum service. Micron tight.
5. For pressures ranging from 0 to 55 lbs. p.s.i.
6. Total travel of bellows illustrated ½", can be used on compression or expansion.
7. Spring rated bellows provide uniform travel.
8. Long life. Cycleage in average use upwards of 10^6.
9. Temperature range—300°F. to 900°F.
10. For corrosive gases or liquids.

Available in standard pipe sizes from 2" to 6" inclusive, they can be supplied with additional bellows flanges for greater travel ranges. Face to face dimensions increase accordingly. When ordering specify type of service and whether used for vacuum or pressure applications. These bellows are designed for specific services and applications. All prices quoted on request.



MAGNI LASTIC

EXPANSION JOINTS

Here is a new, vacuum and medium pressure, expansion joint recently developed by Cook Electric Company, made of Monel metal. It responds to hand pressure flexing, yet is capable of meeting all of the requirements as listed in the specifications at the left. It is used for chemical, diesel oil, special process and steam line applications.

MagniLastic bellows, through their use of all metals and modern metal joining techniques, can be incorporated into many advanced industrial units. Let MagniLastic solve your unusual bellows problems.

COOK ELECTRIC Company

2700 SOUTHPORT AVENUE • CHICAGO 14, ILLINOIS

HELPFUL LITERATURE

1. Combination Shears

Buffalo Forge Co.—24-page illustrated bulletin No. 360A describes line of combination slitting shears, punches and bar cutters. Complete details of construction, operation and features of these universal iron working machines are presented. Wide range of sizes and capacities is available.

2. Steel Mill Equipment

Edgar E. Brosius Co.—20-page illustrated bulletin on equipment for blast furnaces and steel mills describes machines which are engineered for special service. Details are given on floor charging machines, forging blank manipulators, overhead chargers, goggle valves, clay guns, grab buckets, granulating mill and other equipment.

3. Drilling Hardened Steel

Black Drill Co.—4-page illustrated bulletin "Unusual Machining Technique" is reprint of STEEL article on use of Black drills and tools for machining hardened steel. Included is 8-page price list and discount schedule on these drills and reamers.

4. Chain Belts

Chain Belt Co.—4-page illustrated bulletin on Rex Z-Metal chain belts discusses application of these units which feature exceptional resistance to corrosion. Several of more popular types of drives are shown.

5. Nonferrous Metals

Wellman Bronze & Aluminum Co.—16-page illustrated catalog on nonferrous metals includes data to aid in designing new products and in redesigning established products. Tables are presented on relative weights of structural metals; physical and mechanical properties of cast metal; chemical compositions and mechanical properties of magnesium, aluminum and copper base alloys; and conforming specifications.

6. Precision Assemblies

W. H. Nichols & Sons—12-page illustrated bulletin "Mass Production" describes precision assemblies which have been engineered and manufactured on production basis. Company's facilities which make possible these products are described.

7. Industrial Equipment

De Laval Steam Turbine Co.—24-page illustrated bulletin No. 1181 gives details of complete line of steam turbines, helical gears, centrifugal pumps, centrifugal compressors, worm gear speed reducers and IMO pumps. Achievements of company in field of high pressure marine propulsion units and water works centrifugal pumps are related.

8. Clamshell Buckets

Erie Steel Construction Co.—4-page illustrated bulletin No. 2-B describes standard two-line clamshell bucket which can be operated on any type of crane or derrick having two drums. Reeving instructions, lubrication instructions, assembly and disassembly procedures, and parts list are included.

9. Insulating Varnishes

Dow Corning Corp.—8-page illustrated bulletin "DC Varnishes" explains properties and applications of Dow Corning 993 high temperature silicone electrical insulating varnish which is claimed to be moistureproof, heat stable and flexible. Samples of varnished glass cloth and bonded mica-glass cloth insulations are included.

10. Hydraulic Presses

Denison Engineering Co.—28-page illustrated bulletin No. 109A is entitled "Presses." Details are given on standard oil-hydraulic units which feature flexibility, positive control, safety of operation and design simplicity. Specifications are given on various sizes of machines. Engineering data related to hydraulic press design, operation and applications are included.

11. Fastening Devices

Camloc Fastener Corp.—8-page illustrated instruction book No. 44B describes installation procedure for series 4002 cowl fasteners. Step-by-step instruction is graphically presented on installing these quick-opening, vibration-proof locking type aircraft fasteners which are designed to provide easy access to working parts through removable panels.

12. Abrasive Products

Carborundum Co.—24-page illustrated bulletin "How Carborundum Serves Industry" traces discovery of Carborundum and relates story of growth of this company. Typical refractory products developed for war purposes and their uses throughout industry are shown. Also covered are refractory and coated abrasive materials.

13. Industrial X-Ray

Picker X-Ray Corp.—12-page illustrated bulletin No. 1345 is entitled "5 to 50 KVP Industrial X-Ray Units." In addition to describing low voltage, long wavelength machines, it presents data on use of radiography in industrial applications.

14. Protective Coating

Cadet Laboratories—4-page illustrated folder entitled "Beneath the Surface" presents features of invisible, waterproof coating used by food processors, canners, factory, laundry and dairy workers and many others. Designed to guard skin against detergent solutions and irritants, it also can be used to protect nasal membranes against fumes, sprays and powders.

15. Shaper Setups

Cincinnati Shaper Co.—16-page illustrated manual "Setups on Cincinnati Shapers" covers fundamentals in setup, tools, correct setup and related data for handling machining operations.

16. Milling Machine Fittings

Cincinnati Milling Machine Co. — 8-page illustrated publication No. M-1382 discusses cost-reducing features of milling machine attachments and describes indexing tables, universal milling attachment, dividing heads, vises and many other fixtures which enlarge scope of work performed on milling machines.

17. Presses

Chambersburg Engineering Co.—12-page illustrated bulletin No. 208-A is descriptive of single and double-crank steel-side presses. Specifications are presented and complete engineering data are included.

18. Industrial Opportunities

Industries Dept., Portland Chamber of Commerce—48-page illustrated plastic bound booklet entitled "Let's Look At Portland" contains information on Portland, Oregon and its surrounding area. Population, resources, water, fuel, power, climate, transportation, labor, taxes and sites are fully covered by means of photographs, maps, text and statistical data.

19. Adjustable Triangle

Charles Bruning Co.—6-page illustrated folder No. A describes adjustable triangle No. 2598A which can be used in layout work, drawings and plans by engineers, draftsmen and architects. Made of heavy, transparent plastic with molded-in calibrations of half degrees, this triangle enables user to scribe quickly any angle from 0 to 90 degrees.

20. Collet Chucks

Erickson Tools Div., Erickson Steel Co.—12-page illustrated bulletin F and specification inserts give detailed information on tapping, adjustable floating, expanding mandrel, taper and face plate type collet chucks and related tools.

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21. Spotfacing and Boring

Bokum Tool Co.—4-page illustrated folder No. 343 describes B & B spotfacer and boring tool which has wide range of cutting widths. Accuracy is made possible by micrometer adjustment in head. Directions for use and ordering are given.

22. End Mills & Holders

Siewek Tool Div., Domestic Industries, Inc.—36-page illustrated catalog No. 5A contains specific information and prices of double, single, taper shank jig borer and straight shank jig borer end mills as well as end mill and jig borer holders and die sinking cutters.

23. Drill Pointing Data

Chicago-Latrobe Twist Drill Works—12-page illustrated booklet entitled "Correct Drill Pointing" gives full details on repointing drills. Data covers lip clearance, point angle, cutting edges and point thinning as well as speeds and feeds for high speed drills.

24. Machinery Steels

Crucible Steel Co. of America—12-page illustrated pamphlet No. MS 100 gives data and stock information on Max-El machinery steels. Composition, machinability, tensile values, typical applications, availability and identification of these steels are fully covered.

25. Steam Drop Hammers

Erie Foundry Co.—24-page illustrated bulletin No. 340 describes features of line of steam drop hammers which range in capacity up to 50,000 pounds. Details of anvil, frame mounting, frame construction, cylinders, rams, piston and rod, valve gearing and control are presented.

26. Small Quenching Unit

Bell & Gossett Co.—4-page illustrated folder describes B & G Junior Quencher for controlled quenching where small pieces are heat treated. Like larger models, it is completely self-contained unit, combining quench tank with cooler, strainer and all control equipment.

27. Production Facilities

Burgess-Norton Mfg. Co.—8-page illustrated pamphlet covers company's progress, organization and facilities for the production of piston pins, ball bearings, stampings, clutch plates and screw machine products.

28. Grinding Wheels

Eagle Grinding Wheel Co.—156-page illustrated handbook contains basic list prices of vitrified, silicate, shellac and resinoid bonded wheels. Also included is section giving rules for calculating basic list prices.

29. Metal Windows

Wm. Bayley Co.—24-page illustrated catalog supplement presents layouts, sizes and installation details of metal windows, doors and operators conforming with modular planning. Drawings indicate types and sizes and give details for installation.

30. Hydraulic Presses

John S. Barnes Corp.—4-page illustrated folder No. 501-P deals with single purpose hydraulic presses built in any style up to 100-ton capacity. Models shown include cold drawing, crimping, insertion, forming and gooseneck presses.

31. Tapping Machines

Detroit Tap & Tool Co.—6-page illustrated folder No. MTM-45 describes improved model medium-duty tapping machines which are designed for high production, precision tapping operations with either single or multiple spindles. Features, specifications and other details are covered.

32. Combustion Furnace

Harry W. Dietert Co.—2-page illustrated bulletin describes and gives specifications of No. 3600 Glotemp combustion furnace and No. 3400 Varitemp combustion furnace.

33. Bus Structures

Delta-Star Electric Co.—4-page illustrated publication No. 4504 deals with heavy duty, reinforced bus structures for applications wherever severe short circuits are possible.

34. Tool-Holder Bits

Carpenter Steel Co.—6-page illustrated folder entitled "High Speed Tool-Holder Bits" aids in proper selection and use of bits in intermittent cutting, fast continuous cutting, fine finishing and rough turning operations.

35. Joints

Barco Mfg. Co.—Two illustrated bulletins Nos. 292 and 293 present specifications, instructions for ordering and other data on revolving type flexible ball joints and adapters for supplying steam, gas or other fluids from fixed or stationary supply pipe to rotating drum or member.

36. Testing Machines

Baldwin Locomotive Works, Baldwin Southwark Div.—4-page illustrated folder No. 210 describes Sonntag universal testing machines, tools and accessories. Operating mechanism, indicators, accuracy, service and specifications are covered.

37. Urea Resin Glues

Bakelite Corp.—12-page illustrated booklet "Bakelite Urea Resin Glues" discusses these glues for plywood and densified wood. Low cost, wet strength, extendability, fungusproof quality and adaptability are discussed.

38. Superchargers

B-W Superchargers, Inc., Div. of Borg Warner Corp.—20-page illustrated booklet "Supercharging for Greater Power and Improved Performance" describes principle of supercharging and superchargers for marine, locomotive, motor transport and construction applications. Company's facilities and production equipment are shown.

39. Insert Locking System

Bardwell & McAlister, Inc.—24-page illustrated folder file "The Rosan Locking System" discusses system for locking threaded inserts and studs in metals, plastics, wood and other materials. Data are given on various types of inserts, studs and recommended installation tools.

40. Flow Meters

Cochrane Corp.—16-page illustrated booklet No. R-100A contains information on case of Rotameters for measurement of fluid flow. Specific gravities of gases and of various metals used in floats, together with formulas for converting water and air capacities to terms of other liquids and gases are given.

41. Power Presses

Cleveland Punch & Shear Works Co.—16-page illustrated pamphlet "Modern Power Presses" presents information on single point, two point and four point presses designed with one, two and four connections. Capacities range from 150 to 750 tons.

42. Magnetic Contactors

Clark Controller Co.—4-page folder No. 740 deals with direct current magnetic contactors without overload protection which operate on 115 to 550-volt circuit and Vari-Time type contactors which incorporate timing device to provide adjustable time delay.

43. Milling Cutters

Continental Tool Works, Div. Ex-Cell-O Corp.—1-page reprint of advertisement briefly describes type R face milling cutters for positive or negative rake milling which have removable carbide-tipped, high speed steel or cast alloy

44. Diamond Wheels

Diamond Wheel Industries, Inc.—4-page illustrated bulletin gives dimensions and grit data on various sizes and shapes of diamond wheels for production applications.

45. Lubricated Bearings

Bound Brook Oil-Less Bearing Co.—20-page illustrated Size List No. 20 gives dimensions and shows typical shapes of Compo oil-retaining porous bronze bearings and Powdiron oil-retaining sintered iron bearings. Selection data are given to aid in proper use of correct grade and type of material for given applications.

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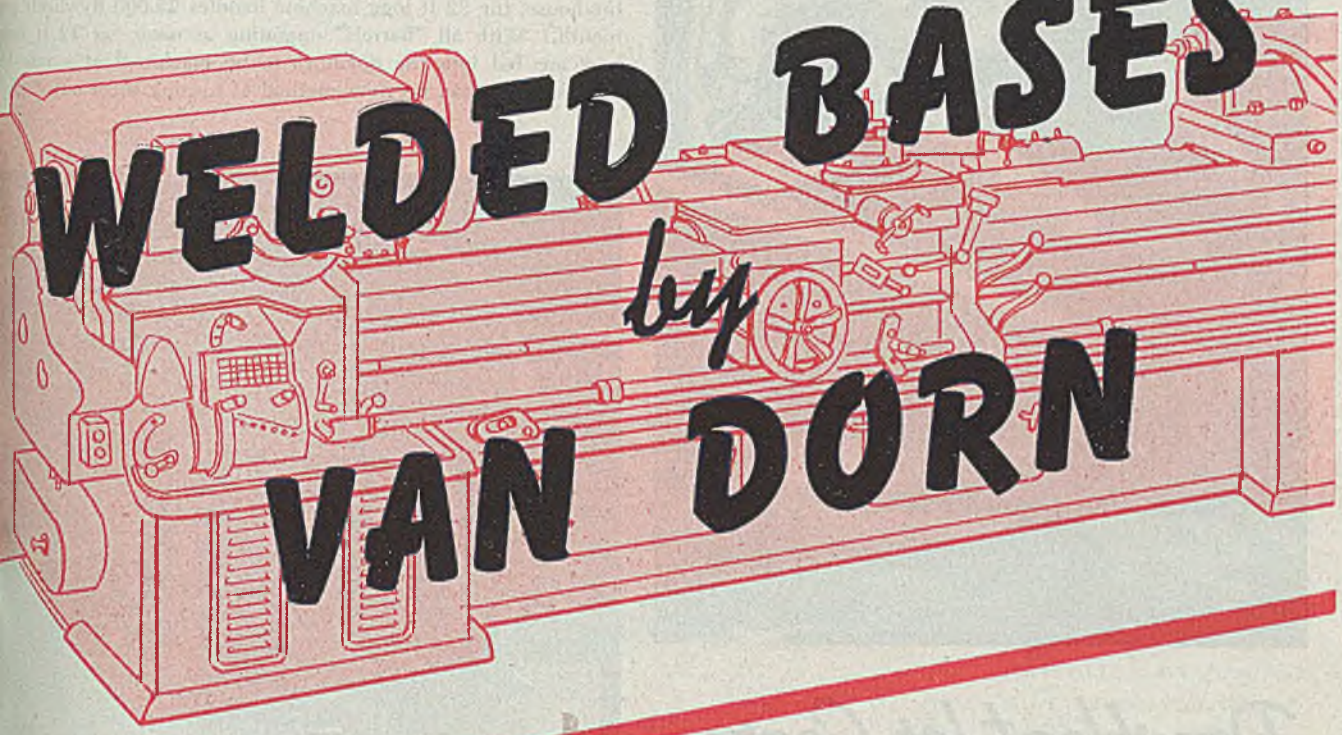
WELDED BASES *by* VAN DORN



• Steel . . . uniform, dependable, durable . . . is fabricated and welded at Van Dorn into machine supports of greater functional value through better design and better performance.

Skilled and experienced design engineers . . . complete fabricating, processing and handling facilities . . . specially trained workmen . . . exacting supervision, are the factors which contribute to the superiority of Van Dorn Weldments.

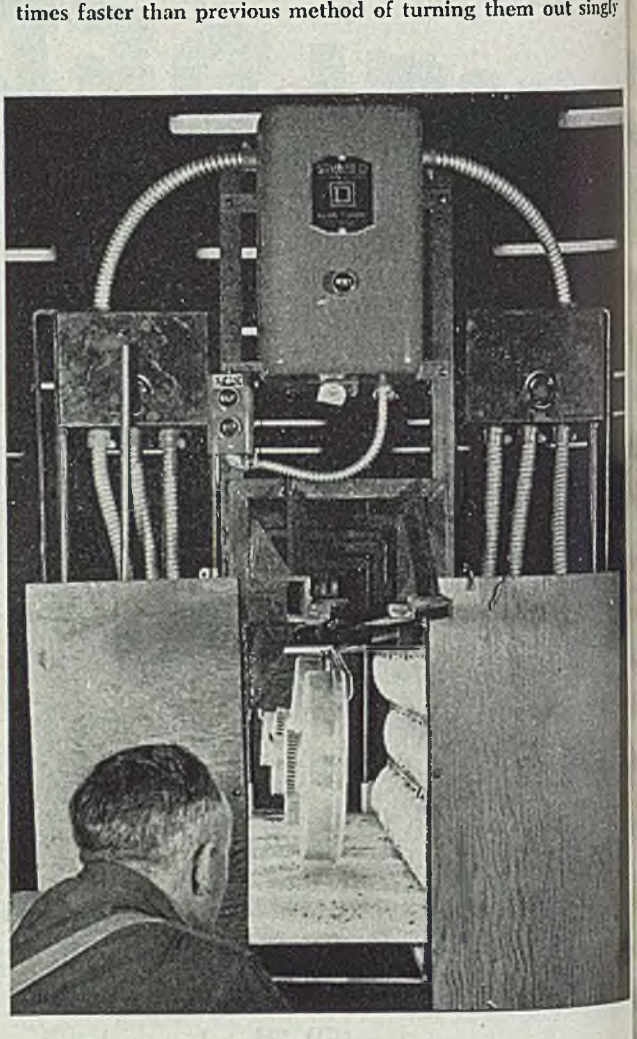
Builders of better iron and steel products for 75 years

THE VAN DORN IRON WORKS CO.

2685 EAST 79TH STREET — CLEVELAND 4, OHIO

"Ack-Ack" Machine

—for high speed production: This could be a six-barreled anti-aircraft gun intended for deadly use against enemy planes, but it's really an automatic machine for fast production of motor flywheels. Recently installed at East Springfield Works of Westinghouse, the 22 ft long machine handles 25,000 flywheels per month. With all "barrels" operating at once, six 12 ft long bars are fed into the openings to be machined at a rate 14 times faster than previous method of turning them out singly



Dry Heat for Gears

—affords efficiency, economy: Miniature infra-red lamp bank replaces the hot oil bath formerly used by Studebaker Corp., South Bend, Ind., to make possible zero fits with aircraft engine reduction driving gears. The tunnel-like oven heats part to 500 degrees, expanding gear so it can be installed on crankshaft. On cooling, metal shrinks to normal size and fit. New process is said to be more efficient, more economical, and to eliminate noxious odors

Lubricant Perambulator

—for on-the-spot service: Only 31 in. long, 37½ in. high and 21 in. wide, the Lubrikart recently introduced to industry is actually a complete lubrication department on wheels. A product of Alemite Division, Stewart-Warner Corp., Chicago, the unit moves anywhere within a plant on its 5-in. ball bearing casters to dispense a variety of types and grades of oil and grease. Basic model carries two 7-gal tanks equipped with low pressure pumps, 5½ ft hose and non-drip nozzles for filling oil reservoirs, hydraulic systems and gear housings on machines; one 7-gal tank with high pressure pump for loading handguns; two 1¾-gal tanks with oil transfer pumps for filling oil cans; six spout-type oil cans, and four lever-type hand guns. There is also space for waste, replacement fittings, small tools or other material

ALUMINUM COMPANY OF AMERICA...

Service on all Magnesium Products

What alloy to use—Sand casting, die or permanent-mold casting, forging, shapes or sheet—you'll find help on this lightest of the light metals, Magnesium, as near as your telephone. Call any Alcoa office—

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BIRMINGHAM 3, ALA., 1320 First National Bldg.
BOSTON 16, MASS., 20 Providence St., Park Square
BUFFALO 7, N. Y., 1880 Elmwood Ave.
CHARLOTTE 2, N. C., 619 Johnston Bldg.
CHICAGO 11, ILL., 520 North Michigan Ave.
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DAVENPORT, IOWA, 918 Kahl Bldg.
DAYTON 2, OHIO, 302 Harries Bldg.
DETROIT 2, MICH., 610 New Center Bldg.
FAIRFIELD, CONN., Post Road
GRAND RAPIDS 2, MICH., 812 Michigan National Bank Bldg.
HARTFORD 3, CONN., 410 Asylum St.
HOUSTON 2, TEXAS, 1806 Commerce Building
INDIANAPOLIS 4, IND., 817 Merchants Bank Bldg.
KANSAS CITY 6, MO., 2300 Power & Light Bldg.
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LOUISVILLE 2, KY., 1154 Starks Bldg.
MILWAUKEE 2, WIS., 735 North Water St.
MINNEAPOLIS 2, MINN., 1060 Northwestern Bank Bldg.
NEWARK 2, N. J., 2706 Newark & Essex Bldg.
NEW ORLEANS 12, LOUISIANA, 911 American Bank Bldg.
NEW YORK 17, N. Y., 230 Park Ave.
OKLAHOMA CITY 2, OKLA., 1209 Apco Tower
PHILADELPHIA 9, PA., 123 S. Broad St.
PITTSBURGH 19, PA., District Sales, 1814 Oliver Bldg.; General Offices, Gulf Bldg.
PORTLAND 4, OREGON, 512 Porter Building
PROVIDENCE 1, RHODE ISLAND, 1421 Industrial Trust Bldg.
RICHMOND 19, VA., 213 Exchange Building, Sixth & Franklin Sts.
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SPRINGFIELD 3, MASS., 301 Tarbell-Watters Bldg.
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TOLEDO 4, OHIO, 1804 Ohio Bldg.
TULSA 3, OKLA., 1405 Philtower Bldg.
WASHINGTON 5, D. C., 605 Southern Bldg.
WICHITA 2, KAN., 411 Fourth National Bank Bldg.

MAGNESIUM MAZLO PRODUCTS

AMERICAN MAGNESIUM CORPORATION

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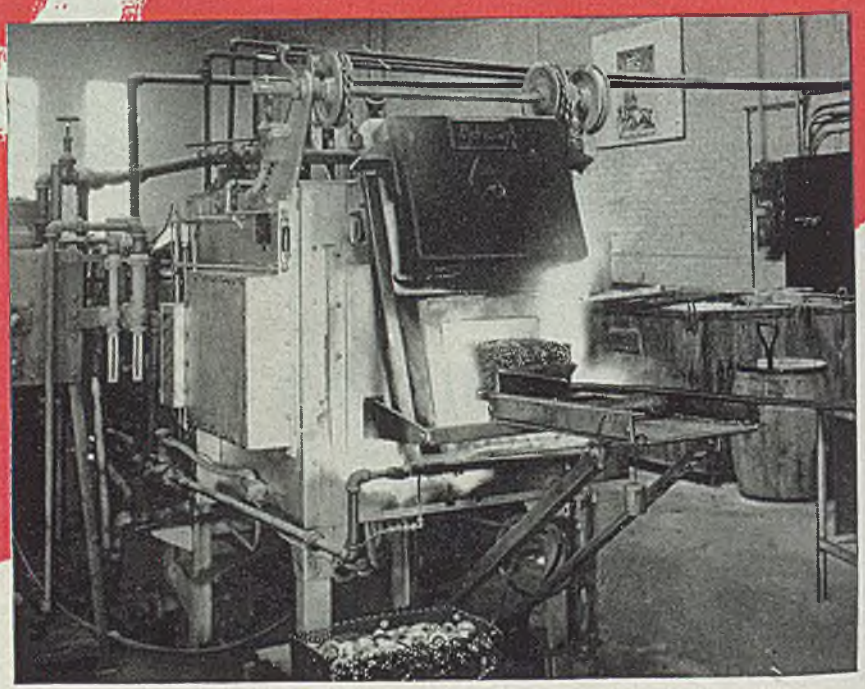
THIS LINDBERG BRAZING FURNACE IS TOUGH



Lindberg Brazing Furnaces are designed and built with the guts to withstand the heaviest kind of production schedules. Because of the simplicity and strength of construction, maintenance is reduced to a minimum and down-time is cut to the bone.

The heating chamber contains no alloy to warp or deteriorate. The silicon carbide hearth withstands heavy loads of heavy pieces. Non-metallic heating elements, with maximum operating temperatures to 2500° F., are quickly and easily replaced without cooling down the furnace. Throughout its construction the Lindberg Brazing Furnace is heavy steel plate, welded gas-tight.

These are only some of the reasons for the success of Lindberg Brazing Furnaces which will do high temperature copper brazing, low temperature silver brazing, sintering of powder metals, general tool hardening, high speed tool hardening and bright annealing. Get all the facts about this hand-pusher type furnace in our new bulletin 201. Lindberg Engineering Company, 2466 W. Hubbard Street, Chicago 12, Illinois.

LINDBERG
Furnaces

SUPER-CYCLONE • CYCLONE • HYDRYZING • BRAZING

Ship Propeller Milling

(*Continued from Page* 109)

during automatic operation. This motor is controlled by a reversing dynamic braking controller which is governed by a measuring relay. The measuring relay is a device that measures motor revolutions and stops the motor after a definite movement has been accomplished. Increment of movement is adjustable, thus providing a means of adjusting the amount of feed for each stroke. This device, when operating in conjunction with a properly designed controller, can measure consistently increments of one-half motor revolution and can then be adjusted to give any increment of movement up to 20 revolutions.

Saddle Feed Drive: Saddle feed screws are each driven by adjustable voltage, direct current drives. These drives are controlled by the position regulators when the tracers are in operation. They are provided with full magnetic reversing regenerative braking controllers so that they may be operated from push buttons at high or low fixed speeds for setting up purposes.

The entire speed range of these motors is obtained by generator voltage control. Consequently, the voltage impressed on the motor armature is an approximate measure of the saddle speed. Voltmeters are provided to indicate this voltage at all times; these are calibrated in terms of saddle speed in inches per minute, and provide the operator with a continuous indication of the cutter saddle speed.

Work Arbor and Model Table Drive: Work arbor and model table are coupled together mechanically and, while their relative position may be changed for indexing the blades, they are moved always as a unit during the machining operation. This is the primary feed motion. When the model table is rotated by the work arbor motor, movement of the model changes the position of probes from their neutral or center position, thus causing saddle feed motors to move in the proper direction and at the proper speed to bring tracer probes back to center position by moving the tracer saddle. Cutter saddles also are moved a proportionate amount as they are driven by the same motor. Models of different ratios are accommodated by changing the gear ratio between the cutter and tracer saddle, thus rate of work arbor rotation controls rate of motion of the saddles.

A certain maximum rate of acceleration can be accommodated by the position regulating system. Work arbor drive is arranged to provide controlled acceleration and retardation so that ability of the regulator system is not exceeded. Rate of acceleration is controlled by a motor operated rheostat driven by an adjustable speed DC motor. This rheostat controls fields of the work arbor motor and its associated adjustable voltage generator.

On most machine tools, it is desirable to maintain a certain optimum surface cutting speed. This speed depends upon size and type of cutter and the material being machined and the "geometry" of the machine. Construction of this propeller milling machine is such that surface speed of cutter across work depends primarily upon two variable factors: Pitch of the blade, which may vary from 6 to 30 ft; and radius of cut, which may vary from 1 to 12½ ft. Work arbor drive must, therefore, provide an adjustable speed range in excess of 60:1.

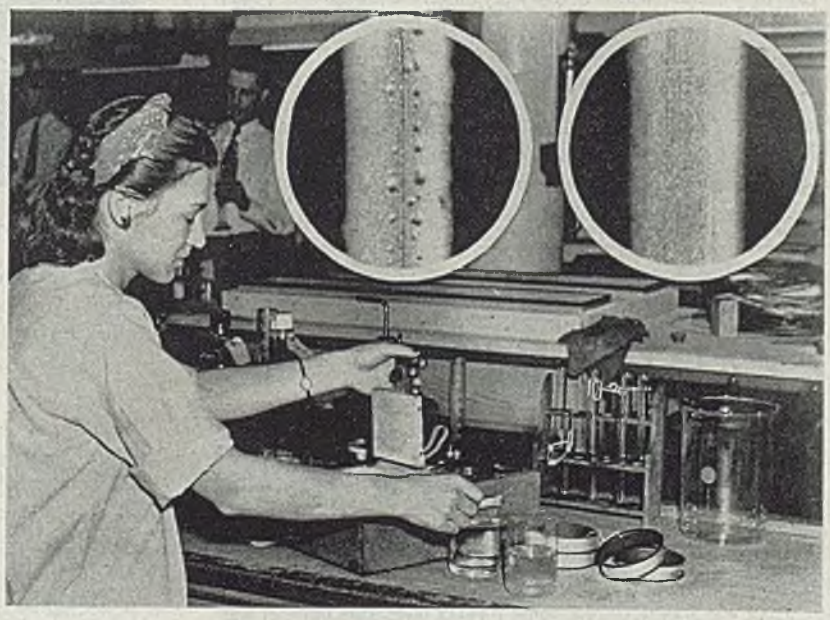
As work arbor drive is the primary feed motion, it must be stable at any operating speed over its entire speed range. This means that the speed regulation with changing loads must be practically flat over the entire speed range. Rototrol regulated adjustable speed drive was selected for this motion because it provides all of these features[4, 5]. Work arbor motor also may be operated from jogging or inching push buttons at a high or low fixed speed to facilitate setting up machine.

Work Arbor and Saddle Feed Control: There is, naturally, a maximum limit to the speed at which the position regulators can follow and maintain the required accuracy of positioning. A speed of 50 in. per minute was set on this machine as the maximum usable feed speed for the cutter saddles. This corresponds to 500 rpm of the saddle feed motors and is the maximum speed at which the position regulating system must follow accurately.

During the return stroke, when the cutters are in the relieved position, high accuracy is not necessary and, consequently, saddle feed motors can operate at their maximum speed of 1000 rpm at this time. To insure that these limits will not be exceeded, a speed regulating system is provided for the work arbor motor. Two voltage relays are connected so as to be responsive to the voltage generated by the saddle feed generators, and these relays are, therefore, responsive to the saddle feed motor speed. These relays are set with a small differential in pick-up voltage, and their contacts are arranged to control the motor operated rheostat.

When pick-up voltage of the first relay is reached, the motor operated rheostat is stopped if it has not already accelerated the work arbor motor to maximum speed. If the position regulator calls for a greater speed from the saddle feed motors than that allowed for by the differential setting of the two relays, the second relay will pick up, causing the rheostat to decrease the work arbor speed. The drop-out point of the second relay is naturally higher than that of the first, consequently it will drop out and stop the rheostat before the voltage drops low enough to drop out the first relay. Pick-up voltage of both of these relays may be set by means of a rheostat located on the operator's control desk. This rheostat is used to set the speed of operation of the feeds.

The amount of metal to be removed may be much greater in some places than in others, hence the depth of cut may vary considerably. For this reason cutter load regulating arrangement is provided. This consists of two additional relays similar to those described above, except that they are connected so as to be responsive to cutter motor current. The contacts of these relays control the work arbor motor rheostat in the same manner as the voltage relays already de-



GOLD COATING: Previous methods of plating fine molybdenum wire for electronic tubes used in communication devices often resulted in blistering the coating, as shown in photomicrograph at left, above. This permitted secondary electronic emission. That plating technique developed by North American Philips Co. Inc. has eliminated this condition, is demonstrated by smooth, dense coating shown in right-hand inset. In lower view, chemist checks porosity in electrical tester, using chemically treated paper

This advertisement is one of a series now appearing in national magazines and newspapers as Consolidated Vultee's contribution toward a clearer public understanding of how and why America must retain its present Air Supremacy, even after Victory.

THE JOKER IN AIR POWER

EVERY PILOT who wings his Liberator or Fortress over Germany or Japan knows what the joker in Air Power is.

Every ground crewman whose job is to keep a Mustang, Thunderbolt, or Corsair in hair-trigger fighting trim knows what it is.

Every aircraft engineer who ever saw the inside of a wind tunnel knows what it is.

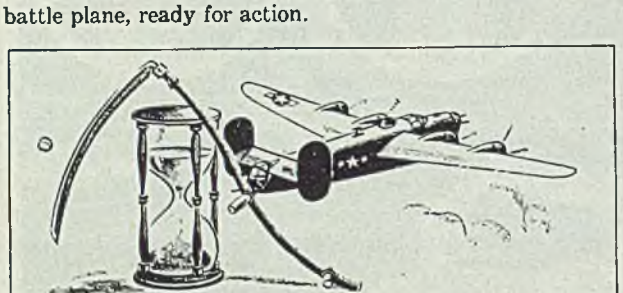
Do you know the joker in Air Power?

It's very important that you should. **For, partly because America forgot it during the prewar years, we came terribly close to losing this war right at the start.**

But now we are winning the war, largely because a few far-sighted men knew what the joker in Air Power was.

So simple—so easy to forget

The joker in Air Power is TIME—the heart-breaking months and years it takes to design, to build, and to perfect a plane to the point where it becomes an efficient, service-tested battle plane, ready for action.



For example, America's first four-engine, long-range bomber was born back in 1934.

But when war was declared, some 7 years later, this bomber was not *even then* ready to go into action as the potent fighting weapon it is today.

True, the first model was flown in the summer of 1935. The aircraft engineers knew then that the basic design was good.

But between the first "prototype" and the current model, **there have been more than 4000 changes, involving over 4 million engineering hours.**

Even by working with desperate speed, it has taken years to smooth out the "bugs"—to give our Air Forces this heavy long-range bomber, so urgently needed, in its most efficient form.

There aren't many short cuts

When the war clouds grew blacker over Europe, the U. S. Army Air Forces came to Consolidated Vultee with the request for still another four-engine heavy bomber.

Shortly afterward—in 1939—the B-24 Liberator was born.

But, even with Consolidated Vultee's long experience in building mammoth sea planes, **it took over 3 years, over 1 million engineering hours, and more than 5 million hours to tool up the plants,** before the Liberator was ready to go into action as one of America's most devastating, heavy bombardment weapons.

Similarly, it took 5 years to develop one of this war's foremost fighter planes from drawing board to final test flight and mass production.

And one of the country's greatest aircraft engines has taken

11 years to develop—and ever since the war started, it's been undergoing change after change to increase its horsepower still more.

America 1941—a second-rate power

Many other examples could be cited. But there is no need to labor the point.

The truth of the matter is that America was caught napping. The nation which invented the airplane was woefully unprepared to defend itself against Axis air power. **We had become a second-rate power in the air.**

And the Axis knew it. They knew that under normal conditions, it takes from 3 to 7 years for a plane to progress from drawing board to combat duty.

What they overlooked was the undreamed-of capacity of the American people, and the American aircraft industry, to do the impossible.

Starting almost from scratch, we have been able to design, build, and deliver war planes by the tens of thousands—an air armada overwhelming in its might and superiority, *as of today.* But remember, the elapsed time has been *five years!*

"Hot" today—obsolete tomorrow

But in aerial warfare, the nation that depends on mere quantity and present-day superiority of its planes cannot win. That is one reason why Germany lost the Battle of Britain in 1940.

Progress in aeronautics is now so rapid that today's "hottest" combat plane is virtually obsolete tomorrow. Its quality must constantly be improved—to keep it superior to the enemy's ever-improving planes.

And it must be replaced, with all possible speed, by new planes now on our drafting boards, in our wind tunnels, or undergoing their test flights.

These are facts which an alert America should not, must not, forget.

Another fact to keep in mind

If we are attacked again, there will probably be no warning whatever—**no time to prepare.**

There will be no other nation to hold off the enemy, as Britain did this time, while we frantically build up our power in the air.

And the attack will most certainly be made with new and even more terrible airborne weapons.

We must be ready, and able, to protect ourselves from such attack.

Air Supremacy alone cannot win a war, and may not in itself prevent *another* war. **But as long as we maintain our strength in the air, no aggressor nation in its right mind will dare think of attacking us.**

Air Power is Peace Power

The backbone of Air Supremacy is a strong, independent competitive aircraft industry, constantly working in research, in the improvement of production technique, and in the development of still finer planes.

But we must understand that Air Power is a combination of *all these things:* a postwar Air Force, commercial air transport, a strong supporting aircraft industry with permanent facilities to meet any emergency, widespread personal flying, and a national air-minded way of thinking.

When we understand this, we begin to realize that Air Power can be one of America's soundest investments in the interests of a lasting peace.

LET'S KEEP AMERICA STRONG IN THE AIR!

CONSOLIDATED VULTEE AIRCRAFT CORPORATION

San Diego, Calif. · Vultee Field, Calif. · Fairfield, Calif. · Tucson, Ariz. · Fort Worth, Texas · New Orleans, La. · Nashville, Tenn. · Louisville, Ky. · Wayne, Mich. · Dearborn, Mich. · Allentown, Pa. · Elizabeth City, N.C. · Miami, Fla.

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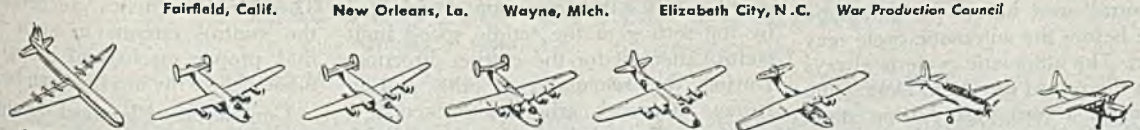


CONVAIR MODEL 37 *Pan American Clipper* · LIBERATOR *4-engine bomber* · LIBERATOR EXPRESS *transport* · CORONADO *patrol bomber* · PRIVATEER *search plane* · CATALINA *patrol bomber* · VALIANT *basic trainer* · SENTINEL *"Flying Jeep"*

scribed. These relays are also provided with calibrating rheostats mounted on the control desk. Through the action of these relays, the work arbor motor speed is regulated in accordance with the cutter load, slowing down when deep cuts or hard spots are encountered and speeding up again when the cutter load returns to normal.

Saddle speed limiting regulators and the cutter load regulators provide safety features which protect the machine and cutters automatically, thus relieving operator from this responsibility while machining operation is going on.

Push Button Control: Contour of a ship propeller blade is a very irregular surface. There are few reference points available to use as datum points when setting up machine. In setting up, the operator must position the rough propeller with respect to the model so that there will be enough stock at all points on each blade. This involves a rather tedious setting up operation during which the various parts of the machine must be moved individually and, in some cases, several motions being accomplished simultaneously and in synchronism.

Momentary contact push buttons in portable push button stations are provided for this purpose. These push buttons give an inching or jogging operation in which the motor rotates only as the push button is held depressed, and the motor is stopped quickly by dynamic or regenerative braking when the button is released.

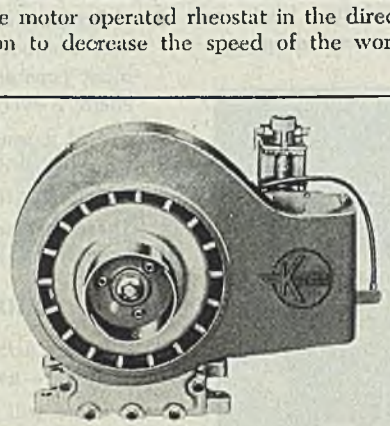
Two fixed speeds are provided for the jogging operation. A fast speed is used rapidly to move the machine parts into approximate position and a very slow speed for accurately spotting these parts.

The jogging push buttons are contained in portable push button stations provided with handles for easy portability, and long flexible cables enable the operator to carry these stations about so that he can take them to any necessary location while setting up the machine. Brackets are provided on the operator's desk which hold these portable push button stations in an accessible position when they are not in use.

Automatic Operation: After the setting up operation is completed, electric circuits are arranged for automatic operation by means of selector switches on the various control stations. This prevents movement of any part through accidental use of the jog buttons and makes the machine ready for full automatic operation.

Position regulators must be in operation and properly adjusted, the cutter motors must be running, and the relieving mechanism control must be set for automatic operation before the automatic cycle may be started. The automatic cycle is always started in the return direction. Depressing the automatic return push button starts the work arbor motor and the motor operated rheostat. The rheostat accelerates the motor until it reaches its maximum speed or until one of the tracer controlled saddle feed motors reaches its selected maximum speed, and the speed regulators take control. The work arbor motor then continues to operate under the control of the speed regulators, and the saddles operate under control of the position regulators which follow the model.

As the cutters approach the edge of the blade, the dogs on the model table operate the return limit switch which starts the motor operated rheostat in the direction to decrease the speed of the work arbor motor. When the rheostat reaches its minimum speed position, the work arbor motor is stopped. The relief drive motors then move the cutter saddles into cutting position and the work arbor motor is started in the opposite direction. This motor is again accelerated by the motor operated rheostat.



SMALL BUT POTENT: An air-cooled, 4-cycle, L-head engine, rated 5 hp at 2600 rpm, but developing 6 hp at 3250 rpm, is making its bow to equipment manufacturers as the lightest engine available in its horsepower class. Embodying principles new in small engine design, single cylinder of motor illustrated is horizontal and detachable, making maintenance easier. Bore is 2¾ in., stroke 3 in., and displacement 17.8 cu in. Entire unit requires only 2.4 cu ft of space. One-inch power takeoff shaft rotates counter clockwise. Torque curve is practically flat, demonstrating engine's ability to "lug" under heaviest load conditions. Kinner Motors Inc., Glendale, Calif., is the maker.

There is a separate saddle speed limit control rheostat on the operator's desk so that maximum speed of the saddle may be set for different speeds in each direction. This permits the operator to set the cutting speed for the best cutting condition while the return stroke may be made at a much faster rate. The motor operated rheostat therefore stops when the saddle speed reaches the maximum determined by the setting of the saddle speed limit control rheostat for the cutting direction. During the remainder of the cutting stroke, the work arbor motor speed is under control of both the speed limit control and the cutter load limit control. The cutter saddles are controlled by the position regulators.

When cutters approach the other edge of the blade, dogs on the model table operate the cut limit switch, which starts

deceleration of work arbor motor throu
action of the motor operated rheost
and again this motor stops when rheost
reaches minimum speed position. Rel
drive motors then move saddle so th
cutters are clear of the work, and wo
arbor is again started in the return dire
tion. At this same time, ram feed motor
started, and it operates for a defin
number of revolutions as determined b
the measuring relay, thus rams are move
ahead a definite amount and cutters w
follow in a new path across the bla
during the next cut stroke. Machine w
continue to follow this automatic cyc
without further attention from the oper
tor except the occasional adjustment
the model table dogs which adjust t
length of stroke to conform approximate
to outline of the blade.

Automatic cycle may be stopped at a
time by depressing the "Stop" push b
ton. This will cause relieving mechanis
to move cutters clear of the work a
work arbor motor to be decelerated j
as is done at the end of the stroke. T
work arbor motor will stop when mot
operated rheostat reaches minimum spe
position and will not start again until
"Start" push button is depressed. Cutt
motors will continue to run and the p
sition regulators will remain in operatio

An emergency-stop push button is pr
vided which is intended for use only
an emergency, for instance, such as t
breaking of a cutter. When this button
depressed, the relieving mechanisms mo
the cutters away from work, and wo
arbor motor and both saddle feed moto
are stopped quickly by regenerati
braking. Position regulators are thro
out of operation. It then is necessary
synchronize the tracers with the cutte
again and pick up the cut by adjustme

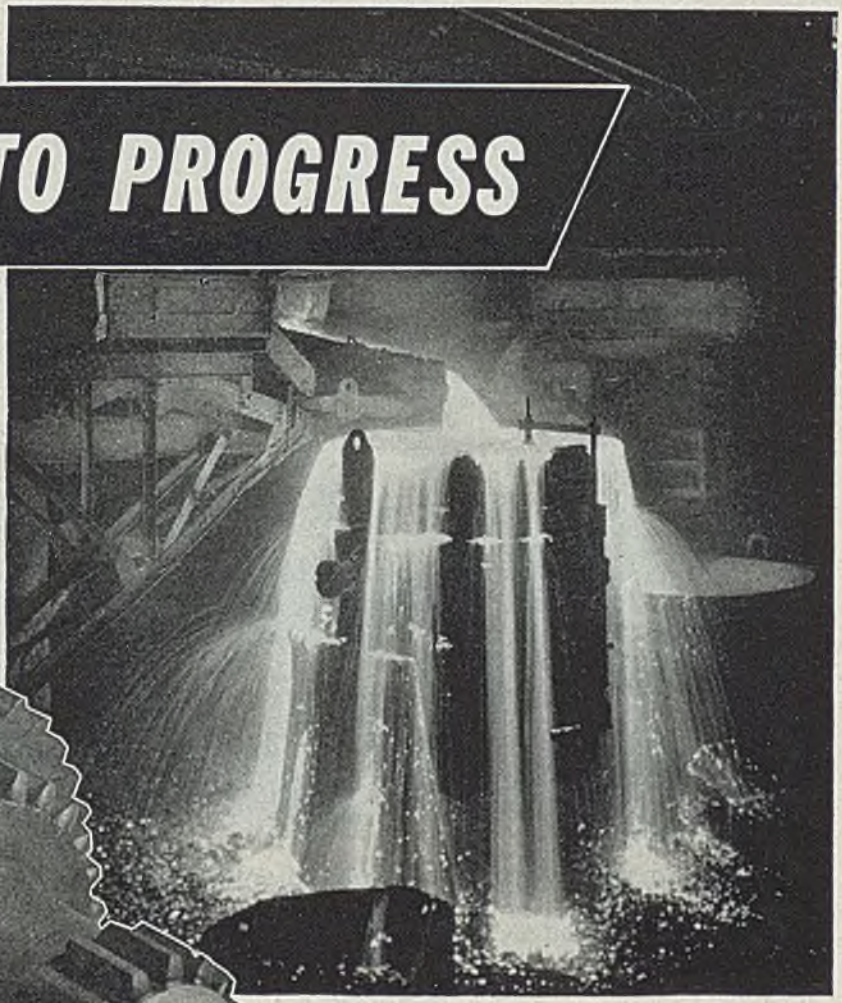
Protective Devices: In addition to
protective features previously describe
overtravel limit switches are provided
protect against inadvertent moveme
of any part of the machine beyond
normal limit of travel. If tracer pro
strike an obstruction, or if they fall
the model because the stroke li
switches are not set correctly, li
switches built into the tracer head
operated. Operation of any of these
switches has the same effect as depress
"Emergency Stop" push button.

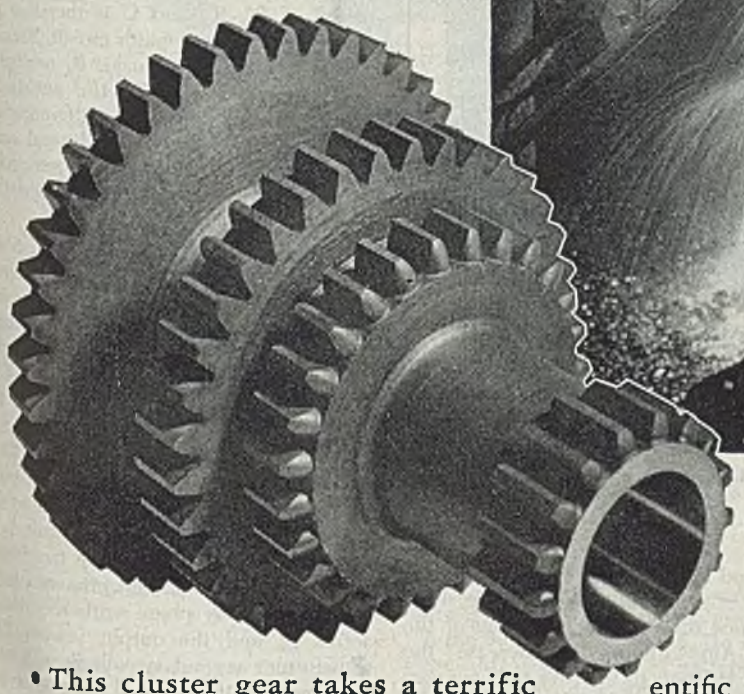
There are a number of set-up clutc
on the machine which provide for
ferent mechanical arrangements for
ous operations. To insure that these
set in their proper relative positi
various interlocking limit switches
arranged to be operated by these lev
These limit switches are connected
the control circuits in such a ma
that proper mechanical set-up must
made before the machine can be oper

Conclusion: Electrical equipment
this propeller miller provides rel
means for performing all of the funct
required on a machine of this type—
by the use of proven apparatus. Seve
new problems of regulation, interlock
and sequence control were encounter
in the design. Standard equipment

GEARED TO PROGRESS

Alloy Steels Designed for the Job





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DRAGLINE EXCAVATOR: Removes 35 tons of overburden with every load at Philadelphia and Reading Coal & Iron Co.'s project near Minersville, Pa. A 25-yard bucket, suspended from a 180-foot boom, is powered by Westinghouse variable-voltage direct-current drive using two 425-horsepower motors on the drag, two 425-horsepower motors on the hoist and three 125-horsepower motors for the swing

employed throughout with minor modifications to make it better suited for its particular use.

The successful creation of a machine tool of this type not only requires a consideration of the structural design of the machine parts to insure rigidity and accuracy, but also co-ordination of design between the electrical engineer and the machine designer in order to arrive at the best solution for the kinematics of the machine. The proper operation of the mechanisms involved depends so much upon co-operative action between the electrical and mechanical devices that the design of both must be considered simultaneously. It would have been very difficult to design electrical equipment for this machine after the mechanical design had been completed.

Regulator Circuit: Because of time delays inherent in the regulating system a stable regulator capable of only mediocre accuracy can be realized by applying only the silverstat positioning stimulus to the amplifier input. Sustained oscillations in this simple low-accuracy regulator would be prevented by the inherent damping of the motor armature circuit. The maximum practical stiffness, and hence the accuracy, of such a system is restricted to relatively low values by fundamental design limitations on the ratio of motor circuit damping to system inertia and also by the time delays which have the effect of introducing phase shifts that reduce the effective damping of the system. Any attempt to increase the regulator stiffness to improve the accuracy would result in hunting. In the system illustrated in Fig. 5, there are three principal time delays; namely, the exciter field delay, the generator field delay, and the motor and generator armature circuit delay. Consequently, in order to obtain a regulating system with adequate stiffness to insure high accuracy, and at the same time provide sufficient damping to insure rapid decay of free oscillations, it is necessary to introduce strong anti-hunting influences which will now be described.

Referring to Fig 5, the voltage e_1 appearing across the sensitivity or stiffness adjusting rheostat R_1 is derived from the silverstat and has an average value corresponding to the normal zero-error position of the tracer probe. At this normal operating point half of the silverstat resistance is shorted out. Variations from this average voltage value, corresponding to displacement of the probe from its zero-error position, can be considered as made up of two components. One of these is the drop due to the component of current which flows through R_2 and is proportional to the probe deflection or positional error. This component constitutes the positioning stimulus for the regulator. The other component is due to the part of the current which flows through the condenser C. By making R_1 small compared to R_2 and by proper choice of the value of C, this component can be made proportional to the rate of change or first derivative of the probe displacement. It is well known that the inclusion in the input to a regulator of a stimulus proportional to the rate of change of the quantity being regulated exerts a powerful stabilizing effect. When the tracer probe is deflected from its normal position, this component of voltage appears ahead of the positioning stimulus. Thus a large restoring force is produced which tends to correct for the error before it can attain its maximum value. For this reason the component may be considered as anticipating the positioning voltage, and the circuit comprised of R_1, R_2, and C is therefore referred to as an anticipator circuit. Because it is not feasible to make R_1 negligibly small compared to R_2, the anticipator does not give perfect differentiation with the result that an additional small time delay acting upon the anticipator output is introduced into the regulating system.

A further stabilizing voltage, e_2, is obtained from the feedback transformer connected into the generator-motor armature circuit. The bridge circuit consisting of R_3, R_4, R_5, and the motor armature resistance is balanced so that the voltage across R_6 is strictly proportional to the back emf of the motor and independent of load and accelerating currents. Since the back emf is proportional to speed, this voltage is thus proportional to the output velocity. The time constant, L/R, of the primary circuit of the transformer is made low so that the primary current is essentially in phase with the voltage across R_6 and the output velocity. The transformer secondary voltage e_2 is proportional to the rate of change of the primary current and hence is proportional to the output acceleration. This voltage is applied to the amplifier input with a polarity such that the torque due to it opposes rapid acceleration of the driving motor. It is therefore anti-hunting in its effect. Because it is not feasible to make the time constant of the transformer primary circuit negligibly small, the differentiation of velocity to obtain acceleration is not perfect and the consequence here also is the introduction of another small time delay acting in this case only upon the acceleration component of the amplifier input voltage.

With regular input voltages described thus far, it is possible to increase the stiffness to a point where the positioning accuracy at very low speeds is more than adequate. However, when the drive motor is running at some constant speed, the steady state excitation required by the main generator must be produced entirely by the positioning voltage. This means that when the motor is running at low speed the silverstat must be deflected by the probe far enough from the mid-position to produce full excitation of the

Miss Throckmorton Puts a V. P. Wise to MUREX FHP

This time, things are what my boss calls "quote, the same—only different, unquote."

The part that's the same is that they're stumped again out in the factory, and that here is this urgent memo yelling for help from my boss, the Vice President in Charge of Production.

The part that's different is that this time the trouble is in our new arc-welding department, and for once my boss does not know the answer.

"Miss Throckmorton," he tells me, in this half-joking way, "you used to work in an arc-welding company. What's the best 'hot rod' for horizontal and flat fillet welding, deep groove work, cover beads and other downhand applications? They want it to operate on either AC or DC, at high currents, and with a rapid deposit rate and good penetration. What shall I tell them?"

"Tell them," I suggested, "to try MUREX FHP. My last boss always called it the best 'hot rod' made. He said it was the old original rod of its type and still way out in front as first choice of most of the big fabricators."

My boss looked at me sort of pop-eyed, then tossed me the memo.

"Here," he grinned, "you tell them."

Three days later we get this enthusiastic report from the arc-welding department. They'd just tried MUREX FHP and ordered a thousand pounds of it. "*Best hot rod on the market,*" the report wound up. "*Weld metal is X-ray sound and ductilities excellent. Little spatter produced, even at high currents, and slag removes freely. Concave fillets and layers in deep groove work are produced without undercutting. In case you can spare Miss Throckmorton, we can use her.*"

That one the boss answered himself, on the phone, with a grin. "Miss Throckmorton will stick where she is," he told them, winking at me proudly. "And if you want to stick where *you* are, you'd better stick to MUREX."

P.S. Miss Throckmorton again. Besides FHP, MUREX makes about 30 electrodes for mild steel, low-alloy steel, stainless steel, and hard surfacing. They're conveniently classified and described on a big MUREX Wall Chart, of which you should have a copy. Just address:

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generator. In other words, a high output speed can be obtained only at the expense of a proportional deviation or error in the tracer probe position, and at top speed this error may be several times the normal acceleration error.

It is the function of the voltage e_3 to minimize these errors proportional to speed. This voltage, being part of the drop across R_6, is proportional to the output velocity and is applied to the amplifier input in series with e_1 and e_2 in such a direction as to tend to maintain the output velocity which produced it. Most of the main generator excitation required to produce the output speed is thus provided by e_3, relieving the silverstat of the major portion of this duty. By this means the velocity error is reduced to a small fraction of what it would otherwise be. The portion of the velocity excitation provided by the silverstat is just sufficient to insure that the tracer unit retains control of the regulator. Instead of improving the stability of the regulator, however, the feedback for velocity error correction has exactly the opposite effect, although, fortunately, the reduction in damping is small, and it is readily compensated for by a slight increase in the derivative component of the anticipator circuit output voltage.

The Amplifier: Use of a vacuum tube amplifier greatly simplifies the attainment of adequate anticipation, acceleration feedback, and velocity error correction with circuit components of small physical size and low power consumption. Its almost infinite input impedance permits a wide flexibility in circuit arrangement and makes it possible to completely eliminate undesirable loading of the anticipator circuit by the feedback circuits and vice versa. A further advantage of the amplifier is that it permits the use of very low wattage silverstat resistors, making it feasible to mount these within the limited space inside the tracer housing, thus avoiding a large number of electrical connections to the tracer unit.

Although only a single tube is indicated in Fig. 5, there are actually three tubes connected in parallel. This improves the reliability of the equipment since the regulators will still operate with somewhat greater error on only two tubes. The tubes, which are of a standard radio type obtainable in any radio shop, are very conservatively loaded so as to insure a long useful life.

A potentiometer R_8 in the cathode biasing circuit is ganged to the stiffness control R_1 for the purpose of compensating for the change in average drop across R_1 as the stiffness of the regulating system is varied. This makes it possible to change the regulator stiffness without causing any disturbance in the system. Control R_9 is used to adjust the regulator to the center of its range during the setting up process.

A voltmeter connected across the silverstat is calibrated in terms of relative error and provides a means of constantly checking the operating condition of the regulator and the accuracy of the milling operation. One of these instruments is located at the control station for each of the two regulators. A vernier centering adjustment not indicated in the schematic diagram, but connected in series with R_9 is mounted alongside the relative error indicator on the control pedestal. This serves as a relative error control and may be used by the operator, if desired, to "monitor" the error during the milling strokes. It also facilitates adjustment during the setting-up operation and provides a means of correcting for possible drifting during the initial warming-up period.

On the strength of experience gained with these machines for automatically milling ship propellers, it is believed that outstanding machines of the future will represent the co-operative efforts of electrical application engineers and the machine designers.

ACKNOWLEDGMENT

The writers wish to acknowledge the able assistance given on this project by Commdrs. Gold and Mumma, Capts. W. C. Wade and L. V. Calhoun of the U. S. Navy, R. H. Patrick and R. E. Morton of the Morton Mfg. Co. and C. R. Hanna, R. A. Hartley, W. O. Osborn, W. R. Harding, W. H. Formhals and G. E. King of Westinghouse.

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METHOD EVALUATES RELATIONSHIP BETWEEN

Hardenability and Martensite

CRITERION of hardenability which is most widely accepted and used is based on a microstructure of 50 per cent martensite, although optimum properties in conventionally quenched and tempered steels will be obtained when the microstructure before tempering is fully martensitic. With low hardenability steels, the difference in hardenability between the 50 per cent martensitic structure and that based on full martensite will not be large, but with steels of higher hardenability, these differences may be considerable.

J. M. Hodge, development engineer, and M. H. Orehoski, metallurgist, Duquesne Works, Carnegie-Illinois Steel Corp., Pittsburgh, have evaluated the relationship between hardenability and percentage of martensite in some low alloy steels, employing metallographic examination of Jominy tests.

The distance along the Jominy bar to 99.9, 95, 90, 80 and 50 per cent martensite microstructure was measured, distance values being converted to hardenability values in terms of ideal diameter, and comparison being made of the values at 50 per cent martensite with those for higher percentages of martensite. In addition, the hardness values corresponding to various microstructures were noted and plotted against carbon content. This was done for 35 steels over a range of 0.15 to 0.79 per cent carbon. Following types of composition were included: (1) Plain carbon; (2) NE-1300; (3) NE-8600; (4) NE-9400; (5) SAE-4100; (6) SAE-4300; (7) SAE-4800; (8) SAE-4600.

It was found that in these steels the full martensite hardenability varied from 80 per cent of the 50 per cent martensite hardenability at an ideal diameter of 1-in., on the 50 per cent basis, to 45 per cent of this value at an ideal diameter of 7-in. on the same basis.

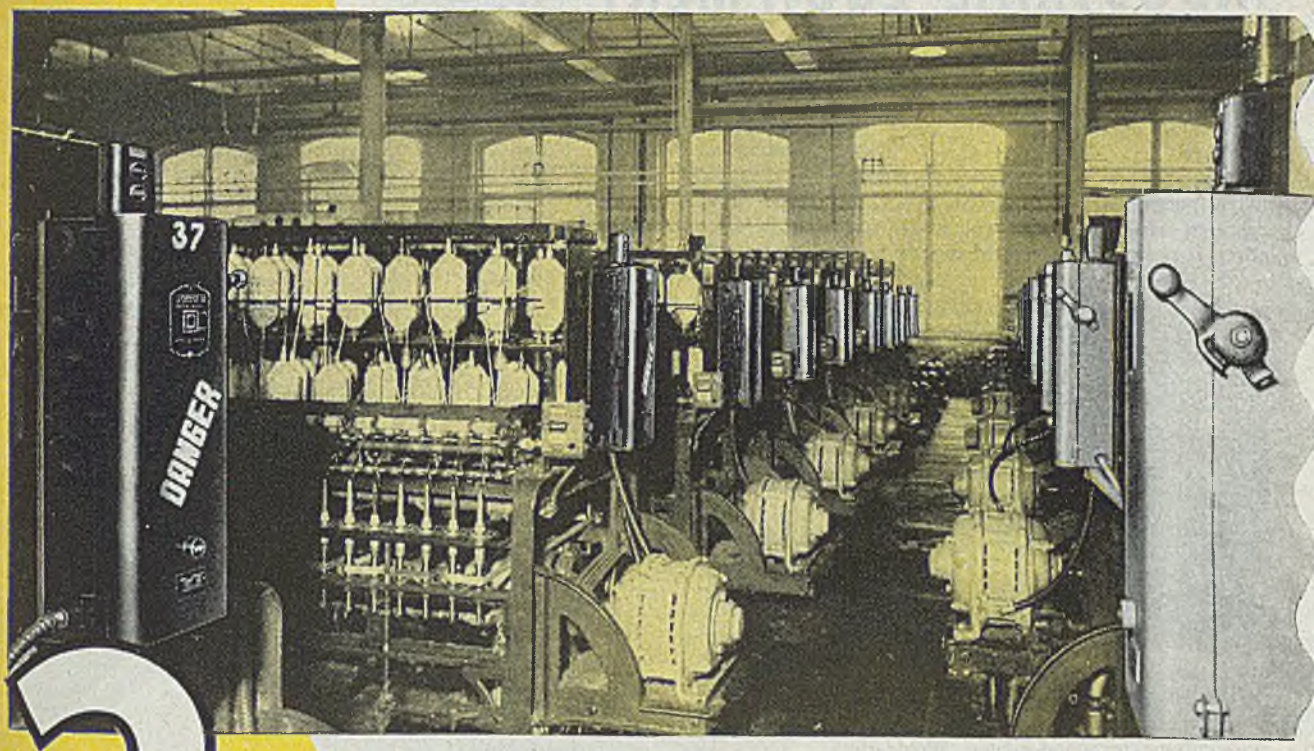
Hardness values of the 99.9 per cent martensite structure were found to vary in a fairly uniform manner with carbon content as follows:

0.20 Carbon—44 rockwell C
0.30 Carbon—50 rockwell C
0.40 Carbon—56 rockwell C
0.50 Carbon—60 rockwell C

Curves correlating hardenability on the 50 per cent basis with that on the basis of 99.9, 95, 90 and 80 per cent martensite; curves correlating calculated hardenability on the 50 per cent basis with that on 99.9, 95, 90 and 80 per cent martensite basis, and curves correlating the hardness of the 99.9, 95, 90, 80 and 50 per cent martensite microstructure with carbon content have been established.

—o—

A new nine-element alloy, K-42-B, developed in Westinghouse Research Laboratories, Pittsburgh, has proved to be one of the solutions to the metallurgical problem of a heat resistant and tough metal for turbine engines. Its toughness at temperatures of 1200° F and resistance to centrifugal stresses which might pull the speeding gas turbine rotor apart have played an important part in bringing gas turbine engines to the practical stage.



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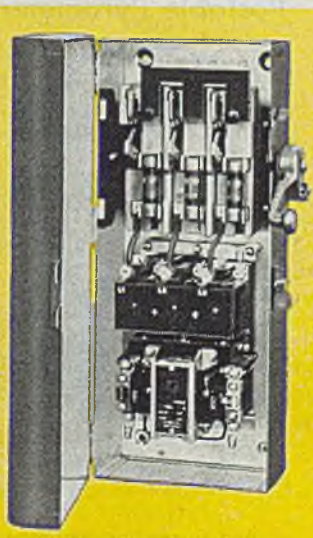

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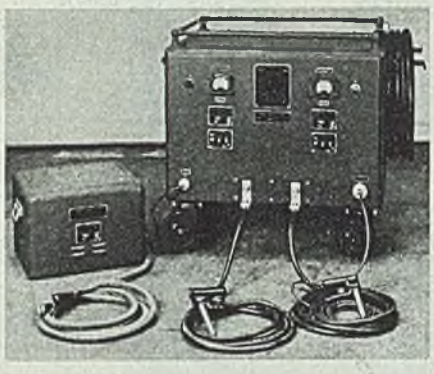
Known as KH-2, a new unit for magnetic particle inspection has been introduced by Magnaflux Corp., 5900 Northwest Highway, Chicago. It is particularly adaptable for inspection of welds, castings, large forgings and machinery parts. It permits detection of deeper sub-



surface discontinuities and enables one to distinguish between laminations and segregations in rolled plate. Welds designed with open roots can be inspected without interference of nonrelevant indications. This unit may be used to locate shrinkage cracks, hot tears, blow holes, porosity, etc. in castings; thermal cracks, lack of penetration and fusion, slag inclusions and other discontinuities in welds; laps, bursts, cold shuts, etc. in forgings; and fatigue cracks in machinery parts.

The unit provides half-wave, single phase, rectified output for direct current magnetization and also high-amperage, low-voltage alternating current for both magnetization and demagnetization.

Portable Pyrometer

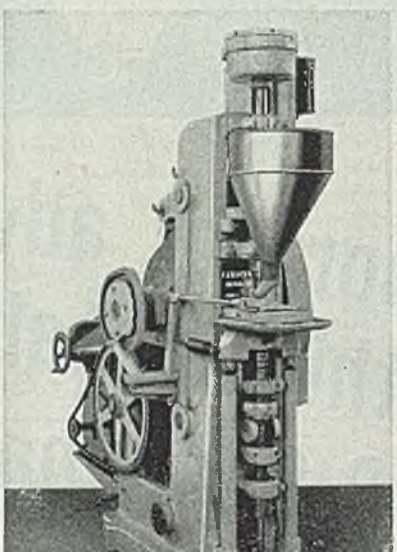
A new portable pyrometer weighing 1¾ lb is offered by Instrument Division, K. H. Huppert Co., 6830 Cottage Grove avenue, Chicago. It is particularly a-

dapted to reading temperature of molten metals (exclusive of ferrous metals) hot air or liquids and for hot surfaces if used with the prod type thermocouple.

Body design of this instrument elevates the scale to an angle that offers reading ease in all working positions and also minimizes side reflections on scale glass. Instrument movement provides accuracy of reading to 2 per cent of scale range. Duo scale is standard with readings of 0 to 500° F and 0 to 1000° F, 0 to 750°F and 0 to 1500° F, or 0 to 1000° F and 0 to 2000° F or equivalent degrees C. Other scales are available on request. Manual room temperature adjustment can be made by the zero adjustment screw on the face of the meter.

Powder Metals Press

For high speed production, up to 45 strokes per minute in automatic operation on usual run of work and to operate also as a start-stop press in making parts with inserts, F. J. Stokes Machine Co., Philadelphia 20, offers a new G-2 press. This machine is of 12 ton capacity and is



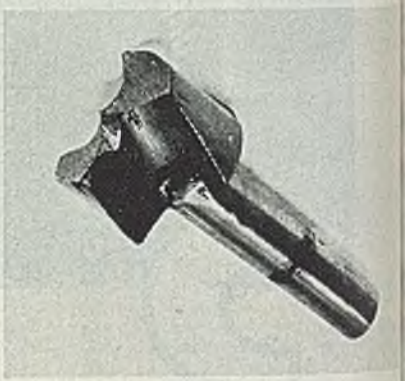
recommended for making small machine parts such as gears, internally or externally splined bushings and ordnance components, carbide tool bits and drawing dies, carbon brushes, brushes with pig-tails and iron cores with threaded shafts molded in place and other similar parts.

As a start-stop press, the operator places the insert in position and pushes a button; press measures charge in usual manner, compresses material around insert, ejects finished piece, leaving punch in the "up" position for the next cycle.

Machine is cam operated with independent cam control of both upper and lower punch movements. Die table is braced to take full rated tonnage of machine and pressures applied through punches may be simultaneous or nonsimultaneous. An independent secondary lower punch applies pressure up to 2½ tons and may be used as a fixed core rod. Upper punch will stay out of the way during nearly a third of cycle to facilitate feeding and is timed to first descend rapidly and then slowly compress material with controlled motion. A built-in hydraulic equalizer assures uniform pressure and more uniform density of each piece.

Mill Drill

Sheet metals that twist out of shape and plastics that shatter under ordinary drilling can be drilled smoothly and perfectly with the new Micro-King mill drills offered by Steel Tools Inc., 2307 Prospect avenue, Cleveland 15. No lead



holes are necessary. Holes can be drilled closer together.

High speed, chrome plated mill drill sets are available in sizes from 1/16 to 2 in. and the same drills can be used on plastics and sheet metals.

Infrared Lamps

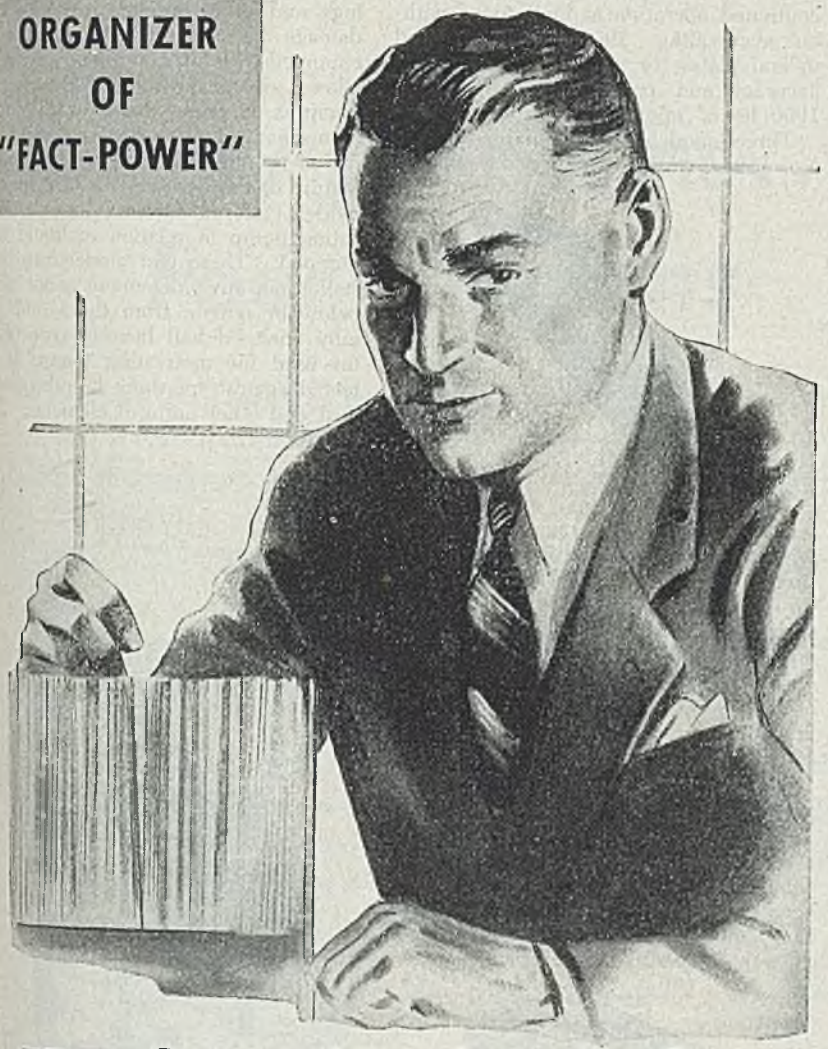
Seven new infrared lamps, including four clear drying and three reflector drying types with wattages ranging from 125 to 500, are announced by Sylvania Electric Products Inc., New York, for industrial heating services including

plastic and metal preheating, baking, drying and dehydrating.

The clear drying types provide a constant heat center length which permits a change in oven temperature by substituting lamps of suitable wattage. Reflector changes are unnecessary. General specifications for these lamps which have a constant heat center of 5¼ in. are as follows: Bulb PS25, 125 w, 115 v, medium base; bulb G30, 250 w, 115 v,

(All claims are those of the manufacturer of the equipment being described)

ORGANIZER OF "FACT-POWER"



HE frees business from the curse of idle facts

What is unusual about this man?

It's his ability to inject the priceless element of *control* into your business records . . . to give them "Fact-Power."

Without control, records are a mere history of stock . . . cost . . . personnel . . . sales. Such records *fail to indicate in themselves what action should be taken, and when.* Minor and major decisions alike must wait upon analysis of recorded facts, unless record systems provide *control.*

Sight analysis, made possible by the development of Kardex Graph-A-Matic charting signal control, is saving thousands of man-hours every day because somebody called in the *Systems Technician.* While providing the all-important control, this man also knows how to simplify and consolidate duplicated and overlapping records. He can design them to eliminate waste effort, house them for faster, easier reference, protect them from fire at the point of use.

Through knowledge interchanged with his hundreds of colleagues, he can bring you the accumulated record-control experience of leading railroads everywhere. He is at our nearest Branch Office, and can go to work for you today.

KARDEX IS 1

. . . 1 among many methods and types of equipment from which the Systems Technician selects and combines those best suited to individual needs.

P. R. MALLORY & CO., Inc.

MALLORY

P. R. MALLORY & CO., INC. wanted speedy terminations. The Systems Technician recommended a *Kardex* contract termination record with follow-up control to eliminate needless delays, protect assets and obtain prompt settlements. Steps are checked on visible margin as accomplished, thus showing exact status and controlling procedure *visibly* at all times. Two-drawer *Safe-Files* protect all supporting papers against fire loss, and serve as a base for the Kardex Cabinets. No lost time, no costly confusion with this compact system! We'll gladly furnish details.

FEDERAL

FEDERAL MOTOR TRUCK CO. wanted faster pricing. Also desired was ability to add new items and make price and other changes without breaking sequence of record. Recommended by Systems Technician, *Speed-A-Matic "Chaindex"* met all requirements with a compact, *visibly* indexed pricing list on which any part number, name and price are seen in a glance. Individual item cards are easily removed, added or changed. Operating speed is double — Federal's pricing is now done by one girl instead of two. Ten days — 400 labor hours — were recently saved in pricing annual inventory.

Spicer

SPICER MFG. CORP. wanted improved stock control. Like other leading manufacturers, Spicer has avoided production delays and cut down "rush" orders with *Kardex* and the sensational new *Graph-A-Matic "Self-Computing" Signal Control.* Actual numerical balances show clearly in a visible "chart." Status of each item is indicated in terms of overstocked, re-order point and follow-up without need of computation or analysis. This tremendous advance in record-keeping simplicity, speed and value is fully detailed in Management Controller No. 708. ASK FOR IT TODAY.

SYSTEMS DIVISION

REMINGTON RAND

315 Fourth Avenue, New York 10, N. Y.

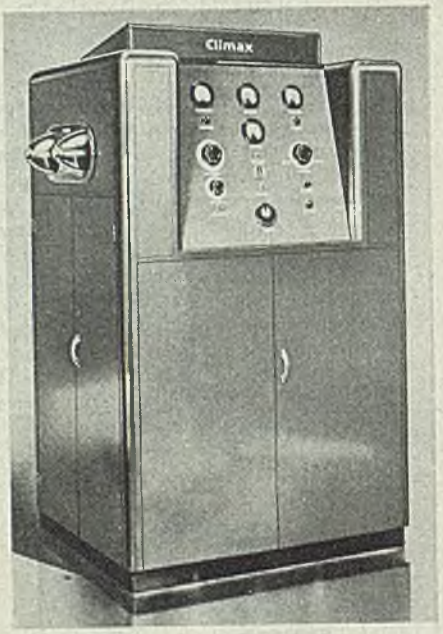
medium skirted mechanical base; bulb G30, 375 w, 115 v, medium skirted mechanical base; bulb G40, 500 w, 115 v, medium skirted mechanical base.

Reflector drying types offer a flexible infrared heating source for many drying and processing applications, including those in paint shops, foundries and other industries. General specifications for these lamps which all have a medium-skirted mechanical base are as follows: Bulb R40, 125 v; bulb R40, 250 w, 115 v; bulb R40, 375 w, 115 v.

Use of medium skirted bases provided with most of these new lamps eliminates loose bases during their extended life. This type of base is locked to the bulb mechanically and without use of cement.

High Frequency Heater

A high frequency heater which provides localized heat for surface hardening, annealing and brazing is announced by Climax Engineering Co., Clinton, Iowa. It is specially adaptable for the food industry with proved applications in such



diversified fields as sterilization, pasteurization, deactivation of enzymes, cooking and heating, baking, destroying infestations, packaging and sealing. This method of electronic heating may be applied to all nonmetallic materials.

Pneumatic Die Grinder

An increased power pneumatic die grinder for continuous high speed operation has been developed by Keller Tool Co., Grand Haven, Mich. It has a 1-piece housing of aluminum alloy with head, muffler and throttle lever blending with general housing contour. Construction features include the built-in oil reservoir which holds oil for 8 hours' operation and which may be filled by removing one screw. Oil is metered to the grinder through an automatic feeder device incorporated in the tool.

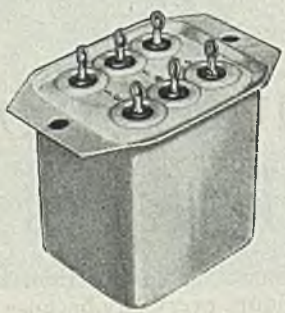
Another feature is the air cooled cylinder. Cool exhaust air circulates around the finned surface of cylinder permitting continued operation at high speed without overheating. Bearings are mounted in end plates for perfect alignment and accuracy and packed with grease for 1000 hours' operation.

Three models are available—Model No. 1505A which is equipped with col-

let chuck for holding mounted grinding wheels with ¼-in. diameter shanks; Model 1505B, equipped with adapter for holding unmounted grinding wheels with ¼-in. diameter holes; Model 1505C, equipped with ¼-in. capacity Jacobs chuck, designed for small, light drilling at high speeds. Speed of all models is 25,000 rpm; length 6 3/4 in.; weight, 18 oz.

Sealed Transformers

A new series of hermetically sealed aluminum case output transformers has been designed by Acme Electric & Mfg. Co., Cuba, N. Y. Use of annealed steel cores and special vacuum impregnated



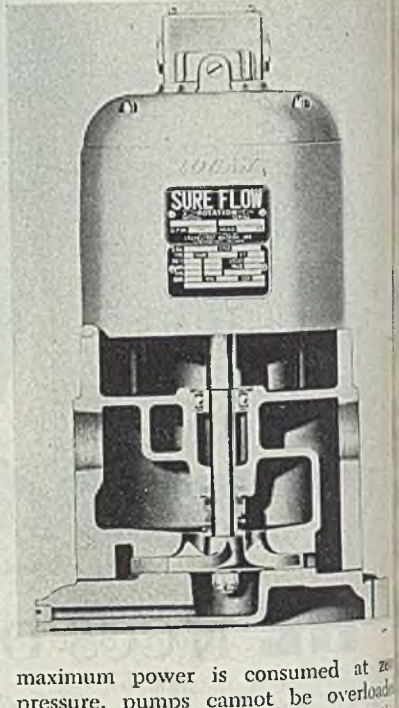
coils improves operating efficiency and general overall performance. Terminals of Pyrex glass with Kovar electrodes and metal collars form a hermetical seal that complies with standards established for 5-cycle immersion tests.

Centrifugal Pumps

Designated as Sure-Flow pumps, an improved line of centrifugal pumps including 27 different sizes and types, is announced by Logansport Machine Co. Inc., Logansport, Ind. Although designed specially for pumping coolants and cutting oils, the pumps are adaptable for circulating cooling liquids, pumping or circulating water or quenching oil and general liquid transfer service. Foot, bracket and flange mounted, grinder and submerged types are available.

One feature of these pumps is the open impeller which eliminates the need for close clearances or metal-to-metal contact of running parts and allows pumping of liquids containing some abrasives, fil-ings and other foreign matter without damage to pump. These units are equipped with integral motor drive which allows greater latitude in locating the pump as no gears, chains or other forms of mechanical drive are necessary.

Self-priming without submerging, a feature of the base and bracket mounted models, affords extreme latitude in locating pump in relation to liquid to be pumped. These two models can be installed at any convenient point above below or remote from the liquid. Totally enclosed ball bearing type of motor used for motivating pumps is protected against splashing liquids, abrasive dust and other harmful elements. Since



maximum power is consumed at ze pressure, pumps cannot be overloaded and any increase in static head, friction head or back pressure reduces delive and power requirements.

Base, bracket and flange mounted mo els employ an improved rotary seal protecting motor and bearings fro liquid. This seal is self-adjusting an accessible for servicing and never sub jected to full pumping pressure. Grin er and submerged models have m seals, an overflow hole in top of colu prevents liquid within pump from rea ing motor bearings.

Rabbeted mounting of the motor hou ing of the pumps assures permane alignment of pump and motor. Pum drive is direct through a single vertic shaft which runs in grease packed ba bearings.

Blast Nozzle

American Foundry Equipment C 555 South Byrkit street, Mishawak Ind., announces a new line of nozz using Norbide boron carbide inser The jacketing of this insert is abrasion-resistant alloy steel. Nozzle guaranteed for 1500 hr of service whe used with steel shot or grit and for hr when used with silica sand.

Many problems . . .
Four solutions

In every steel plant, as in many other kinds of plants, the operations of screening, sizing, separating and dewatering pose a number of problems . . . problems at times unique to that particular installation.

The superintendent knows what he must accomplish to insure having coal, coke or other materials in the capacities and sizes he requires. But—and this is understandable—he may not know precisely what type or types of Screens he needs to get what he wants.

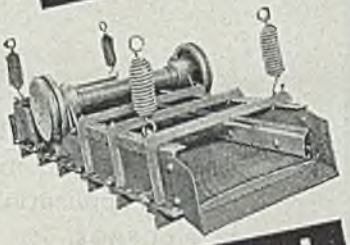
That is where Robins comes in. First of all, each Robins Sales Engineer is an engineer—trained and experienced in understanding objectives and knowing how they can be attained. Next, he has at his disposal four distinct types of Vibrating Screens, each available in a number of styles designed to serve some specific portion of your overall screening demands. In addition, he has a wide selection of Robins Screen Cloth—in meshes and weaves adequate for every purpose.

From all of this, Robins is able to supply practically any plant—large or small—with the exact answers to all its screening problems, be they simple or complex.

In turning to Robins for your Vibrating Screens, you are dealing with the company which originated many of the basic ideas employed in modern-day Screen design. (The circle-throw principle, for example, was conceived by Robins.) So you can be certain of recommendations backed by authority and founded on experience.

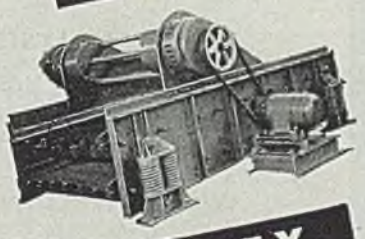
Perhaps you face a problem now—or know what you want and intend to fill that want with Screens that will give dependable service for a long time. If so, get in touch with Robins. When writing, please address Dept. S-7.

GYREX



VIBREX J

VIBREX M



ELIPTEX

ENGINEERS, MANUFACTURERS AND ERECTORS OF MATERIALS HANDLING MACHINERY

ROBINS *makes:* BELT CONVEYORS · COAL AND ORE BRIDGES · BUCKET ELEVATORS · CAR AND BARGE HAULS · CAR DUMPERS · CAR RETARDERS · CASTINGS · CHUTES · CONVEYOR IDLERS AND PULLEYS · CRUSHERS · FEEDERS · FOUNDRY SHAKEOUTS · GATES · GEARS · GRAB BUCKETS · PIVOTED BUCKET CONVEYORS · VIBRATING SCREENS · SCREEN CLOTH · SELF-UNLOADING BOAT MECHANISMS · SKIP HOISTS · STORAGE AND RECLAIMING MACHINES AND SYSTEMS · TAKEUPS · LOADING AND UNLOADING TOWERS · TRIPPERS · WEIGH LARRIES · WINCHES · WINDLASSES

FOR MATERIAL AID IN MATERIALS HANDLING . . . . . It's ROBINS

ROBINS
CONVEYORS
INCORPORATED
Founded in 1896 as Robins Conveying Belt Co.
PASSAIC • NEW JERSEY

Agitation for Quenching

(*Concluded from Page 110*)

critical cooling rate had not yet been attained and vapor pockets formed while at bottom caused excessive soft spots. This condition was remedied by using a propeller, like the one in Fig. 2, to force a flow of water over the parts, washing away the steam.

Blanks of NE 9442 steel, 2½ in. in diameter by 10 ft long, were quenched in the same amount of oil as the brine used in the case of leader pins. Ends reached hardness of 525 brinell for a distance of 1 in. from the ends to center. Balance of the blank hardened to 280-300 brinell.

If the ultimate hardness desired were below the as-quenched hardness obtained in the center section, tempering normally would equalize the hardnesses. However, if desired hardness was greater than that obtained in the center section in the as-quenched condition, therefore it became necessary to employ better agitation for a higher brinell reading. Again, the mechanical agitator shown in Fig. 2 was used, and a uniform, as-quenched hardness of 500-525 brinell was obtained.

Soft spots rarely are encountered in flame hardening or induction hardening where a spray quench is used. Also, it is thought that, in treating by these methods higher hardnesses are reached than those usually achieved by furnace methods. There are many who believe that these higher hardnesses are reached because the cold core creates the effect of a quench by dissipating heat from locally heated areas. This may or may not be true; however, there are many who disagree with this theory. The author has observed parts that have been heated by conventional furnace method reach hardness of 69-70 rockwell C.

In conclusion, it must be remembered that in order to produce the best type of heat treating—free from soft spots, with a maximum amount of distortion and size change, and maximum hardenability—there must be as much thought given to quenching procedure as to heating rates, soaking time, etc. If maximum hardness is sought, and the design or size of section is conducive to vapor formations, it often is necessary to employ flush or spray quenching to achieve the desired results.

Role of Metallurgy in Oil Industry Described

According to an article in a recent issue of *Kellogram*, published monthly by M. W. Kellogg Co., petroleum engineers, New York, the contribution of the metallurgist to engineering and operating huge vessels used in oil refining has been a major factor in the oil industry's development. Contributions made are said to include: Special metal fabrication techniques, new alloy steel developments, use of radiographic inspection, treating operations for steel for special applications, as well as research which may be important in the postwar era.

RACO 8 ELECTRODES

FOR SOUND WELDS WITH POOR FIT-UPS

Whenever you have to bridge wide gaps, that is the time to use RACO 8 Electrodes. These electrodes are heavily coated; can be used in any position . . . direct current, straight polarity or alternating current.

RACO 8 Electrodes meet the requirements of these specifications:

A.W.S.—A.S.T.M. Specification A233-43T, Type E-6012

A.S.M.E. Boiler Code, paragraph U-70

American Bureau of Shipping, Grade H1G and B2G (A.C. or D.C.)

RACO 13

Electrodes likewise give splendid results when welding on light and medium gauges of mild steel. These electrodes comply with A.W.S.—A.S.T.M. Specifications A233-43T, Type E-6013.

★

Send for samples, try out RACO 8 and 13 Electrodes and be convinced of their superior qualities.

The REID-AVERY COMPANY

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DUNDALK • BALTIMORE 22 • MARYLAND

SINCE 1919 PRODUCERS OF ARC WELDING ELECTRODES AND WELDING RODS

Corrosion Resistance

(*Concluded from Page* 122)

sea water varies with local conditions.

2. Rate for plain steel varies between 0.002 and 0.0077-in. per yr average penetration.

3. Average rate of attack for plain and for most low alloy steels is about 0.004-in. per yr average penetration.

4. Under most conditions, substitution of the low alloy steels can be justified only by tests which closely resemble service conditions which can be anticipated.

5. Rate for steel exposed between high and low tides varies with locality, pollution of water, and oil, which may form a protective coating. In warm, humid atmospheres, corrosion may be accelerated appreciably. In some tests, most severe corrosion has occurred just above normal high tides.

6. Presence of 2 to 3 per cent molybdenum usually will prevent seriously deep pitting of chromium-nickel steels containing 18 per cent chromium, 8 nickel; while molybdenum-free steels containing 25 per cent chromium and 20 per cent nickel are resonably immune from excessive pitting attack.

Oil Well Equipment Corrosion Being Studied

Cause of corrosion in the rods, tubing, and cylinders of Pennsylvania oil wells are being studied at Battelle Memorial Institute, Columbus, in a research program conducted for the Pennsylvania Grade Crude Oil Association. Research is aimed at determining corrosion prevention methods and is directed particularly toward the study of corrosion in air-gas secondary recovery operations in the Pennsylvania grade region. Program requires both laboratory investigations in Battelle laboratories and field tests at the producing wells.

To operators of air-gas secondary recovery methods in the Pennsylvania grade region, corrosion is a serious problem. It necessitates pulling and replacing rods and tubing in many wells as often as every 30 days. It has had a serious effect on the life of many wells, particularly in the Franklin and Oil City districts, where air-gas secondary operations are numerous.

—o—

No dewaxing or degreasing is necessary before carbide-tipped tools manufactured by Wendt-Sonis Co., Hannibal, Mo., are inserted into tool holders or before recording tool numbers, although each tool is coated with a special rust preventive compound. In addition to this protection, plastic caps are placed over the carbide tips to prevent chipping.

Resistance Welding

(*Continued from Page* 113)

rents. Since the power system must pro-vide this additional current, oversize lines and transformers are required, again boosting power costs. Too, power rates place a penalty on the user with a low power factor. So the high power factor of the battery-powered welder is a dual cost saver.

No Reactance Losses: When welding work in deep throats where the electrodes may be some distance in from the edge of the assembly, conventional alternating-current welders show serious power losses due to the reactance of the throat circuit. In simpler terms, this means that considerable power is lost in magnetizing the work in one direction, demagnetizing and re-magnetizing it in the opposite direction as the current changes its direction of flow. Since this occurs 60 times every second in conventional 60-cycle systems, much power is thus consumed simply in magnetizing the work.

With a battery-powered welder, there is no such loss because the welding is done with direct current which does not change its direction of flow.

No Unwanted Current Variations: In actual welding, this has another important advantage. With every change in position, that is as more steel is enclosed by the throat in making welds farther and from the edge of an assembly, the actual welding current in a conventional welder varies—the losses increase with amount of metal in the throat. With welding with battery power, there is no such change in welding current as various amounts of steel come in and out of the welder throat. This assures that the desired correct welding current will be had at all times.

Simple Controls: A feature of storage battery welders that has endeared them to maintenance men is the fact that the electric circuits are extremely simple. In fact, any maintenance man with the most rudimentary knowledge of electricity feels immediately at home with these equipments, for he can see with his own eyes the path that the current travels.

Heavy copper busbars mark the current flow. The circuit is simplicity itself from individual cells to cross connection to carbon pile contactor, through adjustable rheostat, to welding electrodes—all out in the open and readily visible. Compared with highly intricate vacuum tube circuits, the contrast is striking.

"It Can't Be Done": Development of battery-power welders is truly one of the can't-be-done-but-we-did-it type of stories. While some of the very earliest resistance welding was done with batteries, their use for heavy duty welding appeared impossible because no switch could be developed that would be capable of interrupting such heavy low voltage direct currents. In a battery-powered welder, the welding current itself must be interrupted.

Conventional alternating-current

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You may need parts, or complete products to market under your own brand, and not have enough capacity for their production.

The same equipment that set war production records can supply your peacetime products on a profitable basis. We have skilled, experienced men who specialize in many different types of work.

Our company has expanded 4 times, delivered over 6 million screw machine parts monthly to the prewar aviation industry. More than 75% of all military aircraft are equipped with our fittings. Four Army-Navy "E" Awards testify to the production ability of Poulsen & Nardon men and machines.

Why not put this skill and experience to work on your production problems? Write our Product Research Department for prompt, accurate estimates on parts or products engineered to your specifications. Poulsen & Nardon, Inc. Main Plant: 2665 Leonis Blvd., Los Angeles 11, Calif., LAfayette 0961. Eastern Office: 345 Madison Ave., New York 17, N.Y., LExington 2-1170.

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PN POULSEN & NARDON, INC.

sistance welders control the heavy welding current indirectly by interrupting the current in the primary of the welding transformer, where the amperes involved are a mere fraction of those in the welding circuit.

This problem of repeatedly interrupting 20,000 to 50,000 amp or more for continuous service hour after hour has some of the foremost electrical engineers in the country "stumped". "It couldn't be done," they said.

Yet Progressive Welder research, under the direction of Chester Leathers, development engineer, found a solution that has proved to be eminently satisfactory. It is a simple direct approach to the problem. Before interrupting the welding current a resistance is automatically inserted and raised in value so that the welding current falls gradually to almost zero. In this manner, it is not necessary to break the large welding current itself, but a much smaller value approaching zero.

The device that does this is a variation of the familiar carbon-pile rheostat. But instead of having many small carbon disks in series, the current is arranged to pass from two large disks into a third centrally located between the two.

Breaking 20,000 Amperes—No Spark. Fig. 3 shows the carbon-pile contactor. It is a massive heavy duty unit capable of making and breaking extremely heavy currents continuously. This unit was viewed in operation interrupting 20,000 amp on a regular production job, yet absolutely no sparking could be seen between the carbon disks as the current was broken—only an occasional glow from a tiny particle of carbon dust.

Fig. 2 is a disassembled view of the carbon-pile contactor in Fig. 3. The centrally located contact A has two carbon disk surfaces facing similar carbon disks mounted on the top and bottom contacts B and C. When these parts are assembled with springs and guides as in Fig. 3, the contact surfaces are just barely separated. When the contactor is operated, an electric solenoid air valve admits air to the cylinder above the contact assembly, operating the piston and forcing the contacting carbon disk surfaces together under a pressure of several thousand pounds.

The four contacting surfaces offer two paths for the flow of the welding current: From the bottom contact to the central one (from B to A) and from the top contact to the central one (from C to A).

As the contacting surfaces go together they first offer considerable resistance to the passage of current. As pressure applied increases, the resistance of the contacting surfaces decreases rapidly until under full pressure, there is practically no resistance to the flow of current and full welding current passes through the contactor. Carbon disk surfaces are specially prepared to have the desired pressure-resistance characteristics.

To stop the flow of welding current air pressure is removed, allowing springs

"Ceilings" are saving you money

*84 months after war started

It's a far longer and more expensive war than the last one—but this time the cost of living hasn't been allowed to get out of hand. If you're ever tempted to grumble at price-and-wage controls, look at these charts—and DON'T. They're one reason to bless ceiling prices...and to check 'em whenever you shop. (They're posted for your protection!)

Rationing gives all a fair share

The Millionbucks get no more points than the poorest folks in town. Necessities are rationed to see that each gets his share. And rationing also keeps prices down: without it the fellow with the biggest wad of dough would have a terrific edge. Share and play square . . . pay points for everything you buy. (And shun black markets like the enemy they are!)

—and the money you DON'T SPEND helps hold living costs down

The plain bread-and-butter fact is this: there's about $1.50 in people's pockets for every dollar's worth of goods in the stores.

Splurge—buy anything you don't actually need—and you put the heat on everything to rise all along the line.

Save—deny yourself something you want but can get along without—and you help yourself a little today and a lot tomorrow.

Squeeze that budget. Squeeze a little more money into your savings account. Squeeze a little more into insurance. Squeeze yourself into buying another War Bond today . . . and every month from now on in.

Wise enough to harness your money for your own safety?

ONLY YOU CAN DO IT.

A United States War Message prepared by the War Advertising Council, approved by the Office of War Information; and contributed by this magazine in cooperation with the Magazine Publishers of America.

in the assembly to separate the contacting surfaces. Upon release of the contacting pressure, the carbon surfaces offer a certain amount of resistance to the flow of current, this resistance increasing rapidly as the pressure decreases so that, as the surfaces separate, practically no current remains to be interrupted.

Everything Is Water-Cooled: Fig. 4, a view of a 32-cell 50,000 amp battery, carbon-pile contactor and charger set, reveals the interlacing network of rubber tubing connecting various portions of the equipment for water cooling.

Note in Fig. 2 the two tube connections seen extending from each contact plate. These connect to an internal cooling water circuit for conducting heat away from the contacting surfaces.

One of the major advances in connection with battery-powered welders was the idea of cooling not only those parts of the welder normally cooled but also the batteries themselves. This has two advantages. It keeps battery temperature at the most efficient level, preventing excess gas formation and the like. At the same time, it makes possible the use of fewer batteries when welding at high rates, since it prevents overheating under such conditions. If cell temperature is kept down, extremely large currents can be handled, it was found. Cooling of conductors also reduces power losses in these.

Every water cooled cell has a 50-in. coil of tubing lying in the electrolyte at top of the cell. Cooling water flows continuously through this tubing. By thus limiting cell temperature to 72°, even under continuous full load service, the battery provides approximately 3,333 amp of welding current per cell (20,000 amp from 12-cell batteries—two 6-parallel groups in series; 50,000 amp from 32-cell unit). At a 20 per cent duty cycle, the cells never even get warm.

Series-Parallel Connections: Of course, cells are not connected all in parallel but in a series-parallel arrangement. A typical 12-cell battery will have six cells connected in parallel; another six connected in parallel; the two groups then connected in series. This gives 4 v output since each cell has 2 v, no load. Voltage across this battery under full load will be about 3.2.

Such a battery will supply 22,000 amp welding current, sufficient to make 1900 welds per hour between two pieces of ⅛-in. hot-rolled steel, with a constant changing current of 3200 amp (low voltage, not "line" current) going into the battery. These welds will be in the form of a ⅜-in. wide spot that will easily meet a standard 3000-lb test when pulled on a hand machine. Most such welds fail by tearing, not at 3000 lb. top but at 6200 lb, more than double the specified test value.

Special Batteries: The lead plate storage batteries employed for these welders were especially developed for service at high charge and discharge rates. Instead of each cell having two terminals, as in conventional batteries, each of these cells has six terminals—three negative, three positive. Thus, each set of plates in every cell is connected to the busbar circuits through three large low-resistance paths, assuring maximum ampere output with low circuit losses. Using multiple connections to each cell this provides low electrical resistance to flow of current, in turn keeping temperature and power losses at a minimum.

Busbars also are bored internally for water cooling. The welding electrodes likewise are cooled. Sometimes, as on other types of welders, the employ a refrigerant to increase the heat removal rate to assure operating temperatures well below room temperatures. Such low electrode temperatures have been found valuable in holding down "mushrooming" of the and in producing better welds. Refrigeration equipment is supplied by Frost rode Products Co.

Adjustments Are Simple: Most plant men who see this machine in action find its extremely simple adjustments a source of great satisfaction. Stepless adjustment of welding current is obtained by changing the position of movable contacts on a cast iron rheostat such as that seen on the left side of the unit in Fig. 4.

Length of time the welding current is applied can be controlled either by a cam type timer that is easily adjusted to provide the welding period desired, as well as any interval between welds, by a simple conventional timer. In the first case, all electronic tubes and circuits are eliminated of course. In the second case, the circuit employed is much simpler than usual as there is no need for electronic contactors, "synchronous" timing and the like.

A safety interlock on the cooling water circuit shuts down the machine in event of any interruption to the water supply.

In Fig. 4 can be seen the arc welding structural steel frame accommodating two groups of 16 cells each, making the 32-cell 50,000 amp battery. Upon the top of the frame is the carbon-pile contactor with its heavy, flexible connections to the moving contacts. Just to the right is the charging set.

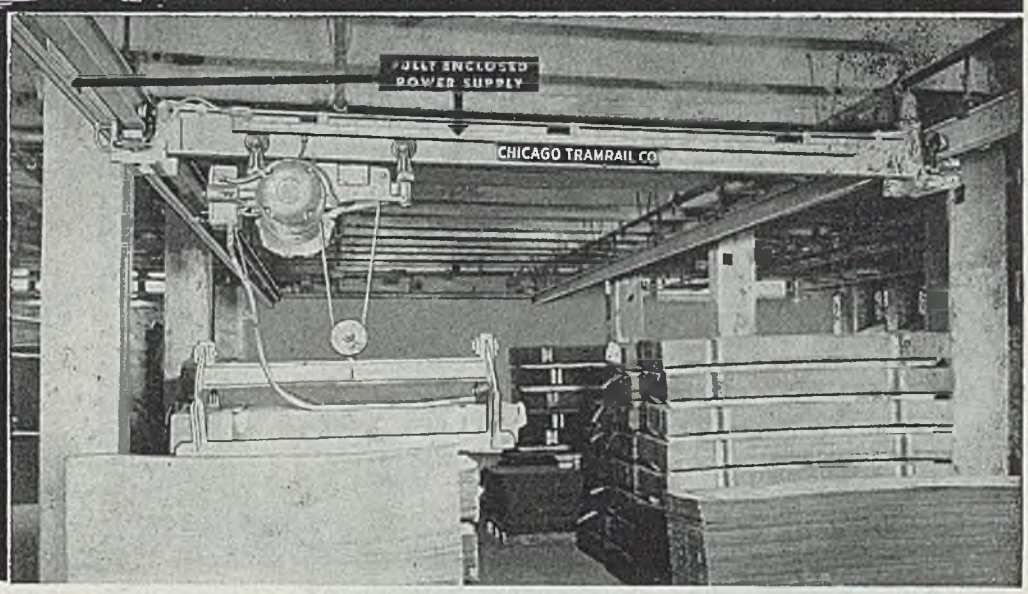
This consists of a 3-phase transformer to change the plant power circuit voltage of 220 or 440 v down to the low voltage required by the batteries. Full-wave copper-sulphide disk rectifiers then change the alternating current to direct current for charging the batteries.

Control of charging current is provided by taps on the transformer. The battery is kept fully charged automatically in many cases by using two charging rates, one just under the value required to maintain the battery at full charge under the particular service on hand, the other rate being sufficient to slightly overcharge the battery. Then a controller is employed to switch from one rate to the other as needed. The controller consists essentially of a voltmeter whose 6-in. scale is calibrated to read from 2.00 to 2.50 v.

It is only necessary to set the con-

Stack up BIG $AVINGS Handling STEEL STORAGE

FASTER
SAFER
at less cost!

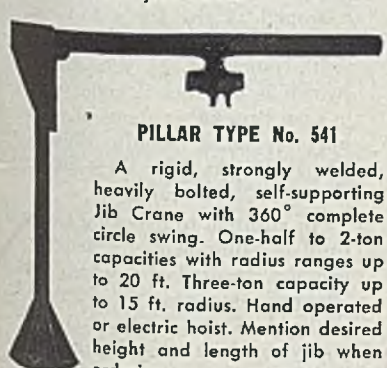


Unit shown is a single motor, Chicago Tramrail Underhung Crane with push-type trolley, electric hoist and Sheet-Grab. Also available in 2 and 3 motor types for automatic operation of longitudinal, lateral and vertical motions of crane.

Photo Courtesy M. Block & Sons, Chicago, Ill.

The savings accomplished by the installation of Chicago Tramrail Overhead Cranes in your steel storage rooms are not theoretical. They are real dollars and cents savings that show up prominently on your cost sheet. The above photograph shows a small, hand-operated overhead crane with sheet-grab handling sheet steel in bundles. It illustrates a few of the ways in which you save.

You *save* on installation costs—one crane does the job of many because it can operate throughout the room, the hoist being shifted from one bay to another at various transfer points along the runways. You *save* on labor: These easily operated cranes release large crews for other work. You *save* on accident costs—the fully enclosed conductors are a real safety feature where men are working on top of the bundles close to the hoist. You *save* space—the steel bundles in the photograph above are stacked more than 6½ ft. high in a ten-foot ceiling room.



PILLAR TYPE No. 541

A rigid, strongly welded, heavily bolted, self-supporting Jib Crane with 360° complete circle swing. One-half to 2-ton capacities with radius ranges up to 20 ft. Three-ton capacity up to 15 ft. radius. Hand operated or electric hoist. Mention desired height and length of jib when ordering.

We urge you—install Chicago Tramrail Overhead Cranes in your steel storage rooms without delay. Discover how the correct type of crane can save labor, reduce costs and speed up safer handling of steel in storage and elsewhere in your plant.

Write—ask us to submit specific recommendations. No obligation.

CHICAGO TRAMRAIL COMPANY

2912 CARROLL AVENUE Phone KEDzie 7475 CHICAGO 12, ILLINOIS

troller to the voltage which represents fully charged condition (about 2.8 in most instances). Then the control operates the charger at the low rate until a drop in battery voltage indicates that charge is desirable; then it automatically switches the charger to the higher rate.

This automatically keeps the battery at the charge desired.

No Power Shutdowns: Failure of the power supply will not require shutting down the welder for a considerable period of time. For instance, the 50,000 amp battery unit with eight cells in parallel will have some 5400 usable amp-hr of energy stored in it, as each cell is rated 680 amp-hr. This is sufficient to make approximately 2000 welds before it becomes necessary to recharge, based on welds of 3000 amp at 1/3 sec each.

Mr. Johnson predicts that the most important advantages of storage-battery powered welders as outlined here will result in a great expansion in their use as the metal fabricating industry becomes better acquainted with their possibilities.

Variety of Equipment Saved by Rubber Repair

Under the Army Air Forces' program to conserve rubber, aircraft tires are retreaded and repaired at the Air Technical Service Command, San Bernardino, Calif. All repair equipment was designed by shop personnel and built at the field. Thousands of tires and tubes including all sizes for both aircraft and ground equipment are handled each day, according to Capt. J. H. Gardiner, rubber conservation officer.

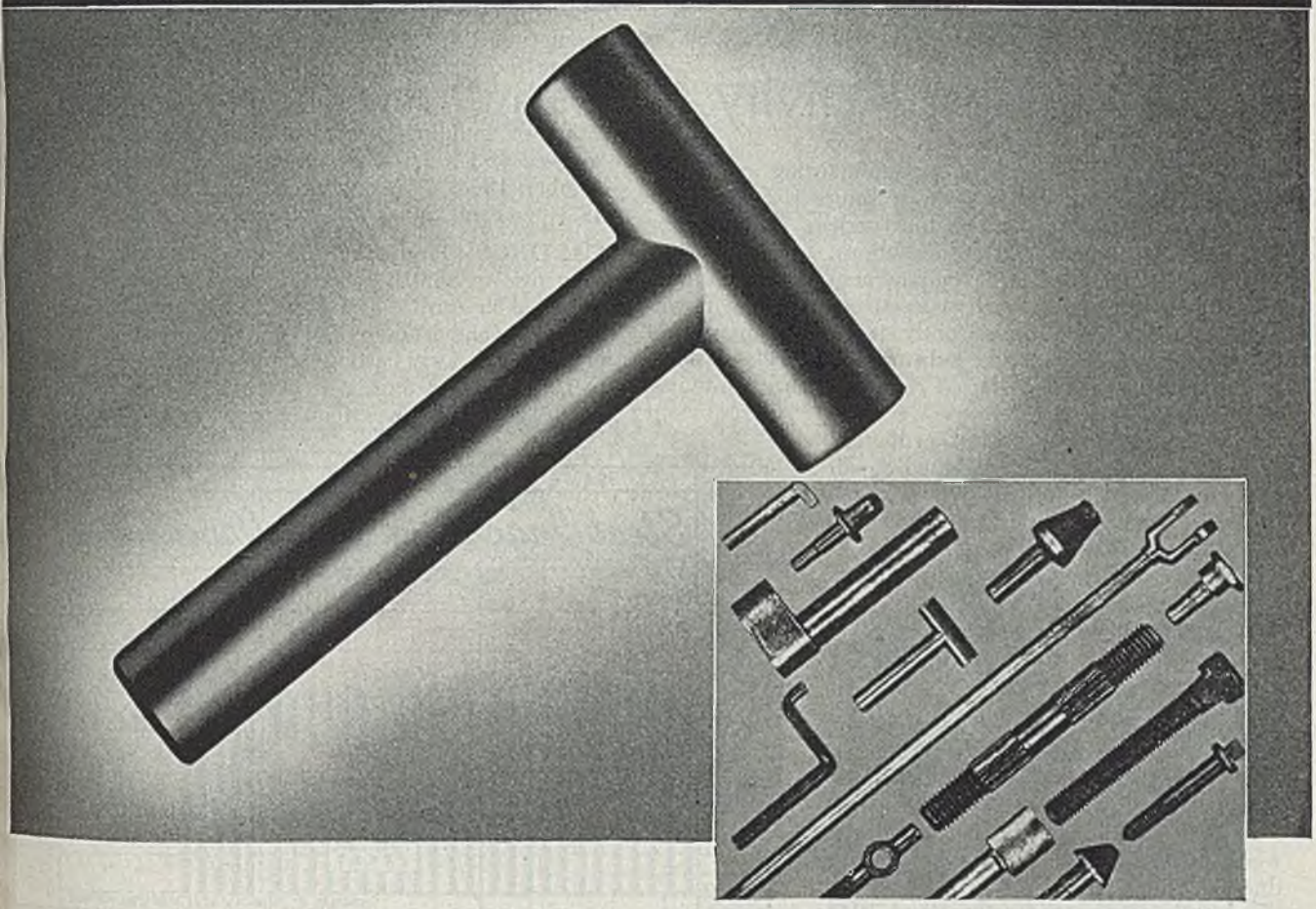
Molds for spot-repairing 56-in. tires on the larger bombers were developed by the branch leader and tire shop foreman, and curing of major rim cut repairs in 56-in. tubes is accomplished with a steam-heated plate designed by another workman. Repair of the inner side of small-diameter tail wheel tubes is made possible by use of a combination steam mold with four steam-heated pipes of various sizes to which tail wheel tubes are clamped. A tire for a C-47 transport is said to have made more than 100 landings with much of its retreading still good which is considered good wear even for a new tire. Other items of rubber equipment repaired include: Rubber self-sealing fuel tanks, Mae West life vests, flying boots, and life rafts.

In addition to checking tires and other rubber equipment to determine what can be repaired and which must be reclaimed as scrap, the 856th AAF Specialized Depot, Ontario, Calif., analyzes the cause of breakdowns. This helps to plan preventive maintenance for making rubber equipment last longer.

—o—

An illustrated brochure entitled 'First' for Twenty-five Years," showing the facilities of the plant and personnel of Wisconsin Screw Co., 21st and Clark, Racine, Wis.

100 YEARS *Making strong the things that make America strong*



If you need Parts like these

...have you considered COLD-FORGING?

A great variety of metal shapes are produced on the same high-precision, high-production machinery that is used to cold-forge RB&W EMPIRE bolts.

Cold-forging gives you the maximum of all the characteristics you would undoubtedly want in such a product —

Strength. Cold-forging on RB&W equipment increases tensile strength; the grain is intensified, flow lines in the metal are preserved. The operation provides an automatic inspection of the material.

Accuracy. RB&W cold-forging machinery can work to close tolerances and produce parts of extreme accuracy and fine finish.

Economy. Such parts can often be produced at much lower cost, due to the high speed production and the virtual elimination of scrap waste.

THE LONGEST EXPERIENCE IN AUTOMATIC COLD-FORGING

This is RB&W's 100th year. The history of this company is also the history of automatic cold-forging, for it introduced the original automatic cold-heading machine and has since pioneered in the improvement of quality and the lowering of costs of fasteners and other parts which can be cold-forged.

In planning new parts, consider the many metal shapes which can be produced by cold-forging and also that RB&W's experience and facilities make it your logical source of supply. At present, wartime commitments have largely monopolized those facilities; in designing for postwar, keep in mind the advantages of this method.

RB&W

Russell, Burdsall & Ward Bolt and Nut Company. *Factories at:* Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill. *Sales offices at:* Philadelphia, Detroit, Chicago, Chattanooga, Los Angeles, Portland, Seattle... with the industry's most complete, easiest-to-use catalog.

BOLTS EMPIRE NUTS-RIVETS

AND ALLIED FASTENING PRODUCTS · SINCE 1845

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

THE BUSINESS TREND

Move to Postwar Jobs Buoys Business Activity

MOVEMENT from wartime manufacturing and munitions plants to jobs with a postwar future is being made by a considerable portion of the workers displaced by war contract cutbacks and cancellations.

A drop in manufacturing employment began in January of this year and in each successive month the downtrend has continued. Significantly, it was in January that employment in the service industries, finance, transportation, and construction started a rise that has continued each month since then.

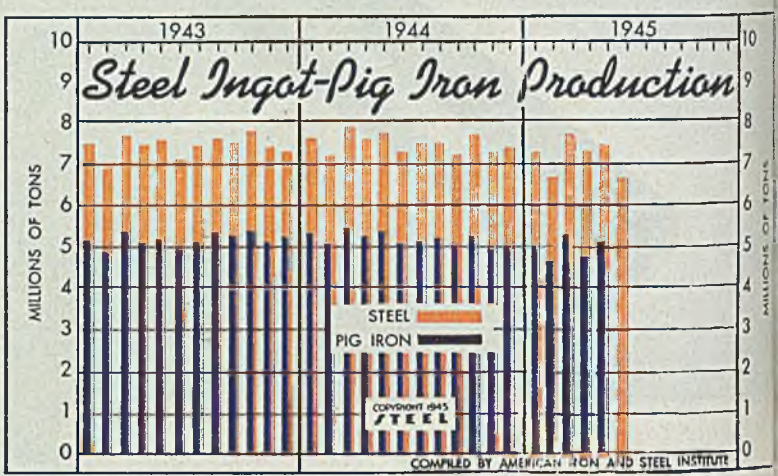
This movement into jobs rather than into unemployment has contributed steadiness to business activity which might otherwise show a greater general decline than that registered in recent months. In the latest week a slight upturn is noted in industrial and business activity, with steel ingot production, which recently has been holding around the 90 per cent of capacity mark, a buoyant factor.

COAL PRODUCTION—A discouraging note in the overall picture is bituminous coal output, daily average production being down 650,000 tons from the previous week. Although the latest reported week included the July 4 holiday, production that week was 624,000 tons less than in the corresponding week of 1944. Production to date in 1945 is 6.9 per cent behind that for the corresponding period of last year.

COMMODITY PRICES—The Bureau of Labor Statistics index of commodity prices in primary markets declined 0.1 per cent in the latest week as a result of lower quotations for agricultural products. The index was 0.2 per cent below a month ago but 1.8 per cent above the first part of July, 1944. Continued upward adjustments in prices for anthracite, permitted by the Office of Price Administration to compensate for higher costs, were offset by lower sales realizations for electricity to leave the group index for fuel and lighting materials unchanged during the week.

BUILDING PERMITS—Continuing to trend upward, the value of building permits issued in June in 215 cities reached $82,802,672, the highest level recorded since November, 1944. This was 9.8 per cent over May, 1945, and 42.3 per cent higher than June, 1944.

CASTINGS—Production of malleable iron castings in May rose to 83,013 short tons from a tonnage of 77,04[illegible] recorded in April. The May, 1945, production was 12,458 tons higher than that in the corresponding period of last year. Steel castings shipped during April amounted to 190,166 short tons, a 10 per cent decrease from March and 7 per cent lower than April, 1944.



Iron, Steel Production

(Net tons—000 omitted)

	Steel Ingots			Pig Iron	
	1945	1944	1943	1945	194[illegible]
January	7,206	7,593	7,425	4,945	5,[illegible]
February	6,655	7,194	6,825	4,563	5,[illegible]
March	7,708	7,826	7,675	5,228	5,[illegible]
April	7,292	7,594	7,374	4,786	5,[illegible]
May	7,451	7,703	7,550	5,016	5,[illegible]
June	6,869	7,234	7,039	....	5,[illegible]
July	....	7,498	7,408	....	5,[illegible]
August	....	7,499	7,586	....	4,[illegible]
September	....	7,235	7,514	....	5,[illegible]
October	....	7,621	7,814	....	4,[illegible]
November	....	7,279	7,374	....	4,[illegible]
December	....	7,366	7,266	....	[illegible]
Total	....	89,642	88,873	....	61,[illegible]

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)	90	88.5	88	96.5
Electric Power Distributed (million kilowatt hours)	4,295	3,978	4,348	4,377
Bituminous Coal Production (daily av.—1000 tons)	1,342	1,992	2,012	1,446
Petroleum Production (daily av.—1000 bbls.)	4,944	4,886	4,888	4,602
Construction Volume (ENR—unit $1,000,000)	$49.0	$30.8	$59.2	$62.5
Automobile and Truck Output (Ward's—number units)	15,100	14,365	19,600	19,420

*Dates on request.

TRADE				
Freight Carloadings (unit—1000 cars)	796†	726	873	905
Business Failures (Dun & Bradstreet, number)	25	9	13	15
Money in Circulation (in millions of dollars)	$26,932	$26,834	$26,533	$22,561
Department Store Sales (change from like week a year ago)‡	+16%	+21%	+4%	+11

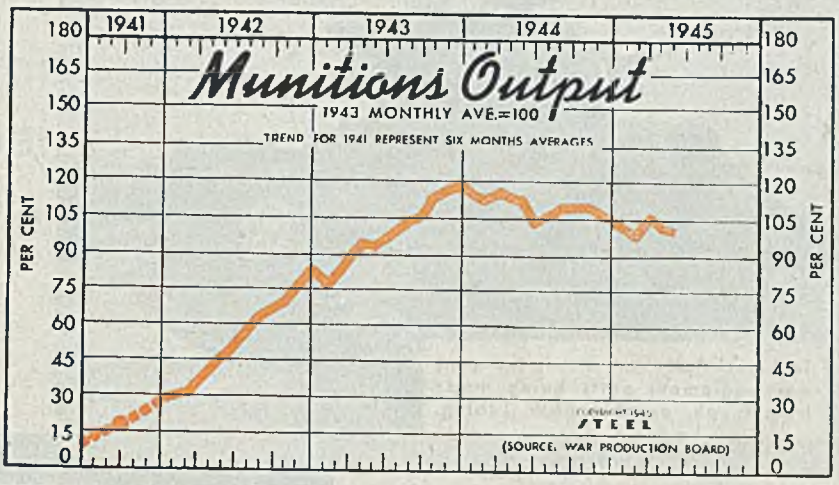
†Preliminary. ‡Federal Reserve Board.

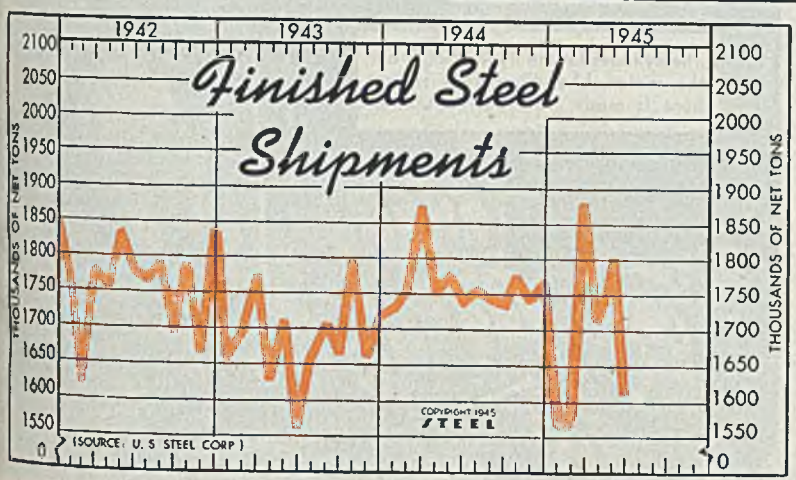
WPB's Munitions Output Index

(Ave. Month, 1943 = 100)

	1940	1941	1942	1943	1944	1945
Jan.	..	..	29	79	112	103
Feb.	..	..	31	82	111	100
Mar.	..	..	36	90	115	106
April	..	12	43	97	111	100
May	..	..	48	95	111	99
June	..	..	53	97	104	...
July	..	..	59	101	106	...
Aug.	..	..	66	105	108	...
Sept.	..	..	69	106	108	...
Oct.	6	17	70	114	108	...
Nov.	..	..	78	117	106	...
Dec.	..	..	85	117	105	...

[e] Estimated.





U. S. Steel Corp.'s Finished Steel Shipments

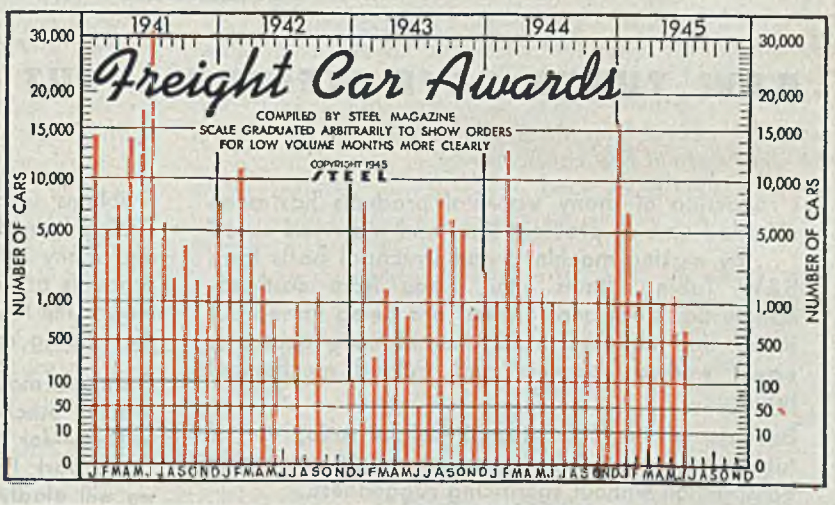
(Net Tons)

	1945	1944	1943	1942
Jan.	1,569,115	1,730,787	1,658,992	1,738,893
Feb.	1,562,488	1,755,772	1,691,592	1,616,587
Mar.	1,869,642	1,874,795	1,772,397	1,780,938
Apr.	1,722,845	1,756,797	1,630,828	1,758,894
May	1,797,987	1,776,934	1,706,543	1,834,127
June	1,602,882	1,737,769	1,552,662	1,774,068
July	.....	1,754,525	1,660,762	1,765,749
Aug.	.....	1,743,485	1,704,289	1,788,650
Sept.	.....	1,733,602	1,664,577	1,703,570
Oct.	.....	1,774,969	1,794,968	1,787,501
Nov.	.....	1,743,753	1,660,594	1,665,545
Dec.	.....	1,767,600	1,719,624	1,849,635
Total	.....	21,150,788	20,244,830	21,064,157
Adjustment	.....	.....	*97,214	*449,020
Total	.....	.....	20,147,616	20,615,137

*Decrease.

Freight Car Awards

	1945	1944	1943	1942
Jan.	7,200	1,020	8,365	4,253
Feb.	1,750	13,240	350	11,725
March	2,500	6,510	1,935	4,080
April	1,120	4,519	1,000	2,125
May	1,526	1,952	870	822
June	670	1,150	50	0
July	.....	795	4,190	1,025
Aug.	.....	3,900	8,747	0
Sept.	.....	400	6,820	1,863
Oct.	.....	2,425	5,258	0
Nov.	.....	1,065	870	0
Dec.	.....	16,245	2,919	135
Total	.....	53,221	41,355	26,028



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$11,648	$10,604	$10,835	$10,177
Federal Gross Debt (billions)	$261.6	$259.1	$242.8	$207.8
Bond Volume, NYSE (millions)	$27.8	$20.3	$60.5	$55.5
Stocks Sales, NYSE (thousands)	4,478	4,115	9,254	7,486
Loans and Investments (billions)†	$64.3	$63.5	$58.3	$56.3
United States Gov't. Obligations Held (millions)†	$47,122	$46,543	$43,296	$41,048

†Member banks, Federal Reserve System.

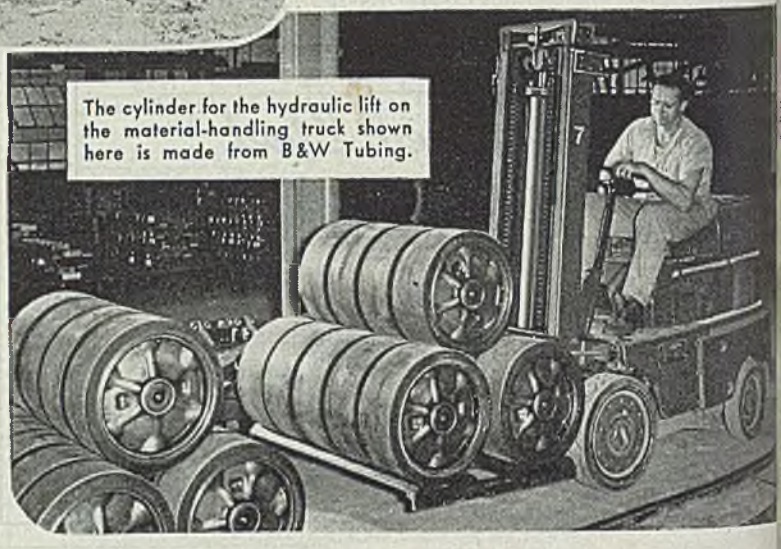
PRICES

STEEL's composite finished steel price average	$58.27	$58.27	$58.27	$56.73
All Commodities†	105.8	105.9	106.0	103.9
Industrial Raw Materials†	118.3	118.7	118.8	113.8
Manufactured Products†	102.0	102.0	102.0	101.1

†Bureau of Labor's Index, 1926 = 100.

Tank track "pins" are among the many war equipment parts being made from tough, durable B&W Tubing.

in feet for tanks



The cylinder for the hydraulic lift on the material-handling truck shown here is made from B&W Tubing.

and arms for trucks

...B&W TUBES SAVE WEIGHT...CUT COSTS

Production of many war-vital products has been speeded up . . . precious time and materials saved . . . by making machined and structural parts from B&W Tubing. Items once made from costly-to-handle bar stock and forgings are being turned out faster and cheaper from dimensionally accurate, easily worked seamless and welded mechanical tubing.

Because of its high strength-weight ratio, use of tubing makes possible important weight savings in construction without sacrificing ruggedness.

In the host of new and unusal war production problems successfully solved by B&W Mechanical Tubing, manufacturers of peace-time equipment will find many adaptions that will help produce better products at lower costs with less waste of material. Now is the time to look into the production short-cuts that tubing makes possible.

From its modern specialty tube mills, B&W can supply mechanical tubing—both seamless and welded—for making any hollow machined or fabricated part. Let us know what you plan to make and we will gladly tell you how B&W Tubing can save you time and money.

B&W TUBES

SEAMLESS. Complete range of carbon, alloy and Stainless steels. Sizes ½ in. to 8⅝ in. O.D.
ELECTRIC-RESISTANCE WELDED Carbon steel grades. Sizes: ¾ in. to 4 in. O.D.

THE BABCOCK & WILCOX TUBE CO.

Welded Tube Division, Alliance, Ohio — Seamless Tube Division, Beaver Falls, Pa.

B&W MAKES BOTH

Little Effect from Effort To Free Civilian Steel

Deliveries continue far advanced as few cancellations appear . . . Scrap and pig iron supply tight . . . Production holds steady

LITTLE effect of War Production Board's effort to clear the complicated mill situation in steel sheets and strip has appeared, following the freezing of books for third quarter and subsequent revision to apply the freeze only to September orders.

Cancellation of steel orders on mill books so far has been much less than expected, most applying to remote deliveries, leaving nearby schedules little higher. Mills have received few cancellations following the order to reduce inventories from 60 to 45 days supply, but more are expected to appear soon. Tightness continues in all major products except plates, the latter being available for August delivery in some instances, with expectation that further easing will be felt in fourth quarter. As a result of the tightness there is limited opportunity to schedule sheets, strip, bars and wire for civilian products before fourth quarter, except in cases where priority relief is afforded. Mills had heavy carryovers fom second quarter, more than sufficient to ovebalance total cancellations, with little expectation of substantial reduction of backlogs during the current quarter.

Some relief is reported given manufacturers of automobile parts, some being able to place orders for early shipment, part of the volume replacing cancellations within lead time, while priority assistance with allotments accompanies others. Some of this tonnage is in heavier sheet and strip gages, which are considerably easier than for lighter gages.

Estimated average rate of steel production last week remained stationary at 90 per cent of capacity, changes in various districts balancing. Cleveland gained 8 points to 86 per cent, Wheeling 5 points to 96½, Cincinnati 5 points to 96, Detroit 3 points to 83 and New England 1 point to 86 per cent. Chicago receded ½-point to 94 per cent, Pittsburgh ½-point to 86½, Buffalo 2 points to 88½ and St. Louis 8 points to 70.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended July 21	Change	Same Week 1944	Same Week 1943
Pittsburgh	86.5	—0.5	90	93
Chicago	94	—0.5	101	99.5
Eastern Pa.	87	None	95	93
Youngstown	90	None	95	97
Wheeling	96.5	+5	100	90
Cleveland	86	+8	92	94
Buffalo	88.5	—2	90.5	93
Birmingham	95	None	95	95
New England	86	+1	90	95
Cincinnati	96	+5	86	92
St. Louis	70	—8	79.5	97
Detroit	83	+3	83	90
Average	90	None	°97	°97

°Based on steelmaking capacities as of these dates.

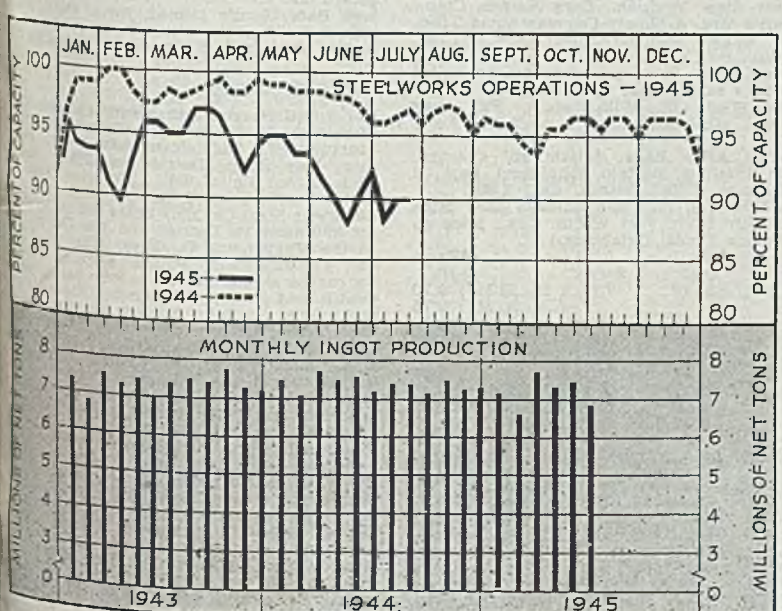
Rates were unchanged as follows: Youngstown 90, eastern Pennsylvania 87 and Birmingham 95.

Structural demand is increasing and more projects are coming out, including public work and industrial expansion. Mills now are booked into November, with some capacity still open in October. Unrated orders are not likely to bring deliveries in third quarter. Relaxation in restrictions on building is causing projects to be forwarded more rapidly than in the past. At the same time contracting is held back in some instances by shortage of other materials than structural steel.

Pig iron production is sufficient to fill needs but is critical, as neither producers nor consumers have much backlog and with a number of blast furnaces down for repairs or because of high costs there is little margin of safety. Melters are taking as much or more thanin second quarter and if more labor were much or more than in second quarter and if more labor were higher, requiring increased iron. Some stacks under repair are nearly ready to return to production and the situation may be eased in a short time.

No betterment has appeared in steel and iron scrap supply and while melters are not distressed there has been no possibility of building reserves to he desired point and some apprehension is felt as to supply for the winter. Labor shortage limits yard preparation and dealers fear to take in too much unprepared scrap in view of inability to process it. Most large users have bought as heavily as brokers are willing to commit themselves and are not now placing new orders. Cutbacks in ammunition contracts and shipbuilding have reduced flow of industrial scrap, with no compensating increase from civilian manufacture. With pig iron production also limited more scrap is desired in steelmaking and for foundry melting. Foundries find cast grades difficult to obtain. Borings and turnings continue to advance on small supply.

Average composite prices of steel and iron products show no change, remaining at ceilings. Finished steel composite is $58.27, semifinished at $37.80, steelmaking pig iron $24.05 and steelmaking scrap $19.17.



COMPOSITE MARKET AVERAGES

	July 21	July 14	July 7	One Month Ago June, 1945	Three Months Ago April, 1945	One Year Ago July, 1944	Five Years Ago July, 19
Finished Steel	$58.27	$58.27	$58.27	$58.27	$57.55	$56.73	$56.
Semifinished Steel	37.80	37.80	37.80	36.45	36.00	36.00	38.
Steelmaking Pig Iron	24.05	24.05	24.05	24.05	23.55	23.05	23.
Steelmaking Scrap	19.17	19.17	19.17	19.07	19.17	19.17	19.

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire nails, tin plate, standard 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. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	July 21, 1945	June, 1945	April, 1945	July, 1944
Steel bars, Pittsburgh	2.25c	2.25c	2.15c	2.15c
Steel bars, Chicago	2.25	2.25	2.15	2.15
Steel bars, Philadelphia	2.57	2.57	2.47	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.25	2.25	2.20	2.10
Plates, Philadelphia	2.30	2.30	2.25	2.15
Plates, Chicago	2.25	2.25	2.20	2.10
Sheets, hot-rolled, Pittsburgh	2.20	2.20	2.20	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.70	3.70	3.65	3.50
Sheets, hot-rolled, Gary	2.20	2.20	2.20	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.70	3.70	3.65	3.50
Bright bess., basic wire, Pittsburgh	2.75	2.75	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.90	2.90	2.80	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$36.00	$36.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	36.00	36.00	34.00	34.00
Rerolling billets, Pittsburgh	36.00	36.00	34.00	34.00
Wire rods, No. 5 to 5/16-inch, Pitts.	2.15	2.15	2.00	2.00

Pig Iron

	July 21, 1945	June, 1945	April, 1945
Bessemer, del. Pittsburgh	$26.19	$26.19	$26.19
Basic, Valley	24.50	24.50	24.50
Basic, eastern del. Philadelphia	26.34	26.34	26.34
No. 2 fdry., del. Pitts., N.&S. Sides	25.69	25.69	25.69
No. 2 foundry, Chicago	25.00	25.00	25.00
Southern No. 2, Birmingham	21.38	21.38	21.38
Southern No. 2 del. Cincinnati	25.30	25.30	25.30
No. 2 fdry., del. Phila.	26.84	26.84	26.84
Malleable, Valley	25.00	25.00	25.00
Malleable, Chicago	25.00	25.00	25.00
Lake Sup., charcoal, del. Chicago	37.34	37.34	37.34
Gray forge, del. Pittsburgh	25.19	25.19	25.19
Ferromanganese, del. Pittsburgh	140.33	140.33	140.33

Scrap

Heavy melting steel, No. 1 Pittsburgh	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.45	18.75
Rails for rolling, Chicago	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00

Coke

Connellsville, furnace, ovens	$7.50	$7.50	$7.00
Connellsville, foundry ovens	8.25	8.25	7.75
Chicago, by-product fdry., del.	13.35	13.35	13.35

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, Feb. 4, 1942 and May 1945. 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. Seconds and off-grade products are also covered. Exceptions applying to individual companies are noted in the table. Finished steel quoted in cents per pound.

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 Kaiser Co. Inc., $43, f.o.b. Pacific ports.)

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncrop., $45.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $36; Detroit, del. $38; Duluth (bil) $38; Pac. Ports, (bil) $48. (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. Granite City Steel Co. $47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co., Kaiser Co. Inc., $58.64, Pac. ports.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $42. Detroit, del. $44; Duluth, billets, $44; forg. bil. f.o.b. Pac. ports, $54.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 f.o.b. Toronto, O. Geneva Steel Co., Kaiser Co. Inc., $64.64, Pacific ports.)

Open Hearth Shell Steel: Pittsburgh Chicago, Gary, Cleveland, Buffalo, Youngstown, Birmingham, base 1000 tons one size and section; 3-12 in., $52; 12-18 in., excl., $54.00; 18 in. and over $56. Add $2.00 del. Detroit; $3.00 del. Eastern Mich. (Kaiser Co. Inc., $76.64, f.o.b. Los Angeles).

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54; del. Detroit $56, Eastern Mich. $57.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $36. (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 Point, Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—5/16 in. inclusive, per 100 lbs., $2.15. Do., over 5/16—47/64-in., incl., $2.30; Galveston, base, 2.25c and 2.40c, respectively. Worcester add $0.10; Pacific ports $0.50. (Pittsburgh Steel Co., $0.20 higher.)

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3": Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham base 20 tons one size, 2.25c; Duluth, base 2.35c; Mahoning Valley 2.32½c; Detroit, del. 2.35c; Eastern Mich. 2.40c; New York del. 2.59c; Phila. del. 2.57c; Gulf Ports, dock 2.62c; Pac. ports, dock 2.90c. (Calumet Steel Division, Borg-Warner Corp., and Joslyn Mfg. & Supply Co. may quote 2.35c, Chicago base; Sheffield Steel Corp., 2.75c, f.o.b. St. Louis.)

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., 2.80c.
(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)	0.70
		(.20-.30 Mo)	0.75
2300	1.70	4300	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.85	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 2.70c; Toledo 2.80c. (Keystone Drawn Steel Co. may sell outside its usual market area on Proc. Div., Treasury Dept. contracts at 2.65c, Spring City, Pa., plus freight on hot-rolled bars from Pittsburgh to Spring City. New England Drawn Steel Co. may sell outside New England on WPB directives at 2.65c, Mansfield, Mass., plus freight on hot-rolled bars from Buffalo to Mansfield.)

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit del. 3.45c; Eastern Mich. 3.50c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.25c; Detroit del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c; Pacific ports, dock 2.55c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo base 2.15c; Detroit, del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c.

Iron Bars: Single refined, Pitts. 4.40c; double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, single ref., 5.00c, double ref., 6.25c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.20c; Granite City, base 2.30c; Detroit del. 2.30c; Eastern Mich. 2.35c; Phila. del. 2.37c; New York del. 2.44c; Pacific ports 2.75c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., may quote 2.35c, hot carbon sheets, nearest eastern basing point.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.15c; Eastern Mich. 3.20c; New York del. 3.39c; Phila. del. 3.37c; Pacific ports 3.50c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.70c; Granite City, base 3.80c; New York del. 3.96c; Phila. del 3.87c; Pacific ports 4.25c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.85c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; Granite City 3.70c; Pacific ports 4.25c; copper iron 3.90c, pure iron 3.85c; zinc coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.25c.

Enameling Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 2.85c; Granite City, base 2.95c; Detroit, del. 2.95c; eastern, Mich. 3.00c; Pacific ports 3.50c; 20-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.45c; Detroit del. 3.55c; eastern Mich. 3.60c; Pacific ports 4.10c.

Electrical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.30c	4.05c	3.30c
Armature	3.65c	4.40c	3.75c
Electrica	4.15c	4.90c	4.25c
Motor	5.05c	5.80c	5.15c
Dynamo	5.75c	6.50c	5.85c
Transformer			
72	6.25c	7.00c	.....
65	7.25c	8.00c	.....
58	7.75c	8.50c	.....
52	8.55c	9.30c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.20c; Eastern Mich. 2.25c; 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. 2.90c; Eastern Mich. 2.95c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Chicago 3.05c; Detroit del. 3.05c; Eastern Mich. 3.10c; 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, 0.50 lb. tin, $4.50; 0.75 lb. tin $4.65.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c; Pacific ports 4.55c.

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; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.25c; New York, del. 2.44c; Phila., del. 2.30c; St. Louis, 2.49c; Boston, del. 2.57-82c; Pacific ports, 2.80c; Gulf ports, 2.60c.

(Granite City Steel Co. may quote carbon plates 2.35c f.o.b. mill; 2.65c f.o.b. D.P.C. mill; Kaiser Co. Inc., 3.20c, f.o.b. Los Angeles. Central Iron & Steel Co. 2.50c f.o.b. basing points; Geneva Steel Co., Provo, Utah, 3.20c, f.o.b. Pac. ports.)

Floor Plates: Pittsburgh, Chicago, 3.50c; Pacific ports, 4.15c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c; Gulf ports 3.95c; Pacific ports 4.15c.

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; Pacific ports, 2.75c.

(Phoenix Iron Co., Phoenixville, Pa., may quote carbon steel shapes at 2.35c at established basing points and 2.50c, Phoenixville, for export; Sheffield Steel Corp., 2.55c f.o.b. St. Louis, Geneva Steel Co., 3.25c, Pac. ports); Kaiser Co. Inc., 3.20c f.o.b. Los Angeles).

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, $1 for Duluth).

Bright basic, bessemer wire 2.75c

Spring wire 3.35c

(Pittsburgh Steel Co., 0.20c higher.)

Wire Products to the Trade:

Standard and Cement-coated wire nails, and staples, 100-lb. keg, Pittsburgh, Chicago, Birmingham, Cleveland, Duluth $2.90; galvanized, $2.55; Pacific ports .....$3.40 and $3.05

Annealed fence wire, 100-lb., Pittsburgh, Chicago, Cleveland 3.20c

Galvanized fence wire, 100 lb., Pittsburgh, Chicago, Cleveland 3.55c

Woven fence, 15½ gage and heavier, per base column ..... .67c

Barbed wire, 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 70; twisted barless wire, column 70.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled 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	½	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	54½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-19	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, $43.00. Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $45.00.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $31-$33.

Supplies: Track bolts, 4.75c; heat treated, 5.00c. Tie plates, $46 net ton, base, Standard spikes, 3.25c.

*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.

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

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEEL					
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	48.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
†321	29.00	34.00	41.00	28.25	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.

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.
⅜-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
⅜-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	*7.50
Connellsville, foundry	8.00- 8.50
New River, foundry	9.00- 9.25
Wise county, foundry	7.75- 8.25
Wise county, furnace	7.25- 7.75
By-Product Foundry	
Kearney, N. J., ovens	12.68
Chicago, outside delivered	12.60
Chicago, delivered	13.35
Terre Haute, delivered	13.10
Milwaukee, ovens	13.35
New England, delivered	14.25
St. Louis, delivered	†13.35
Birmingham, delivered	10.50
Indianapolis, delivered	13.10
Cincinnati, delivered	12.85
Cleveland, delivered	12.80
Buffalo, delivered	13.00
Detroit, delivered	13.35
Philadelphia, delivered	12.88

*Operators of hand-drawn ovens using trucked coal may charge $8.00, effective May 26, 1945. †13.85 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	11.55c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras.

	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	NE hot bars 8600 series	NE hot bars
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[14]	4.144[21]	4.715	6.012[22]	6.01
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[13]	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[13]	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	5.816[22]	5.86
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[30]	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[14]	4.165[21]	.....	.....	...
Bethlehem, Pa.*	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	...
Claymont, Del.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	...
Coatesville, Pa.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	...
Buffalo (city)	3.35[1]	3.40[1]	3.63[1]	5.26[1]	3.35[1]	3.819[1]	3.819[1]	4.75[15]	4.40[10]	3.75[21]	4.669	5.60[22]	5.75
Buffalo (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.81[1]	3.50[1]	4.65[15]	4.30[10]	3.65[21]	4.35	5.60[22]	5.75
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[15]	4.40[14]	3.75[21]	.....	.....	...
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[15]	4.30[14]	3.65[21]	.....	.....	...
Cleveland (city)	3.35[1]	3.588[1]	3.40[1]	5.188[1]	3.35[1]	3.60[1]	3.60[1]	4.877[15]	4.40[14]	3.75[21]	4.45[21]	5.60[22]	5.85
Cleveland (country)	3.25[1]	.....	3.30[1]	.....	3.25[1]	3.50[1]	3.50[1]	.....	4.30[14]	3.65[21]	4.35[21]	.....	...
Detroit	3.450[1]	3.661[1]	3.609[1]	5.281[1]	3.450[1]	3.700[1]	3.700[1]	5.000[13]	4.500[34]	3.800[21]	4.659	5.93[22]	5.90
Omaha (city, delivered)	4.115[1]	4.165[1]	4.165[1]	5.765[1]	3.865[1]	4.215[1]	4.215[1]	5.608[19]	5.443[34]	4.443[13]	.....	.....	...
Omaha (country, base)	4.015[1]	4.065[1]	4.065[1]	5.665[1]	3.765[1]	4.115[1]	4.115[1]	5.508[19]	.....	.....	.....	.....	...
Cincinnati	3.611[1]	6.391[1]	3.661[1]	5.291[1]	3.425[1]	3.675[1]	3.675[1]	4.825[12]	4.475[34]	4.011[21]	4.711	6.10	6.10
Youngstown, O.*	.....	.....	.....	.....	.....	.....	.....	4.40[12]	.....	.....	.....	.....	...
Middletown, O.*	.....	.....	.....	.....	3.25[1]	3.50[1]	3.50[1]	4.65[16]	.....	.....	.....	.....	...
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	5.231[15]	4.20[24]	3.75[21]	4.65	5.75[22]	5.95
Milwaukee	3.637[1]	3.687[1]	3.687[1]	5.287[1]	3.387[1]	3.737[1]	3.737[1]	5.272[15]	4.337[14]	3.887[21]	4.787	5.987[22]	6.00
Indianapolis	3.58[1]	3.63[1]	3.63[1]	5.23[1]	3.518[1]	3.768[1]	3.768[1]	4.918[15]	4.568[24]	3.98[21]	4.78	6.08[22]	6.19
St. Paul	3.76[2]	3.81[2]	3.81[2]	5.41[2]	3.51[2]	3.86[2]	3.86[2]	5.257[15]	4.46[24]	4.361[21]	5.102	6.09[22]	6.19
St. Louis	3.647[1]	3.697[1]	3.697[1]	5.297[1]	3.397[1]	3.747[1]	3.747[1]	5.172[15]	4.347[34]	4.031[21]	4.931	6.181[22]	6.35
Memphis, Tenn.	4.015[5]	4.065[5]	4.065[5]	5.78[5]	3.965[5]	4.215[5]	4.215[5]	5.265[15]	4.78[34]	4.33[21]	.....	.....	...
Birmingham	3.50[1]	3.55[1]	3.55[1]	5.908[1]	3.45[1]	3.70[1]	3.70[1]	4.75[15]	4.852[24]	4.54	5.215	.....	...
New Orleans (city)	4.10[4]	3.90[4]	3.90[4]	5.85[4]	4.058[4]	4.20[4]	4.20[4]	5.25[26]	5.079[10]	4.80[21]	5.429	.....	...
Houston, Tex.	3.75[2]	4.25[2]	4.25[2]	5.50[9]	3.763[2]	4.313[2]	4.313[2]	5.313[26]	4.10[10]	3.65[23]	.....	.....	...
Los Angeles	4.40[4]	4.65[4]	4.95[4]	7.20[4]	5.00[4]	4.95[4]	6.75[4]	6.00[13]	7.20[6]	5.583[21]	5.613	5.85[22]	5.95
San Francisco	4.15[7]	4.35[7]	4.65[7]	6.35[7]	4.55[7]	4.50[7]	5.75[7]	6.35[13]	7.30[15]	5.333[21]	7.333	8.304[22]	8.40
Portland, Oreg.	4.45[27]	4.45[27]	4.75[27]	6.50[27]	4.65[27]	4.75[27]	6.30[27]	5.75[13]	6.60[15]	5.533[15]	.....	.....	8.00
Tacoma	4.35[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.95[15]	7.60[15]	5.783[21]	.....	.....	8.00
Seattle	4.35[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.95[15]	7.05[15]	5.783[21]	.....	.....	...

*Basing point cities with quotations representing mill prices, plus warehouse spread.
NOTE—All prices fixed by Office of Price Administration in Amendments Nos. 10 to 18 to Revised Price Schedule No. 49. Deliveries outside ... cities computed in accordance with regulations.

BASE QUANTITIES

[1]400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 8999 pounds; [6]—300 to 9999 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 bundl... [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pou... [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 t... 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pou... [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, ... [27]—300 to 4999 pounds.

Ores

Lake Superior Iron Ore

Gross ton. 51½% (Natural) 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, units, 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	7.50-8.00

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 (seller's nearest rail)

48% 3:1	52.80
less $7 freight allowance	

Manganese Ore

Sales prices of Metals Reserve Co., cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85.0c; Fontana, Calif., Provo, Utah, and Pueblo, C... 91.0c; prices include duty on ... ported ore and are subject to p... miums, penalties and other pr... sions of amended M.P.R. No. ... effective as of May 15. Price basing points which are also po... of discharge of imported ma... nese ore is f.o.b. cars, shipside, dock most favorable to the b...

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$1...

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Chemical Composition Limits, Per Cent — Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Electric furn... Bars per 100 lb.	Billets per GT	Bars per 100 lb.	Billets
NE 8612	.10-.15	.70-.90	.20-.35	.40-.60	.40-.70	.15-.25	$0.65	$13.00	$1.15	$95.0
NE 8720	.18-.23	.70-.90	.20-.35	.40-.60	.40-.70	.20-.30	.70	14.00	1.20	98.0
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	98.0
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	98.0
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.80	16.00	1.30	98.0
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.65	13.00	1.15	98.0
NE 9830	.28-.33	.70-.90	.20-.35	.70-.90	.85-1.15	.20-.30	1.30	26.00	1.80	98.0
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	98.0
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	98.0

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 ... on vanadium alloy.

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941, amended Feb. 14, 1945. Exceptions indicated in footnotes. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$26.00	$25.50	$27.00	$26.50
Newark, N. J., del.	27.53	27.03	28.53	28.03
Brooklyn, N. Y., del.	28.50	.....	.....	29.00
Birdsboro, Pa., base	26.00	25.50	27.00	26.50
Birmingham, base	†21.38	†20.00	26.00	.....
Baltimore, del.	26.61	.....	.....	.....
Boston, del.	26.12	.....	.....	.....
Chicago, del.	25.22	.....	.....	.....
Cincinnati, del.	25.06	23.68	.....	.....
Cleveland, del.	25.12	24.24	.....	.....
Newark, N. J., del.	27.15	.....	.....	.....
Philadelphia, del.	26.46	25.96	.....	.....
St. Louis, del.	25.12	24.24	.....	.....
Buffalo, base	25.00	24.00	26.00	25.50
Boston, del.	26.50	26.00	27.50	27.00
Rochester, del.	26.53	.....	27.53	27.03
Syracuse, del.	27.08	.....	28.08	27.58
Chicago, base	25.00	24.50	25.50	25.00
Milwaukee, del.	26.10	25.60	26.60	26.10
Muskegon, Mich., del.	28.19	.....	.....	28.19
Cleveland, base	25.00	24.50	25.50	25.00
Akron, Canton, O., del.	26.39	25.89	26.89	26.39
Detroit, base	25.00	24.50	25.50	25.00
Saginaw, Mich., del.	27.31	26.81	27.81	27.31
Duluth, base	25.50	25.00	26.00	25.50
St. Paul, del.	27.63	27.13	28.13	27.63
Erie, Pa., base	25.00	24.50	26.00	25.50
Everett, Mass., base	26.00	25.50	27.00	26.50
Boston, del.	26.50	26.00	27.50	27.00
Granite City, Ill., base	25.00	24.50	25.50	25.00
St. Louis, del.	25.50	25.00	.....	25.50
Hamilton, O., base	25.00	24.50	.....	25.00
Cincinnati, del.	25.44	25.61	.....	26.11
Neville Island, Pa., base	25.00	24.50	25.50	25.00
‡Pittsburgh, del. No. & So. sides	25.69	25.19	26.19	25.69
Provo, Utah, base	23.00	22.50	.....	.....
Sharpsville, Pa., base	25.00	24.50	25.50	25.00
Sparrows Point, base	26.00	25.50	.....	.....
Baltimore, del.	26.99	.....	.....	.....
Steelton, Pa., base	.....	25.50	.....	26.50
Swedeland, Pa., base	26.00	25.50	27.00	26.50
Philadelphia, del.	26.84	26.34	.....	27.34
Toledo, O., base	25.00	24.50	25.50	25.00
Youngstown, O., base	25.00	24.50	25.50	25.00
Mansfield, O., del.	26.94	26.44	27.44	26.94

Base grade, silicon 1.75-2.25%; add 50 cents for each additional 0.25% silicon, or portion thereof; deduct 50 cents for silicon below 1.75% on foundry iron. †For phosphorus 0.70% or over deduct 38 cents. ‡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.

Note: Add 50 cents per ton for each 0.50% manganese or portion thereof over 1.00%.

Nickel differentials: Under 0.50%, no extra; 0.50% to 0.74% incl., $2 per ton; for each additional 0.25% nickel, $1 per ton.

High Silicon, Silvery

6.00-6.50 per cent (base)	$30.50		
6.51-7.00	$31.50	9.01- 9.50	36.50
7.01-7.50	32.50	9.51-10.00	37.50
7.51-8.00	33.50	10.01-10.50	38.50
8.01-8.50	34.50	10.51-11.00	39.50
8.51-9.00	35.50	11.01-11.50	40.50

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%.

Electric Furnace Ferrosilicon: Sil. 14.01 to 14.50%, $45.50; each additional .50% silicon up to and including 18% add $1; low impurities not exceeding 0.05 Phos., 0.40 Sulphur, 1.00% Carbon, add $1.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton. (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.)

Charcoal Pig Iron

Northern

Lake Superior Furn. $34.00
Chicago, del. 37.34

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. $24.50
Valley base 24.50

Low Phosphorus

Basing points: Birdsboro, Pa., $30.50; Steelton, Pa., and Buffalo, N. Y., 30.50 base; 31.74, del., Philadelphia. Intermediate phos., Central Furnace, Cleveland, $27.50

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differential: 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.

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: Struthers Iron & Steel Co. may charge 50 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.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky. $68.50

First Quality

Pa., Ill., Md., Mo., Ky.	54.40
Alabama, Georgia	54.40
New Jersey	59.35
Ohio	47.70

Second Quality

Pa., Ill., Md., Mo., Ky.	49.35
Alabama, eorgia	40.30
New Jersey	52.00
Ohio	38.15

Malleable Bung Brick

All bases 63.45

Silica Brick

Pennsylvania	54.40
Joliet, E. Chicago	62.45
Birmingham, Ala.	54.40

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	32.90
Wire cut	30.80

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Metallurgical grade, f.o.b. Ill., Ky., net ton, carloads CaF_2 content, 70% or more, $33; 65 but less than 70%, $32; 60 but less than 65% $31; less than 60%, $30. (After Aug. 29 base price any grade $30.) war chemicals.

Ferroalloy Prices

Ferromanganese (standard) 78-82% c.l. gross ton, duty paid, $135; add $6 per packed c.l., $10 for ton, $12.50 less-ton, f.o.b. cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer; Rockdale or Rockwood, Tenn., where Tennessee Products Co. is seller; Birmingham, Ala., where Sloss-Sheffield Steel & Iron Co. is seller; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%; delivered Pittsburgh, $140.33.

Ferromanganese (Low and Medium Carbon): per lb. contained manganese; eastern zone, low carbon, bulk, c.l., 23c; 2000 lb. to c.l., 24.40c; medium, 14.50c and 15.20c; central, low carbon, bulk, c.l., 23.30c; 2000 lb. to c.l., 24.40c; medium 14.80c and 16.20c; western, low carbon, bulk, c.l., 24.50c, 2000 lb. to c.l., 25.40c; medium, 15.7c and 17.20c; f.o.b. shipping point, freight allowed.

Spiegeleisen: 19-21% carlots per gross ton, Palmerton, Pa., $36; 16-19%, $35.

Electrolytic Manganese: 99.9% plus, less ton lots, per lb. 37.6 cents.

Chromium Metal: 97% min. chromium, max. .50% carbon, eastern zone, per lb. contained chromium bulk, c.l., 79.50c, 2000 lb. to c.l. lots; central, 81c and 82.50c; western 82.25c and 84.75c; f.o.b. shipping point, freight allowed.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, R.R. freight allowed, eastern zone, $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: High carbon, eastern zone, bulk, c.l., 13c, 2000 lb. to c.l., 13.90c; central, add .40c and .65c; western, add 1c and 1.85c—high nitrogen, high carbon ferrochrome: Add 5c to all high carbon ferrochrome prices; all zones; low carbon eastern, bulk, c.l., max. 0.06% carbon, 23c, 0.10% 22.50c, 0.15% 22c, 0.20% 21.50c, 0.50% 21c, 1.00% 20.50c, 2.00% 19.50c; 2000 lb. to c.l., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 0.20% 22.50c, 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add .4c for bulk, c.l. and .65c for 2000 lb. to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb. c.l.; carload packed differential .45c; f.o.b. shipping point, freight allowed. Prices per lb. contained Cr high nitrogen, low carbon ferrochrome: Add 2c to low carbon ferrochrome prices; all zones. For higher nitrogen carbon add 2c for each .25% of nitrogen over 0.75%.

Special Foundry ferrochrome: (Chrom. 62-66%, car. approx. 5-7%) Contract, carload, bulk 13.50c, packed 13.95c, ton lots 14.40c, less, 14.90c, eastern, freight allowed, per pound contained chromium; 13.90c, 14.35c, 15.05c and 15.55c central; 14.50c, 14.95c, 16.25c and 16.75c, western; spot up .25c.

S.M. Ferrochrome, high carbon: (Chrom. 60-65%, sil. 4-6%, mang. 4-6% and carbon 4-6%.) Contract, carlot, bulk, 14.00c, packed 14.45c, ton lots 14.90c, less 15.40c, eastern, freight allowed; 14.40c, 14.85c, 15.55c and 16.05c, central; 15.00c, 15.45c, 16.75c and 17.25c, western; spot up .25c; per pound contained chromium.

S.M. Ferrochrome, low carbon: (Chrom. 62-66%, sil. 4-6%, mang. 4-6% and carbon 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium; 20.40c, 20.85c, 21.65c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up .25c.

SMZ Alloy: (Silicon 60-65%, Mang. 5-7%, zir. 5-7% and iron approx. 20%) per lb. of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up .25c.

Silcaz Alloy: (Sil. 35-40%, cal. 9-11%, alum. 6-8%, zir. 3-5%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed; 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up .25c.

Silvaz Alloy: (Sil. 35-40%, van. 9-11%, alum. 5-7%, zir 5-7%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern, freight allowed; 58.50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up ¼c.

CMSZ Alloy 4: (Chr. 45-49%, mang. 4-6%, sil. 18-21%, zir. 1.25-1.75%, and car. 3.00-4.50%). Contract, carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up .25c.

CMSZ Alloy 5: (Chr. 50-56%, mang. 4-6%, sil. 13.50-16.00%, zir. .75-1.25%, car. 3.50-5.00%) per lb. of alloy. Contract, carlots, bulk, 10.75, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c and 12.50c, central; 13.25c and 13.75c, 14.50c and 15.00c, western, spot up .25c.

Ferro-Boron: (Bor. 17.50% min., sil. 1.50% max., alum. 0.50% max. and car. 0.50% max.) per lb. of alloy contract ton lots, $1.20, less ton lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Manganese-Boron: (Mang. 75% approx., boron 15-20%, iron 5% max., sil. 1.50% max. and carbon 3% max.), per lb. of alloy. Contract, ton lots, $1.89, less, $2.01, eastern, freight allowed; $1.903 and $2.023 central, $1.935 and $2.055 western, spot up 5c.

Nickel-Boron: (Bor. 15-18%, alum. 1% max., sil. 1.50% max., car. 0.50% max., iron 3% max., nickel, balance), per lb. of alloy. Contract, 5 tons or more, $1.90, 1 ton to 5 tons, $2.00, less than ton $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Chromium-Copper: (Chrom. 8-11%, cu. 88-90%, iron 1% max. sil. 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot, up 2c.

Vanadium Oxide: (Fused: Vanadium oxide 85-88%, sodium oxide approx. 10% and calcium oxide approx. 2%, or Red Cake: Vanadium oxide 85% approx., sodium oxide, approx. 9% and water approx.

2.5%) Contract, any quantity, $1.10 eastern, freight allowed, per pound vanadium oxide contained; contract carlots, $1.105, less carlots, $1.108, central; $1.118 and $1.133, western; spot add 5c to contracts in all cases.

Calcium metal; cast: Contract, ton lots or more $1.80, less, $2.30, eastern zone, freight allowed, per pound of metal; $1.809 and $2.309 Central, $1.849 and $2.349, western; spot up 5c.

Calcium-Manganese-Silicon: (Cal. 16-20% mang. 14-18% and sil. 53-59%), per lb. of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up .25c.

Calcium-Silicon: (Cal. 30-35%, sil. 60-65% and iron 3.00% max.), per lb. of alloy. Contract, carlot, lump 18.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up .25c.

Briquets, Ferromanganese: (Weight approx. 3 lbs. and containing exactly 2 lbs. mang.) per lb. of briquets. Contract, carlots, bulk .0605c, packed .063c, tons .0655c, less .068c, eastern, freight allowed; .063c, .0655c, .0755c and .078c, central; .066c, .0685c, .0855c and .088c, western; spot up .25c.

Briquets: Ferrochrome, containing exactly 2 lb. cr., eastern zone, bulk, c.l., 8.25c per lb. of briquets, 2000 lb. to c.l., 8.75c; central, add .3c for c.l. and .5c for 2000 lb. to c.l.; western, add .70c for c.l., and .2c for 2000 lb. to c.l.; **silicomanganese,** eastern, containing exactly 2 lb. manganese and approx. ¼ lb. silicon, bulk, c.l., 5.80c, 2000 lbs. to c.l., 6.30c; central, add .25c for c.l. and 1c for 2000 lb. to c.l.; western, add .5c for c.l., and 2c for 2000 lb. to c.l.; **ferrosilicon,** eastern, approx. 5 lb., containing exactly 2 lb. silicon, or weighing approx. 2½ lb. and containing exactly 1 lb. of silicon, bulk, c.l., 3.35c, 2000 lb. to c.l., 3.80c; central, add 1.50c for c.l., and .40c for 2000 lb. to c.l.; western, add 3.0c for c.l. and .45c for 2000 to c.l.; f.o.b. shipping point, freight allowed.

Ferromolybdenum: 55-75% per lb. contained molybdenum f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

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.

Ferrosilicon: Eastern zone, 90-95%, bulk, c.l., 11.05c, 2000 lb. to c.l., 12.30c; 80-90%, bulk c.l., 8.90c, 2000 lb. to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb. to c.l., 9.05c; 50%, bulk c.l., 6.65c and 2000 lb. to c.l., 7.85c; central 90-95%, bulk, c.l., 11.20c, 2000 lb. to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 10.45c; 75%, bulk, c.l., 8.20c, 2000 lb. to c.l., 9.65c; 50% bulk, c.l., 7.10c, 2000 lb. to c.l., 9.70c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb. to c.l., 15.60c; 80-90%, bulk, c.l., 9.55c, 2000 lb. to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000 to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 to c.l., 8.75c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

Silicon Metal: Min. 97% silicon and max. 1% iron, eastern zone, bulk, c.l., 12.90c, 2000 lb. to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% silicon and max. 2% iron, eastern, bulk, c.l., 12.50c, 2000 lb. to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c f.o.b. shipping point, freight allowed. Price per lb. contained silicon.

Manganese Metal: (96 to 98% manganese, max. 2% iron), per lb. of metal, eastern zone, bulk, c.l., 36c, 2000 lb. to c.l., 38c, central, 36.25c, and 39c; western 36.55c and 41.05c; 95 to 97% manganese, max. 2.50% iron, eastern, bulk, c.l., 34c; 2000 to c.l., 35c; central 34.25c and 36c; western, 34.55c and 38.05c; f.o.b. shipping point, freight allowed.

Ferrotungsten: Spot, carlots, per lb. contained tungsten, $1.90; freight allowed as far west as St. Louis.

Tungsten Metal Powder: spot, not less than 97 per cent, $2.50-$2.60; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb. contained titanium; ton lots $1.23; less-ton lots $1.25; eastern. 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 eastern. 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 destination east of Mississippi River and North of Baltimore and St. Louis. 6-8% carbon $142.50; 3-5% carbon $157.50.

Carbortam: Boron 0.90 to 1.15% net ton to carload, 8c lb. Lots Suspension Bridge, N. Y., frt. allowed same as high-carbon ferro-titanium.

Bortam: Boron 1.5-1.9%, ton lots 45c lb., less ton lots 50c lb.

Ferrovanadium: 35-55%, 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.

Zirconium Alloys: 12-15%, per lb. of alloy, eastern contract, carlots bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads bulk per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot ¼c per ton higher.

Zirconium Alloy: 35-40%, Eastern contract basis, carloads in bulk or package, 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. 5.75c; ton lots 6.50c. Spot ¼ cent higher.

Simanal: (Approx. 20% each Si, Mn., Al.) Contract, frt. all. not over St. Louis rate, per lb. alloy; carlots 8c; ton lots 8.75c; less ton lots 9.25c.

Borosil: 3 to 4% boron, 40 to 45% Si., $6.25 lb. cont. Be., f.o.b. Philo., freight not exceeding St. Louis rate allowed.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to page [illegible] of Sept. 4, 1944, issue of STEEL. Quotations are on gross tons.

PHILADELPHIA:

(Delivered consumer's plant)

No.1 Heavy Melt. Steel	$18.75
No. 2 Heavy Melt. Steel	18.75
No. 2 Bundles	18.75
No. 3 Bundles	16.75
Mixed Borings, Turnings	13.75
Machine Shop Turnings	13.75
Billet, Forge Crops	23.75
Bar Crops, Plate Scrap	21.25
Cast Steel	21.25
Punchings	21.25
Elec. Furnace Bundles	19.75
Heavy Turnings	18.25

Cast Grades

(F.o.b. Shipping Point)

Heavy Breakable Cast	16.50
Charging Box Cast	19.00
Cupola Cast	20.00
Unstripped Motor Blocks	17.50
Malleable	22.00
Chemical Borings	16.51

NEW YORK:

(Dealers' buying prices.)

No. 1 Heavy Melt. Steel	$15.33
No. 2 Heavy Melt. Steel	15.33
No. 2 Hyd. Bundles	15.33
No. 3 Hyd. Bundles	13.33
Chemical Borings	14.33
Machine Turnings	10.33
Mixed Borings, Turnings	10.33
No. 1 Cupola	20.00
Charging Box	19.00
Heavy Breakable	16.50
Unstrip Motor Blocks	17.50
Stove Plate	19.00

CLEVELAND:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
No. 1 Comp. Bundles	19.50
No. 2 Comp. Bundles	19.50
No. 1 Busheling	19.50
Mach. Shop Turnings	12.00-12.50
Short Shovel Turnings	15.50
Mixed Borings, Turnings	13.50
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	13.50-14.00
Billet, Bloom Crops	24.50
Sheet Bar Crops	22.00
Plate Scrap, Punchings	22.00
Elec. Furnace Bundles	20.50

BOSTON:

(F.o.b. shipping points)

No. 1 Heavy Melt. Steel	$14.06
No. 2 Heavy Melt. Steel	14.06
No. 1 Bundles	14.06
No. 2 Bundles	14.06
No. 1 Busheling	14.06
Machine Shop Turnings	9.06
Mixed Borings, Turnings	9.06
Short Shovel Turnings	11.06
Chemical Borings	13.81
Low Phos. Clippings	16.56
No. 1 Cast	20.00
Clean Auto Cast	20.00
Stove Plate	19.00
Heavy Breakable Cast	16.50

Boston Differential 99 cents higher, steel-making grades; Providence $1.09 higher.

PITTSBURGH:

(Delivered consumer's plant)

Railroad Heavy Melting	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
No. 2 Comp. Bundles	20.00
Short Shovel Turnings	16.50-17.00
Mach. Shop Turnings	13.50-14.00
Mixed Borings, Turnings	14.50-15.00
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	16.00
Billet, Bloom Crops	25.00
Sheet Bar Crops	22.50
Plate Scrap, Punchings	22.50
Railroad Specialties	24.50
Scrap Rail	21.50
Axles	26.00
Rail 3 ft. and under	23.50
Railroad Malleable	21.00

VALLEY:

(Delivered consumer's plant)

No. 1 R.R. Hvy. Melt.	$21.00
No. 1 Heavy Melt Steel	20.00
No. 1 Comp. Bundles	20.00
Short Shovel Turnings	15.50-16.00
Cast Iron Borings	14.50-15.00
Machine Shop Turnings	13.00-13.50
Low Phos. Plate	22.50

MANSFIELD, O.:

(Delivered consumer's plant)

Machine Shop Turnings	13.00-14.00

BIRMINGHAM:

(Delivered consumer's plant)

Billet, Forge Crops	$22.00
Structural, Plate Scrap	19.00
Scrap Rails, Random	18.50
Rerolling Rails	20.50
Angle Splice Bars	20.50
Solid Steel Axles	24.00
Cupola Cast	20.00
Stove Plate	19.00
Long Turnings	8.50- 9.00
Cast Iron Borings	8.50- 9.00
Iron Car Wheels	16.50-17.00

CHICAGO:

(Delivered consumer's plant)

No. 1 R.R. Hvy. Melt.	$19.75
No. 1 Heavy Melt. Steel	18.75
No. 2 Heavy Melt. Steel	18.75
No. 1 Ind. Bundles	18.75
No. 2 Dlr. Bundles	18.75
Baled Mach. Shop Turn.	18.75
No. 3 Galv. Bundles	16.75
Machine Turnings	13.25-13.75
Mix. Borings, Sht. Turn.	13.75
Short Shovel Turnings	14.25-14.75
Cast Iron Borings	13.25-13.75
Scrap Rails	20.25
Cut Rails, 3 feet	22.25
Cut Rails, 18-inch	23.50
Angles, Splice Bars	22.25
Plate Scrap, Punchings	21.25
Railroad Specialties	22.75
No. 1 Cast	20.00
R.R. Malleable	22.00

(Cast grades f.o.b. shipping point, railroad grades f.o.b. tracks)

BUFFALO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.25
No. 2 Heavy Melt. Steel	19.25
No. 1 Bundles	19.25
No. 2 Bundles	19.25
No. 1 Busheling	19.25
Machine Turnings	13.50
Short Shovel Turnings	16.00
Mixed Borings, Turn.	13.50
Cast Iron Borings	14.50
Low Phos.	21.75

DETROIT:

(Dealers' buying prices)

Heavy Melting Steel	$17.32
No. 1 Busheling	17.32
Hydraulic Bundles	17.32
Flashings	17.32
Machine Turnings	10.50-11.00
Short Shovel Turnings	11.50-12.00
Cast Iron Borings	10.50-11.00
Low Phos Plate	19.32-19.82
No. 1 Cast	20.00
Heavy Breakable Cast	16.50

ST. LOUIS:

(Delivered consumer's plant)

Heavy Melting	$17.50
No. 1 Locomotive Tires	20.00
Misc. Rails	19.00
Railroad Springs	22.00
Bundled Sheets	17.50
Axle Turnings	17.00
Machine Turnings	10.50-11
Shoveling Turnings	11
Rerolling Rails	21
Steel Car Axles	21.50-22
Steel Rails, 3 ft.	21
Steel Angle Bars	21
Cast Iron Wheels	20
No. 1 Machinery Cast	21
Railroad Malleable	16
Breakable Cast	18
Stove Plate	15
Grate Bars	15
Brake Shoes	15
(Cast grades f.o.b. shipping point	18
Stove Plate	

CINCINNATI:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18
No. 2 Heavy Melt. Steel	18
No. 1 Comp. Bundles	18
No. 2 Comp. Bundles	18
Machine Turnings	7.50- 8
Shoveling Turnings	9.50-10
Cast Iron Borings	9.50-10
Mixed Borings, Turnings	8.50- 9
No. 1 Cupola Cast	20
Breakable Cast	18
Low Phosphorus	21.00-21
Scrap Rails	20.50-21
Stove Plate	16.00-16

LOS ANGELES:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$14
No. 2 Heavy Melt. Steel	12
No. 1, 2 Deal. Bundles	9
Machine Turnings	8
Mixed Borings, Turnings	20
No. 1 Cast	

SAN FRANCISCO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$15
No. 2 Heavy Melt. Steel	14
No. 1 Busheling	15
No. 1, No. 2 Bundles	14
No. 3 Bundles	9
Machine Turnings	15
Billet, Forge Crops	18
Bar Crops, Plate	15
Cast Steel	
Cut Structural, Plate, 1", under	18
Alloy-free Turnings	14
Tin Can Bundles	14
No. 2 Steel Wheels	23
Iron, Steel Axles	15
No. 2 Cast Steel	16
Uncut Frogs, Switches	16
Scrap Rails	14
Locomotive Tires	

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½c, 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) 13.00c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 15.75c; 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, chemical, 6.40c, corroding, 6.45c, E. St. Louis for carloads; 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., plus 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less through 2000 lbs.

Secondary Aluminum: All grades 12.50c per lb. except as follows: Low-grade piston alloy (No. 122 type) 10.50c; No. 12 foundry alloy (No. 2 grade) 10.50c; chemical warfare service ingot (92½% plus) 10.00c; steel deoxidizers in notch bars, granulated or shot, Grade 1 (98-99½%) 11.00c, Grade 2 (92-95%) 9.50c to 9.75c, Grade 3 (90-92%) 8.50c to 8.75c, Grade 4 (85-90%) 7.50c to 8.00c; any other ingot containing over 1% iron, except PM 754 and hardness, 12.00c. Above prices for 30,000 lb. or more; add ¼c 10,000-30,000 lb.; 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. Alloy ingots, incendiary bomb alloy, 23.40c; 50-50 magnesium-aluminum, 23.75c; ASTM B93-41T, Nos. 2, 3, 4, 12, 13, 14, 17, 23.00c; Nos. 4X, 11, 13X, 17X, 25.00c; ASTM B-107-41T, or B-90-41T, No. 8X, 23.00c; No. 18, 23.50c; No. 18X, 23.00c. Selected magnesium crystals, crowns, and muffs, including all packing screening, barrelling, handling, and other preparation charges, 23.50c.. 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 allowed all other alloys 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, 99.8% or higher, not meeting specifications for Grade A, with 0.05 per cent maximum arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.12½c; Grade F, below 99% (for tin content), 51.00c.

Antimony: American, bulk carlots f.o.b. Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.5% and over (arsenic, 0.05%, max. and other impurities, 0.1%, max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb.; ½c for 9999-224-lb.; and 2c for 224 lb. and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

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: OPA ceiling prices per 76-lb. flask f.o.b. point of shipment or entry. Domestic produced in Calif., Oreg., Wash., Idaho, Nev., Ariz., $191; produced in Texas, Ark. $193. Foreign, produced in Mexico, duty paid, $193. Open market, spot, New York, nominal for 50 to 200 flasks; $158 to $163 in smaller quantities.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $17 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%, $1.50 lb. for 550 lb. (bbl.); $1.52 lb. for 100 lb. (case); $1.57 lb. under 100 lb.

Indium: 99.9%, $7.50 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y. 44.75c per ounce.

Platinum: $35 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 and 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% 26.50c.

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: Soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlot 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 diameter 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; 8.25c, 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. Grasselli, 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.

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.

Scrap Metals

	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%	11.000	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; babbit-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 7.50c; Muntz metal condenser tubes 7.00c; 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, truckloads of 5000 pounds or over; Segregated solids, 2S, 3S, 5c lb., 11, 14, etc., 3 to 3.50c lb. All other high-grade alloys 5c lb. Segregated borings and turnings, wrought alloys, 2, 2.50c lb. Other high-grade alloys 3.50, 4.00c lb. Mixed plant scrap, all solids, 2, 2.50c lb. borings and turnings one cent less than segregated.

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 7.25c, old zinc 5.25c 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 clipping 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 170

No substantial change in the sheet market has become apparent, though a slight easing is noted in some gages. Cancellations have not yet affected the general situation but more are expected later. Some automotive parts manufacturers are able to get orders accepted by priorities assistance. Heavier gages are more easily obtained than lighter.

Philadelphia — Fabricators of automobile parts are successfully placing orders for delivery in third quarter, some in August. Part of this volume replaces cancellations within lead time, while priority assistance with allotments accompanies others. Cancellations still are without material influence on rated order schedules, although in spots they are slightly more apparent. A portion of the automotive tonnage included in the above is for heavier gages, substantially easier than for lighter stock, 16-gage and under.

While jobbing mills have limited space in September for warehouses, deliveries on hot and cold-finished range from November to first quarter next year. Hot-rolled pickled are the tightest with most producers, with galvanized scarcest with some. Enameling and electrical sheets are tight, with schedules filled for the remainder of the year and unrated inquiry for reconversion requirements substantially heavier. Increase in requirements for next quarter will contribute toward strong buying of heavier gages. Hot-rolled strip has eased with some suppliers, with October rollings open. Cold-rolled strip is in November. Openings in strip schedules are filled by WPB, dependent on end use.

Pittsburgh — Volume of order cancellations is relatively light, despite reported downward adjustments in a number of war programs and effort of WPB to sift out duplicate orders. Effect of WPB regulation lowering allowable consumers' inventories by 25 per cent is also negligible to date. Leading producer here states that only one cancellation has been received due to the downward adjustment in inventory regulations. In this instance the tonnage already had been rolled. There are no openings in sheet and strip schedules for third-quarter delivery, except for heavy gage hot-rolled items at some mills. Unless cancellations develop in substantially greater volume than currently indicated, most third-quarter shipments will be on rated order basis. There has been a large reduction in heavy steel shell containers, but this has been largely offset by heavier requirements for the smaller shell containers. Sellers continue to accept a heavy volume of unrated orders; in one instance a backlog of 500,000 tons is reported. Subject to WPB approval of manufacturers' applications, priorities assistance has been granted for third-quarter output of washing machines and refrigerators. However, no priority assistance has been granted manufacturers of other household appliances, which means that these items will not be available except on a limited basis before early next year. Relatively small tonnage for automobile builders is being placed on mill production schedules, but considerable amount has been booked for delivery on basis of if and when conditions permit.

Cleveland — Sheet producers face a tight situation and important interests in this area had so heavy a carryover from second quarter that the few cancellations so far received have done little to bring bookings down to the quarter's capacity. As a result of this carryover no new business is possible for third quarter and whatever capacity may be available for additional orders in fourth quarter will depend on cancellations, which are expected to be heavier. Many unrated orders are being offered but cannot be placed on schedules until the situation eases or in case of preference ratings being granted for essential needs.

Boston — Additional narrow cold strip allotments for fourth quarter delivery are approved only under pressure, indicative of firmer grip on sheet and strip mill schedules by WPB, despite partial thawing of third quarter rolling mill orders and expected unfreezing for September shortly. Recent moves have permitted a check and better clarification as to producer backlogs. New rated buying is slow, with rerolling schedules for November filling. Unrated orders are filed, but some potential inquiry is retarded by other factors; fabricators are uncertain as to components, labor, costs and selling prices for finished products. In scattered instances fabricators moving toward conversion have two types of orders with mills, some small allotments and the remainder unrated. Effect of re-screening of orders and cancellations is small; one district mill reported a single ton canceled the first week. Relatively few orders permitted under Z-3, small manufacturers, are offered. Textile machinery builder, North Adams, Mass., is seeking a large tonnage of bessemer hot or cold strip, 0.035 to 0.052, in widths 3⅛ to 3½ inches, car lots, and is combing surplus markets in view of extended deliveries. In sheets, heavier gages have eased more; indications are some third quarter tonnage will be available. Demand for heavier gages, however, is slow. War volume is lower and material is too heavy for most consumer hard goods, for which potential demand is greatest.

Springfield plant, Westinghouse Electric Corp., is in production on two new models of electric refrigerators for commercial use, first since 1942. Of all-steel cabinet construction, porcelain interior and high-baked enamel exterior, units are of 20 and 30 cubic feet, streamlined with chromium-plated decorative strips across bottom of the cabinet. First produced units will fill high priority orders; the line will be enlarged later to five models.

Cincinnati — District mills see relatively no hope for a change in the present tight conditions in sheets, despite some recent cancellations. Unrated orders continue to increase, but rolling schedules do not admit unrated business at the time. Some shifts in military requirements have taken up some slack and at the same time some material has been moved up earlier on schedules, which are still tight well into the fall.

St. Louis — In spite of increasing layoffs in munitions production, sheet production is hampered by lack of workers, which is increasing. Granite City Steel Co. will close its Defense Plant Corp. plant, representing 40 per cent of its capacity, for that reason. More than 3500 tons of sheets urgently required by the Army await shearing and loading labor. A tonnage of plates rolled in May was finished and shipped the first week in July. Sheets for Army tanks, containers, jeeps, stoves, railroad cars and motors are in a critical bottleneck. Hot-rolled sheet deliveries now are in February, cold-rolled in April, tin plate in January, alloy and heavy galvanized sheets in February and light galvanized sheets in June, next year.

Chicago — Consumers of sheets whose requirements run heavy find their situation becoming more critical. Inventories are being consumed faster than replacements. This reflects the lengthening deliveries of sheetmakers as well as the fact that warehouse stocks are depleted. Sheet cancellations are negligible, but informed quarters state that other fortnight may see an increase.

Steel Bars . . .

Bar Prices, Page 170

Easier situation continues in steel bars, following lighter demand for ships and other war work. Deliveries can be obtained for fairly nearby dates, depending on size, though on some diameters mills are sold well through the year. Alloy bars are in better position than carbon.

Cleveland — Bar producers are in easier position, with deliveries promised on some sizes of carbon bars for the fourth quarter, much depending on size. It is possible that in a specific instance a small tonnage of some sizes might be promised for August, or even for late July if it fitted into a schedule with others of the same size. On other diameters mills are filled for the full year. All alloy bars are easy as compared to carbon bars and can be obtained much earlier in all sizes.

Boston — Sum total of cancellations, cutbacks and downward revisions in carbon and alloy bars for war contracts is substantial and in New England the major part of the operation involving initial reductions in requirements is nearing completion. There are more ahead, but deepest cuts, for the near future, are accomplished. Not all this tonnage at mill levels has been fully canceled, but the trend is in that direction. Prospects of filling gaps to full extent of peak war volume are slim. Primarily because the volume increased relatively more than most steel products, plates during the shipbuilding peak a possible exception, loss of war orders looms correspondingly large. Demand, substantially in the non-rated category, is fairly active, but a full return of reconverted production to normal channels will not approach the war peak.

St. Louis — Pressure for merchant bars is being eased by cancellations and bombs. New orders continue to be placed, but in smaller tonnages. Production is limited by shortage of labor.

Seattle — Merchant bar demand is steady, large tonnages going to shipconstruction plants and warehouses. Reinforcing bar demand is light, with only a few small orders being placed. Washington state has awarded a bridge involving 30 tons and several industrial and other buildings require less than 100 tons each.

Philadelphia — Although cancellations are beginning to develop in heavier volume, notably in shell steel, deliveries are slow to reflect this and on most sizes schedules still are in late fourth quarter

There are fluctuating openings. One mill reflecting shell steel cutbacks went from October to August on some sizes, but the openings were quickly filled and it is back to October and beyond. In carbon bars, rounds and squares under one inch are available earliest, in August with some mills. Hot-rolled alloys continue relatively easy, in August. Demand for rated bar volume tends downward.

Chicago—Although carbon bar schedules are more than comfortably filled through last quarter, some progress is being made in reducing carryovers. Prospect is that the carryover may be eliminated by September. Because of recent cutbacks in the small shell program, cold drawers have eased up in their specifications for steel.

Steel Plates . . .

Plate Prices, Page 171

Plates are in easy situation, losses from shipbuilding reduction not being compensated by other needs. With heavy carbuilding programs under way and some new ship work for private owners some tonnage is in prospect. This gives better prospect for fourth quarter bookings, an eastern platemaker is waiving a $3 premium permitted by OPA, indicating desire for more tonnage, even at a sacrifice.

Philadelphia — Plate deliveries have not moved beyond September. Demand is slow, emphasized by declining shipbuilding requirements. One eastern producer is waiving the $3 premium permitted by OPA. Demand for carbuilding, including low-alloy high-tensile, will be substantially higher next quarter, with 12,000 tons for three ships outstanding in shipyard buying. Plates have also been placed for 2360 tons of large diameter water pipe for Philadelphia. The largest contract, 1560 tons, to be fabricated by American Locomotive Co. and 800 tons to Bethlehem Steel Co., Bethlehem, Pa. Deliveries on heads are easy, notably large and small spun, which are in August.

Pittsburgh — No openings in rolling schedules are available through August on plate mills here, although a minor tonnage of unvalidated orders has been scheduled for August. All strip mills have been reconverted from production of plates, while output on regular plate mills is estimated to be 10 to 15 per cent below that produced early this year. However, a steady downward trend in plate production schedules is indicated, despite the fact that considerable unrated tonnage is being booked. With plate orders for shipbuilding nearly completed and further curtailment in the heavy program likely, plate sellers anticipate considerable production of unrated tonnage later this quarter. However, a substantial improvement in orders is likely to develop early in fourth quarter as work gets under way on army freight cars awarded recently.

Boston — Production of railway passenger cars at Pullman-Standard Car Mfg. Co. shops, Worcester, suspended since third quarter, 1942, will be resumed soon by granting of priority assistance for materials and components during the remainder of this year and approval for the building of 664 new units, including those previously authorized, but not built. Priority aspect as regards plates is hardly needed with deliveries

still in late third quarter, but is important in procurement of parts to meet the advanced building program. At Worcester, plant extensions and installations of additional new equipment, notably welding, are under way. The shop is currently scheduled on light transportation equipment, including trolley units, well through the year, but railroad passenger cars will be added with heavier plate deliveries in fourth quarter. Plate orders, although maintained for heavy industrial equipment, are but a fraction of the shipbuilding peak. Two district yards are closing next month. Effect on numerous subcontracting shops by the slump in ship construction has left large unfilled gaps. Most mills still have openings for late third quarter, notably heavier sheared plates.

Tubular Goods . . .

Tubular Goods Prices, Page 171

Seattle — Pipe deliveries are slow but demand for water system materials is increasing, several major projects being ready for release as soon as materials can be obtained. The Carlton district at Portland, Oreg., has awarded 200 tons or more of 10-inch pipe and fittings to Pacific States Cast Iron Pipe Co., Portland. E. H. Washbond, recorder, Gearhart, Oreg., will open bids Aug. 1 for about 200 tons of six to ten-inch cast pipe and fittings. Hillsboro, Oreg., plans a $700,000 system, including a four-million gallon reservoir and 22 miles supply line.

Pittsburgh — Demand for oil coun pipe is heavy, with schedules on bo butt and lap-weld extended well in second quarter. Mechanical tubing ge erally is promised for January shipme but in a few gages openings in schedul are reported for October and Novembe Jobbers have difficulty maintaining ad quate inventories of tubing; stocks other pipe items are in good balanc with turnover relatively high. Selle do not expect to ship much tonnage an unrated basis this year. Some eas in demand for 24-inch pipe for fragme tation bombs has been offset by augme ed requirements for chemical and hi explosive bombs. England has been a tive in the export market lately, but having difficulty in placing needs for sh ment in period the material is wante

The Federal Power Commission authorized the United Gas Pipe L Co. to construct a $7,261,221 pipe l from Carthage, Tex., to Monroe, L 143 miles. Also approved was a 1 mile, 18-inch line from United Gas Pi Line Co.'s gasoline plant in the Carth field to connect with the proposed 2 inch line. A. O. Smith Corp., Milwa kee, was awarded the contract for ma ing the welded line pipe, which w represent 35,000 tons of steel. Contr called for 754,000 feet of 24-inch, 10 800 feet of 8 to 20-inch and 24,000 f of 18-inch pipe.

New York — Ordnance contracts re quiring seamless tubing are subject minor cutbacks or cancellations; mill de liveries have not eased to any exte While some reductions have been ma in mortar shells, demand is heavy; 3 bombs, larger diameters, fourth quar needs will approach 240,000 tons, increase of about 40,000 tons. Rock tube demand continues high. Seamle mills are in first quarter on most siz notably alloy small sizes. Utilities a also showing more interest in pipe a tubing while oilfield casing inquiry heavier. There is not much chance delivery of unrated volume in the ne future. In the East aircraft cancel tions have not reduced materially d mand for chrome-moly seamless, s allocated by the aircraft scheduling un lead time for this grade is extended w deliveries ranging into first quarter. Cu backs in aircraft schedules at Long Isla plants have been slight. Most revisi have been by the army in heavier typ reductions in Navy programs, may l later, have not yet appeared on Lo Island. Buying, however, by airc builders has long since followed m conventional lines based closer to r quirements without the wild rush for materials in sight which marked earl policy. Some excess inventories wh followed design changes, now better l uidated, brought this about. Eng builders are, however, feeling some ef fect of cutbacks, mainly for advance schedules, rather than current.

Wire . . .

Wire Prices, Page 171

Boston — That duplication of unrat orders, by the manufacturing end esp cially, will contribute to confusion wire mill schedules next quarter, when definite improvement in deliveri

develops, is foreseen. First order assured of shipment will eliminate those more extended; of the open-end tonnage booked subject to uncertain openings part, at least, ultimately may be canceled. This is not an immediate, or third-quarter factor, but may well be before the year is out. Although still substantial, volume of rated orders is down some, overall being about equal to unrated orders, margin, if any with the latter. Cancellations, while in the aggregate considerable, have been, and are, ranged over so many sizes and grades as to ease only slightly any group. This is notably true as regards fine wire specialties in which cancellations are frequently balanced by new rated orders.

New York — Openings for third quarter shipment of unrated volume, result of cutbacks to date, are filled. Aggregate total is not impressive and is largely in low carbon. In round figures third quarter volume in this category is 10-15 per cent, balance rated.

Cleveland — Wire producers are crowded to meet demand for practically all products, especially for nails. Government construction in the Pacific is calling for immense quantities and nail mills have heavy backlogs, with preferred orders being filed constantly. Capacity through the remainder of the year is filled. Considerable lend-lease is also being placed, taking a high preference. While cancellations of some types of wire for war purposes have been made, other essential tonnage has been moved up to fill the gaps. Civilian demand for products on which restrictions have been eased is pressing and preferential treatment is being given in some cases, which adds to the heavy burden on producers.

St. Louis — Wire demand in this district is changing from military to civilian. Producers are as busy as at any time but production is down, through cancellation of war contracts for heavy wire, which are replaced by lighter gages. CMP covers 80 per cent of wire orders but by Oct. 1 about 50 per cent is expected to be unrated. Mills now are accepting some unrated business for fourth quarter delivery. Bed manufacturers are buying heavily.

Chicago — Production of merchant wire products is insufficient to meet current demand. In this connection, deliveries of smaller sizes of nails and bale ties continues critical. Steel fence posts maintain their position of heavy demand.

Structural Shapes . . .

Structural Shape Prices, Page 171

Shape mills are booked well ahead, with an average of November, though some capacity is available earlier. Some relaxation of restrictions on building gives hope of better demand soon. Considerable public work delayed by the war is pressing for material.

Pittsburgh — Structural mills are booked into November, although a few openings are available in October. There is little likelihood of filling unrated orders this quarter unless production can be substantially increased through greater allotments of steel. Awards are relatively light, but the outlook for the construction industry has been improved somewhat by relaxation of certain WPB controls over building activities. Although a greater volume of alterations and repairs can now go ahead, and much work on highways and airports started, resumption of construction on any large scale must await replenishment of stocks of building materials, which are in short supply.

Seattle — Fabricating shops are busy, most contracts being for military requirements and subcontracts for shipyards and airplane work. Small tonnages of shapes for industrial uses are being placed, one shop reporting an average of 200 tons per month in minor projects. State highway bridges and other improvements, delayed since Pearl Harbor, offer a large potential postwar market.

Philadelphia — Extensions in shape deliveries carry most sizes into November, including bar-size angles. Decline in shipyard buying has not affected shape mill deliveries to the extent expected, due in part to increased inquiry in other directions and the heavy load carried by relatively few mills. Nevertheless, more fabricating shops are in need of tonnage, which is reflected in lower quotations on fabricated work. The largest award is for 1500 tons for storehouses at Mechanicsburg, Pa., reduced from 2300 tons.

Boston — Loss of shipbuilding tonnage is not being replaced in other directions, although more industrial construction is ahead, notably in the Springfield, Mass., district, where Westinghouse and Moore Drop Forging Co. plan large expansions. At least one paper mill project is under consideration; awards include 150 tons for a storage building, Pullman-Standard Car Mfg. Co., Worcester, placed with a Boston district shop. Structural mill schedules on most sizes are

about filled for October. In view of the large potential capacity of structural mills, in no way taxed by backlogs and prospective heavier volume, lengthening shape deliveries are seemingly paradoxical. The answer is several producers have either halted shape rollings or substantially curtailed them during the war and the load is being carried by the two largest producers in the East, with limited ingot directives up to now.

New York — Structural shape deliveries, few sizes excepted, are in October, with November schedules filling. Contracts for fabricated tonnage are light in this area, but are substantial for automobile plant expansions in various sections. Heavier volume which has been held in abeyance is also nearing the active stage.

Rails, Cars . . .

Track Material Prices, Page 171

New York — For delivery in first quarter, 1946, contracts have been placed for 12,790 railroad cars by the War Department on which priority assistance for steel and other materials will be given. Equipment is for the Philippines. Cars will have 30-ton capacity, 42-inch gage track, with cast iron wheels. Joint orders placed by Missouri-Pacific and Texas Pacific for two light-weight passenger trains include 100 cars. Sleepers, 47, will be constructed of low-alloy high-tensile steel underframes and aluminum alloy, superstructure, also the balance of passenger cars, although mail, baggage and express units will be of low-alloy high-tensile steel throughout.

Pig Iron . . .

Pig Iron Prices, Page 173

Tightness prevails in pig iron as demand shows some increase as war restrictions are eased. Full production is being absorbed and no stocks are being accumulated. Some concern is expressed over winter supply as inventories continue low. A number of blast furnaces are idle because of repairs or high cost factors. Sustained demand for basic for steelmaking prevents much increase in foundry grades.

Pittsburgh — Sellers continue to be pressed meeting current pig iron requirements, and little improvement is indicated through the remainder of this year. Some relief in demand for basic iron is expected to develop from the 50 per cent cutback in the artillery shell program, but this is not likely to be fully felt until the latter part of this quarter. Melters state that although pig iron stocks are too low for comfort, the industry probably will not be placed under allocation again. Fact that some steel producers have been forced to get additional pig iron from outside sources, plus the added factor of inadequate supplies of the right grades of scrap, have combined to increase overall demand for merchant iron. Despite the near capacity pig iron output in the district, with 50 out of 54 furnaces active for some time now, iron stocks of producers and foundries are declining somewhat, as consumption is slightly in excess of production. Out of 26 idle units 13 are down for relining, while the remaining 13 are out of blast, due to high cost factors and lack of manpower. Pig iron requirements are not expected to decline for many months, for in addition to the indicated heavy military requirements there is now to be added the pent-up demand for authorized products.

New York — Although pig iron supply is sufficient for current requirements, production is absorbed and no stocks are being built up by furnaces. Sustained heavy demand for basic permits no easing in foundry and malleable schedules. Increased demand for bessemer brought about by war is also maintained. Use of melt of basic and bessemer slackens substantially more than appears likely in the near future, supply of foundry grades will remain tight. Total melt is maintained and would be higher except for shortage of foundry labor. Most consumers have worked inventories up to or near the 30-day limit. As progress improves toward reconversion in the heavy machinery and equipment industries, commensurate with labor supply, iron requirements will rise; cast iron foundries in the East are taking in new tonnage for pending increased schedules.

Buffalo — With releases against current quarter bookings being filed steadily the pig iron market continues tight. Prisoners of war are working in many state foundries but locally the WMC committee has refused to permit their hire. Foundries still complain of labor shortages restricting operations. Reports that this area would increase shipments to New England have been substan-

ed by a leading producer transferring a furnace from basic to merchant iron for shipment east. Shipments have been retarded by shortage of cars, gondolas being in much less than needed supply.

Seattle — The pig iron situation has eased noticeably, due to curtailment of shipbuilding. Plants report ample supply. Pig iron needs are modified by sufficient supply of cast scrap, although there is no over supply. Pig iron price is at ceiling. Cancellations of war contracts have appeared in the foundry industry, one large plant having laid off about 150 workers, with some smaller shops also affected. As a whole the foundry industry is working to capacity, as far as manpower will allow.

Philadelphia — There are few revisions in delivery schedules, with supplies catching up on shipments, notably in basic. There are few stress calls for iron with more consumers holding 30-day inventories. While still tight, supply of all grades is sufficient to meet current needs, which are recovering from the curtailed rate earlier in the month, due to vacation shutdowns. August shipments are expected to be slightly heavier than July. Foundries have substantial orders for castings and efforts to place subcontracts are continued in some instances.

Boston — Not only is shortage of labor retarding improvement in pig iron melt at shops with high priorities for reconversion, but hot metal departments at steel works are feeling the pinch; open-hearth schedules at one works have been reduced to 144 hours from 168. For the same reason higher melt by the cast pipe foundry is restricted. Thousands have been let go at shipyards, Providence, Portland and Hingham, but they cannot be enticed into a foundry, balking at the lower wages; state unemployment payments attract a large number. Heavier consumers of iron are operating near or somewhat under 30-day inventory; most smaller shops have straightened out on a full 30-day basis and are releasing shipments accordingly.

Cincinnati — Current operations of pig iron melters show relatively no change from previous levels, although foundrymen generally indicate some moderate increase would be possible if the labor situation would ease. Potential business is still substantial, but foundries are limited by labor. Shipment on contract continues at a satisfactory rate, and early indications are that specifications for next quarter will be about the present rate.

Chicago — Labor shortage continues the chief obstacle to foundry production in this area. Iron supply is tight but has not been a limiting factor on output, but some castings makers experience difficulty in maintaining the 30-day maximum inventory. Blast furnace situation in this district has deteriorated further with Carnegie-Illinois Steel Corp. blowing out No. 9 stack at Gary July 16 for relining.

Scrap . . .

Scrap Prices, Page 174

Scrap supply continues tight and melters are seeking further tonnage in most areas. Concern is felt for winter reserves as backlogs are not being built as fast as desired. Labor shortage for collection and preparation is an important factor. Rise in turnings prices continues and has reached close to ceilings in most districts.

Pittsburgh — Barring early termination of the war, outlook for adequate steel scrap supplies this winter is poor. At present steel mill and foundry operations are not retarded because of lack of scrap, but inventories are abnormally low and the volume of incoming material is barely sufficient to meet current needs. Supply of production scrap is tending downward, reflecting 50 per cent reduction in the artillery shell program, while downward adjustments in other war schedules are an increasing factor. Under normal conditions scrap consumers would be building inventories at this time in preparation for the seasonal decline in the preparation of scrap during the winter. Limited supply of pig iron will not help matters. Scrap inventories now are barely being sustained, in some instances a reduction is reported. Most of the Baltimore & Ohio Railroad's scrap list was allocated into the Chicago area recently, with some material directed here. Considerable portion of railroad scrap offerings are said to be on allocation, but here also the manpower shortage has hindered normal preparation. Market on turnings remains strong, with ceiling expected to be reached next month. Most current sales of turnings have been at $16.50, with relatively small tonnage moving at $17.

Buffalo — Strength was added to the scrap market by report that a leading

consumer, which bought substantially recently, was low on material and sales of turnings were within 25 cents of ceiling. Yard receipts are fairly liberal but most dealers have large backlogs. Some dealers feel they might have difficulty covering further business because of limited labor supply. A surprise sale was reported of 2000 tons of unprepared war salvaged tank scrap, after lying in dealers' yards more than a year because of high alloy content. Scrap arriving by water continues to help the consumer most in need. A boatload of about 5000 tons, the first in several weeks, has arrived from Duluth and an additional 3500 tons has arrived by barge canal.

Seattle — Scrap supply is sufficient for demand, the greatest problem being shortage of yard labor. Cast scrap is at ceiling, $20, and while there is no reserve dealers have sufficient to meet foundry needs. Steel scrap continues at $1 below ceiling.

Philadelphia — All grades of heavy melting steel are at ceiling, and machine shop turnings and No. 3 bundles have advanced. Demand is strong, with most steelmakers in eastern Pennsylvania taking shipments. Some scrap from the Philadelphia area is going to the Bethlehem district. There is slight easing in demand for less select grades of cast, but No. 1 machinery and charging box are short with numerous consumers.

Boston — Heavy melting steel scrap for quality wire-making continues tight. Of the supply available, ratio suitable for wire mill open hearths continues limited, with slight improvement. District steel works inventories are generally under the 60-day limit and are for the most part stationary. Better lots of unprepared offered bring higher prices with consumers frequently bidding direct. Firmness machine shop and shoveling turning prices are attributed to heavier consumer buying and slackening shop production. Prices are at ceiling except for one or two light steelmaking grades. No substantial easing in short supply of cast grades is likely until more textile and shoe machinery equipment is scrapped by replacements and this is not indicated for the near future. Including August accumulations, Boston navy yard is closing this week on 1265 tons of steel scrap, including 500 tons of unprepared heavy melting and 300 tons of light iron.

Turnings, including short shoveling, are back to ceiling, as are other grades, although uncertainty is present in low phos. Foundries are paying ceiling on the latter. Foundries in some cases located in districts which might be subject to transportation delays later have been permitted to maintain 90-day inventories instead of 60, though scarcity would indicate doubt if such an inventory can be accumulated in the near future.

St. Louis — Scrap supply is tight because of drain toward the Chicago district and labor shortage. Most mills take all that is offered but are not in distress. No. 2 heavy melting steel is most in demand. Most remote tonnages except from northern Texas and Oklahoma, is bypassing this area, going to Chicago. Dealer shipments are slow. Shell plant curtailments continue to increase price of machine shop turnings now quoted at $10.50 to $10.75. Brokers feel that action by Surplus Property Board in disposal of material may ease the situation by declaring much material is scrap, from accumulations from contract cancellations. Selling agencies so far have been conservative in this respect.

Chicago — Mills continue in heavy need of scrap and take all prime grades offered and at ceiling prices. Considerable material also is flowing to melters on allocation from out of the district, this volume steadily increasing. The overall strength of the market exerts strong influence on turning and boring grades and OPA ceiling has been reached on one or two grades. Consumers have paid full ceiling of $13.75 for mixed boring and short turnings plus commission, while machine shop turnings have sold at $13.75 ceiling, both plus and without commission. Short shoveling turnings are up 25 cents to $14.25 to $14.50, which is $1 below maximum.

Cleveland — Scrap continues scarce and melters are taking all they can get to replace heavy inroads into stocks. Leading consumers have placed heavy tonnages with dealers, who are hard pressed to obtain material to apply on contracts. Until brokers have been able to complete orders now on books buyers probably will stay out of the market, there being no point to placing further orders while earlier commitments are unfilled. Borings and turnings are high and getting nearer ceilings. Cast grades are scarce and foundries are unable to obtain anything near their needs.

New York — Advance in turnings to ceiling brings all major steelmaking

grades to that level. While shipments are maintained, some hesitancy in buying has centered around peace rumors in the Pacific. Water shipments via the canal continue light, most material going to eastern Pennsylvania.

Warehouse . . .

Warehouse Prices, Page 172

Pittsburgh — To permit steel distributors the same order privileges as other sheet and strip steel buyers who purchase any or all of their requirements on an unrated basis, WPB has lifted the restrictions on total of such orders warehouses are allowed to place with mills. Distributors formerly were required to limit sheet and strip orders during any quarter to 25 per cent of their 1944 orders for these products. Some warehouse interests are filling a substantial number of unrated orders, trusting that the steel supply situation will have eased by the time mill shipments are made on the orders they are now placing. In most instances, however, distributors are reluctant to accept unrated orders in excess of the tonnage available from the mills on the same basis.

Construction of a new warehouse here has been started by Tin Mill Products Corp., Pittsburgh, warehouse distributors of flat-rolled steel. Cost of the new plant, including equipment, will be in excess of $175,000, with the contract going to Landau Brothers Building Co., Pittsburgh.

New York — Warehouses are unable to meet heavy demand for nails; stocks of other merchant products and galvanized sheets are about as tight. Inventories of light-gage sheet are depleted. Any improvement in general replacements is confined to heavier products, plates and heavier sheets, but most of these are as tight as ever. Alloy volume ratio with distributors holds higher than with mills, with slight decline in carbon bars. Overall sales to mills with resellers are slightly lower this month, compared with last. Extended mill deliveries on nails are turning large inquiries to jobbers, up to 100 tons of a size. Only part of this volume can be filled. If lumber is available no early easing in nail demand is foreseen in postwar period.

Boston—While slackening demand for bars is reflected in warehouse inquiry, decline in buying is relatively less than with mills, notably in alloys. Individual orders are smaller, but are still fairly numerous. Overall volume booked by distributors is down only slightly from last month. Acceptance of unrated varies depending on individual inventory and prospects for early replacement. Substantial volume in this category, lighter flat-rolled products excepted, is taken, but on the whole inquiry is less than expected. Only in spots are replacements improved; practically none on products for which demand is sharpest.

Nonferrous Metals . . .

Nonferrous Prices, Page 175

New York — With the way open for additional copper for civilian production first consideration will be given to disposal of domestic production. Buying for August, at about the July rate, is being done on the basis that some metal held in the MRC reserve will be available to the extent required. Thus far improvement in civilian demand has not balanced heavy reductions in war requirements and stockpile reserves continue to grow, as in recent months, reversing the trend earlier this year.

Some delay in clarifying zinc delivery schedules for next month results from filing for preferred orders on obsolete forms. Indications are that domestic production will continue under control, under the recent revision, notably in high-grade and prime western, and in any competition for free metal foreign zinc will have the advantage, some claim.

Demand for lead for August is maintained and the total supply, including foreign, will be slightly in excess of needs. Tin continues to be regarded as among the tightest materials.

Canada . . .

Toronto, Ont. — Buying continues at a brisk pace in the Canadian steel market, despite the fact that producers are indefinite with regard to delivery of civilian orders. Slowing in munitions and other war production has resulted in some steel order cancellations as well as curtailed buying on this account but there has been little actual reduction in overall demand as civilian buying is taking up any slack that has developed through reduced war demand. While

steel producers are endeavoring to redu backlogs, at the same time their sale men are out building goodwill amo customers. Many companies that ha been on war work for the past thre or four years are putting plants in shap for conversion to peacetime productio but it is not expected steel will be ava able for production of consumer goo before the end of this year. Meantim large orders are being placed in the ho of obtaining delivery as soon as war re quirements are satisfied. There are n indications of lifting or abandoning c ceiling prices, although steel produce still have hopes that action in this dire tion may be taken soon.

While buying of sheets was less ac tive during the week, inquiries were nu merous. Sheet mills are solidly booke through this year and have large tonnag carryovers to the end of first quarte 1946, and some have withdrawn fro the market in an effort to keep booking within a reasonable limit.

Demand for carbon bars is sustained but there has been some slowing in buy ing of alloy bars. On both grades, how ever, mills are heavily booked to th end of the year and on only a few size have they unfilled capacity.

Some easing of plate supply has bee reported during the week, and some mil now are maintaining delivery on sched ule.

No improvement is reported in supp of wire and nails and producers are se to be facing difficulties in meeting th more pressing demands. On certa types of nails a rather serious shorta has developed and producers are una to correct this situation, chiefly due shortage of skilled workers.

Merchant pig iron sales show le variation from week to week and th holiday season apparently has had general effect. Sales for the week we reported at approximately 8000 tons, in cluding 4000 tons of foundry iron, 3 tons of malleable and 1000 tons of bas

Scrap iron and steel receipts contin in good volume despite reduced offe ings from war plants and the fact th only small tonnages of automobile scra are appearing. A large part of incomi scrap is from the rural districts and fro western Canada. While steelmaking scra exceeds current requirements, dealers st report difficulties in meeting all deman for cast and stove plate, while only sma lots of malleable scrap are being re ceived.

Steel in Europe . . .

London — (*By Radio*) — Ore imp into Great Britain are increasing as oc transport becomes freer. Demand f heavy structural sections is slow. R buying is active to repair war dam Plate demand is improving for gener use. Capacity for steel sheet product is filled to the end of the year.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1500 tons, storehouses at Mechanicsburg, P to Bethlehem Steel Co., Bethlehem, Pa through Corbetta Construction Co., N York.

700 tons, factory building and boiler hou Nineteen Hundred Corp., St. Joseph, Mich to Joseph T. Ryerson & Son Inc., Chicag Pierson Construction Co., Benton Harbo

Mich., contractor; bids June 14.

550 tons, factory building, Kalamazoo Stove & Furnace Co., Kalamazoo, Mich., to Joseph T. Ryerson & Son Inc., Chicago.

205 tons, 39 pile driver leads, various locations, for Bureau of Yards and Docks, U.S. Navy, Chicago, 105 tons Stupp Bros. Bridge & Iron Co., St. Louis, and 100 tons to Judson-Pacific Co., San Francisco.

200 tons, engineering building 132, Chrysler Corp., Highland Park, Mich., to Bethlehem Steel Co., Bethlehem, Pa. .

190 tons, mill building, National Paper Co., Ranson, Pa., to Anthracite Bridge Co.

160 tons, warehouse for Carpenter Steel Co., Reading, Pa., to Reading Metalcraft Co., Reading, Pa.

146 tons, mill building for Molded Products Co., Scranton, Pa., to Anthracite Bridge Co.

115 tons, building for Deerfield Packing Co., Bridgeton, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

STRUCTURAL STEEL PENDING

350 tons, addition to Transite pipe building, Waukegan, Ill., for Johns-Manville.

285 tons, beam spans, various locations, for Chicago, Milwaukee, St. Paul & Pacific Railroad, Chicago; bids July 5.

250 tons, addition to warehouse building, Waukegan, Ill., for Johns-Manville.

REINFORCING BARS . . .

REINFORCING BARS PLACED

800 tons, war housing project, 39th and Wentworth avenue, Chicago, to Truscon Steel Co., Youngstown, Ohio; Sherry-Richards Co., Chicago, contractor; bids June 6.

800 tons, Chicago Housing Authority, Chicago, to Truscon Steel Co., Youngstown.

200 tons, Bureau of Reclamation, invitation K-23323, Boulder City, Nev., to Carnegie-Illinois Steel Corp., Pittsburgh.

200 tons, Bureau of Reclamation, invitation K-23307-A, Boulder City, Nev., to Kaiser Steel Co., Richmond, Calif.

REINFORCING BARS PENDING

1000 tons, building, Bureau of Census, Suitland, Md.

340 tons, wire mesh, SBI route No. 18 Sec. 16-R, Kendall and DeKalb counties, Ill., for state highway commission; bids July 20.

250 tons, nurses home, Mt. Sinai hospital, Chicago; bids July 9.

150 tons, bumper and spring plant, Chevrolet Motor division, General Motors Corp., Flint, Mich.

100 tons, Grand Rapids Varnish Co., Grand Rapids, Mich.

PLATES . . .

PLATES PLACED

Unstated, two 80,000-barrel oil storage tanks for U. S. Navy near Puget Sound yard, to Chicago Bridge & Iron Co., Chicago.

PLATES PENDING

Unstated, four oil storage tanks each 10,000 gallons, for Longview, Wash.; bids to Bonneville Power Administration, Portland, Oreg., July 18.

PIPE . . .

CAST IRON PIPE PLACED

200 tons or more, Carlton district, Portland, Oreg., to Pacific States Cast Iron Pipe Co., Portland.

CAST IRON PIPE PENDING

3820 tons, district commissioners, Washington, United States Pipe & Foundry Co., Burlington, N. J., low on 1070 tons, 8 and 12-inch, also 58 tons, water pipe specials; Florence Pipe Co., Florence, N. J., low on

250 tons, 16-inch; bids July 9.

300 tons or more, 24-inch Class 150, Billings, Mont.; bids in.

200 tons or more, 6000 feet 6, 8 and 10-inch bell and spigot, Gearhart, Oreg.; bids to E. H. Washbond, recorder, Aug. 1.

Unstated, 22-mile supply line and other improvements at Hillsboro, Oreg.; bids in near future; $700,000 project.

RAILS, CARS . . .

RAILROAD CARS PLACED

Missouri-Pacific and Texas & Pacific, jointly, two lightweight trains, 100 cars; 47 sleepers, high tensile low alloy underframes and aluminum alloy superstructures, to Pullman-Standard Mfg. Co., Chicago; balance 53 cars, including passenger, mail, baggage and express, latter three types low-alloy high-tensile throughout, to American Car & Foundry Co., New York (St. Charles, Mo., plant). Missouri-Pacific 56 cars, including 28 sleepers; Texas & Pacific, 44 cars, 19 sleepers.

Southern Pacific, 1000 fifty-ton box cars, 750 fifty-ton auto box and 50 twenty-five ton cabooses.

War department, for Philippines, 1840 box, to Pullman-Standard Car Mfg. Co., Butler, Pa.; American Car & Foundry Co., 4000 box at Madison, Ill., 190 tank, Milton, Pa., and 130 refrigerators, Chicago; 1290 low-side, 1290 high-side gondolas and 500 flats to Bethlehem Steel Co., Johnstown, Pa.; 1860 flats at East Chicago and 190 tank, Milton, Pa., to General American Transportation Corp.; 1500 flats, to Greenville Steel Car Co., Greenville, Pa.

RAILROAD CARS PENDING

Atchison, Topeka & Santa Fe, 1500 fifty-ton box cars and 250 seventy-ton covered hoppers.

Clinchfield, 1000 fifty-ton hoppers, 300 fifty-ton box cars, 50 fifty-ton flats.

Missouri-Kansas-Texas, 50 seventy-ton covered hoppers.

LOCOMOTIVES PLACED

Missouri-Pacific, three 4000-horsepower diesel and three 2000-horsepower diesel-electric, jointly, with one 4000-horsepower unit for Texas & Pacific to Electro Motive Division, General Motors Corp., LaGrange, Ill.

War Department, forty-seven 0-6-0 steam locomotives for export to China, Burma and India, to H. K. Porter Co. Inc., Pittsburgh.

LOCOMOTIVES PENDING

Chicago, Rock Island & Pacific, four 4000-horsepower diesel-electric freight.

U. S. Navy's Advanced Base Covers Vast Area in Pacific

(*Continued from Page 79*)

for no other reason than to get it out of the way. It will take a lot of sorting, and it will have to be inspected carefully for live explosives and booby traps. How much of this battle scrap there is nobody seems to know, but from appearances it must run into a good many thousand tons.

It is a different matter entirely in the case of so-called "fleet scrap." This scrap, of known analyses, is gone over carefully by the Navy's Material Recovery Section. Everything that is fit for further use is screened out. A good engine, for example, is taken out of a badly damaged hull and placed in a good hull. Empty oil drums by the thousands are cleaned for re-use by a caustic solution. Fleet scrap is accumulated and screened and prepared at the Navy's salvage yard

at Makalapa on the island of Oahu, Hawaii. This yard, equipped with alligator shears, cutting torches, baling presses, etc., is operated under Lt. (jg) William H. Glosser, formerly of M. Glosser & Sons, scrap dealers, Johnstown, Pa.

One of the Navy's outstanding accomplishments in this war is the technological training it has given to hundreds of thousands of officers and enlisted men. Every modern trade is represented; from the ranks of these men, it is certain, will come large numbers of the key workers, supervisors and managers in our postwar industry.

These men should have a better-than-even chance to forge ahead in civilian industry for their trades have been taught to them thoroughly, and they have a fine attitude toward work. They are not clock-watchers. Despite the large numbers of men to be seen at naval establishments in general, actually there are manpower shortages almost everywhere; there is so much work to be done in the Pacific. The men in the Navy are accustomed to overtime work — often around the clock, to back up the boys on the combat line—and they are glad to work overtime for this purpose even though the amount of their pay-check is not increased thereby.

A tour of naval establishments throughout the Marianas and western Carolines reveals few direct contacts between manufacturing companies in the United States and the men who, by reason of their duties in the Navy, are interested in their products. Occasionally one sees in the western Pacific a manufacturer's representative who is charged with the duty of reporting on the behavior of his company's products in service, and of suggesting improvements; but such men are few and far between and they have relatively few contacts with Navy personnel. Navy men in the western Pacific seldom see manufacturers' catalogs or direct-mail promotion pieces.

This situation is unfortunate, not only because these men have time to read technical literature, and would appreciate the opportunity to do so in their spare time, but because manufacturers would be bound to reap rich dividends in the future by building acceptance and goodwill in this audience now.

The fact that there is almost no literature of this kind at the disposal of Navy men in the western Pacific possibly may result from a misunderstanding of a standing order of the postmaster general which bans delivery to Pacific destinations of business circulars sent by third class mail. This ban never was intended to apply to house organs and catalogs, and it does not apply to educational material.

In fact, the only problem facing the manufacturer who wants to send copies of house organs and catalogs to men in the Pacific area is that of getting their names and addresses. This problem is one that can be licked by ordinary business resourcefulness. A manufacturer can get a long start in the compilation of

such a list by questioning his customers as to the names and addresses of former employes now in the service. And there is nothing in the postal regulations to prevent him writing these men by first class mail to ask for the names and addresses of other interested men to be added to his list.

Manufacturers who would like to send their literature and catalogs to interested service men in the Pacific area should state their problem, in writing, to the Chief of Naval Operations, Postal Affairs Section, Navy building, Washington 25, D. C. It is advisable when they write that they enclose copies of the printed material which they want to circulate among the service men.

CONSTRUCTION AND ENTERPRISE

OHIO

AKRON, O.—Remington Products Co. will build factory and office buildings at 1507 Copley road, at estimated cost of $11,000.

ALLIANCE, O.—Consolidated Inc. has been incorporated with 250 shares no par value to build aircraft, parts and accessories, by Russell E. Iden, 47 North Linden avenue, and associates.

ALLIANCE, O.—Consolidair Inc. has been incorporated with 200 shares no par value to manufacture aircraft parts and accessories, by Russell E. Iden, Kenneth W. Tibbets and Evan W. Morris. Mr. Iden is agent.

CINCINNATI—Emery Industries Inc. has been given WPB authorization for installing additional facilities for manufacture of glycerine, etc., to cost $165,000.

CINCINNATI—Lunkenheimer Co. has been granted WPB authorization for revamping of present and installation of new equipment, shakeout grating, belt conveyors, hoppers, dust collecting system, etc., in its bronze foundry, to cost $407,835.

CLEVELAND—Westinghouse Electric Corp., Maloney building, Pittsburgh, is erecting a one-story addition to its plant at 1216 West 58th street, to cost about $39,000.

CLEVELAND—Eaton Mfg. Co. has received WPB authorization for construction of plant addition to house nitriding facilities and additional plating equipment, to cost $113,775.

CLEVELAND—National Advisory Committee for Aeronautics, Washington, has received WPB authorization for construction of four additional test cells for combustion studies for jet propulsion and guided missiles at Cleveland, to cost about $244,000.

CLEVELAND—Modern Gas Furnace Co. has been incorporated with 250 shares no par value to manufacture heating furnaces, by Gerald W. Doyle, 517 NBC building, agent, and associates.

CLEVELAND—Collinwood Pattern Works, 17118 St. Clair avenue, will build a one-story plant building 40 x 80 feet at East 172nd street and St. Clair avenue, to cost about $13,000.

CLEVELAND—Harshaw Chemical Co. will ask bids in fall for plant addition at 1000 Harvard avenue, estimated to cost $291,000, for which WPB approval has been granted.

CLEVELAND—Cleveland Welding Co., 2115 West 117th street, has let contract to H. L. Vokes Co., 5300 Chester avenue, for a 100 x 200-foot factory building, to cost about $50,000.

CLEVELAND—Phoenix Ice Machine Co., 2711 Church avenue, has let contract to H. E. Klefman Co., 3436 Lorain avenue, for a one-story 96 x 134-foot plant addition to cost about $40,000. W. Caldwell, Engineers building, is architect.

CLEVELAND—Steel Improvement & Forge Co., 6416 Metta avenue, has let contract to J. L. Hunting Co., Ninth-Chester building, for a one-story warehouse addition 50 x 202 feet, to cost about $40,000. W. Hatch, Hippodrome building, is architect.

COLUMBUS, O.—Columbus & Southern Ohio Electric Co., M. L. Evans, vice president, 215 North Front street, will build steam boiler plant costing about $1,400,000 and service and shop building to cost $300,000. C. Gillivan is chief engineer.

EUCLID, O.—Defense Plant Corp. through Chase Brass & Copper Co. Inc., has WPB authorization for installation of annealing machines, heating units, cabinets and service lines for production of mortar shells, to cost about $405,000.

MANSFIELD, O.—Westinghouse Electric Corp. is taking bids for conversion of warehouse on East Fourth street to factory use, at estimated cost of $228,000. Separate contracts will be let.

RITTMAN, O.—Ohio Boxboard Co. has given WPB authorization for a two-story addition 184 x 210 feet and to install papermaking equipment, at cost of $275,000.

SALEM, O.—E. W. Bliss Co. has received WPB authorization for erection of a building and installation of bending brake, grinders, chippers, etc., to cost about $328,600.

YOUNGSTOWN—Modern Trimedge Co., 402 Mahoning avenue, Marvin H. Itzkovits, president, is erecting a 20,000-square foot addition and installing an anodizing and plating machine.

MASSACHUSETTS

WESTFIELD, MASS.—Westfield Tool & Die Co., 55 Arnold street, will build a two-story 50 x 65-foot plant building, to cost about $50,000. M. B. Harding, 6 Main street, is architect.

CONNECTICUT

COS COB, CONN.—New York, New Haven & Hartford railway, E. E. Oviatt, chief engineer, has let contract to Gibbs & Hill Inc., 450 Seventh avenue, New York, at $697,5[illegible] for design and construction of power plant alterations.

NEW BRITAIN, CONN.—Department of public works, City Hall, has preliminary plans for refuse incinerator to cost $250,000, for postwar construction. Keis & Holroyd, 95 Broadway, Troy, N. Y., engineers. G. Mollen, City Hall, city engineer.

PLAINFIELD, CONN.—Plastic Film Corp., Plainfield, has let contract to A. F. Peasley Inc., 15 Lewis street, Hartford, Conn., for a one-story 43 x 200-foot plant addition to cost about $45,000.

NEW YORK

BUFFALO—Watkins Body Corp., 666 Genesee street, builder of motor truck bodies, has an expansion program to more than double capacity and employment.

ROCHESTER, N. Y.—General Railway Signal Co., 131 Lincoln avenue, will take bids soon for alteration and reconversion of manufacturing buildings at cost of about $1 million.

PENNSYLVANIA

PHILADELPHIA—Pennsylvania Range Boiler Co., Washington avenue and 24th street, has let contract to Wintz Bros. Inc., 161[illegible] Sellers street, for boiler and tank shop additions, to cost $70,000. M. A. Greenberg, 1701 Erlen road, LaMott, Pa., is engineer.

PITTSBURGH—Jones & Laughlin Steel Corp. has WPB authorization for an addition 24 x 30 feet and installation of motors, etc., to cost $97,000.

PITTSBURGH—Dravo Corp., Neville Island, has let contract to Booth & Flinn, 1942 Forbes street, Pittsburgh, for construction of dry dock facilities, including piers, foundations for dry docks, electric work, gantry crane rails, etc.

MICHIGAN

DETROIT—Purpose Tool & Mfg. Co., 810 West Elizabeth street, has been incorporated with $20,000 capital to manufacture tools, dies, jigs, fixtures, by Allen A. Saltz, 4276 Leslie avenue.

DETROIT—Valentine Welder & Mfg. Co., 7310 Woodward avenue, has been incorporated with $100,000 capital to manufacture mobile arc welding equipment, by C. Elbert Valentine Jr., 16170 Muirland avenue.

OXFORD, MICH.—Merritt Mfg. Co., 29 Oxford street, has been incorporated with $30,000 capital to manufacture electric wiring assemblies, by Joseph A. Sweet, 569 Currey street, Rochester, Mich.

VAN DYKE, MICH.—Roadway Mounting & Equipment Co., 21177 Mound road, has been incorporated with $12,000 capital to manufacture bolster mounts and road machinery by Albert Franta, 1445 Manning avenue, Detroit.

ILLINOIS

CARLINVILLE, ILL.—City has plans nearly completed for postwar construction of sewage disposal plant costing about $60,000. F. Morse is city engineer.

CHICAGO—Illinois Institute of Technology, Harry T. Heald, president, has started construction of a $200,000 naval science building, first unit of a $13 million campus development on 32nd street between State and Dearborn streets. Plans are by Ludwig Mies van der Rohe, professor of architecture in the Institute, with Holabird & Root, Chicago, associate architects.

DANVILLE, ILL.—F. L. Jacobs & Co., Detroit, manufacturer of cushion springs for automobiles, will build an 80 x 80-foot plant costing $300,000 at Danville, served by the Wabash railroad.

INDIANA

INDIANAPOLIS—Link-Belt Co., Ewald Works, 220 South Belmont street, has let contract to Carl M. Keupal Construction Co., 1107 Hume-Mansur building, for a one-story 120 x 812-foot and part two-story 80 x 260-foot additions, estimated to cost about $600,000.

MADISON, IND.—Williamson Heater Co., 337 West Fifth street, Cincinnati, plans new plant on 30-acre site, to cost about $1,250,000.

RICHMOND, IND.—Crosley Corp., Richmond, plans postwar refrigerator manufacturing plant at Sheridan avenue and city limits, to cost about $2 million.

DELAWARE

CLAYMONT, DEL.—General Chemical Co., 40 Rector street, New York, will take bids soon on a manufacturing plant in North Claymont, to cost about $600,000.

MARYLAND

SPARROWS POINT, MD.—Bethlehem-Sparrows Point Shipyard Inc., Frank Hodge, manager, is adding several thousand feet of space to its pipe shop and erecting a building to be equipped with special equipment for X-raying pipe and other metal used in ship construction.

LOUISIANA

JENNINGS, LA.—O. Gautier, mayor, City Hall, plans postwar sewage disposal plant costing about $276,000 and incinerator costing $43,000. Barnard & Burk, Triad building, Baton Rouge, La., are consulting engineers.

WEST VIRGINIA

FOLLANSBEE, W. VA.—Sheet Metal Specialty Co. has received WPB authorization for an addition and installation of presses, annealing furnace, welder, etc., for production of canisters, to cost $245,000.

MISSOURI

JOPLIN, MO.—City, J. J. Saunders, commissioner, City Hall, will hold election soon on $700,000 bond issue for postwar sewage disposal plant. H. T. Lawrance, 1802 NW 21st street, Oklahoma City, Okla., is consulting engineer.

ST. LOUIS—Natkin & Co., 1601 South Hanley road, St. Louis county, plans a $200,000 addition to its air conditioning equipment plant.

ST. LOUIS—Welsch Furnace Co., 5601 Manchester avenue, plans a $40,000 plant addition.

ST. LOUIS—John Ramming Machine Co., 4591 McRee avenue, plans postwar plant addition to cost about $125,000.

UTAH

PROVO, UTAH—Pacific States Cast Iron Pipe Co., H. King, general manager, has let contract for plant additions and remodeling to F. H. McGraw & Co., Box 3269, Salt Lake City, estimated to cost $250,000.

CALIFORNIA

ALAMEDA, CALIF.—Bureau of Yards & Docks, Navy Department, Eighteenth street and Constitution avenue, Washington, has let contract to Dinwiddie Construction Co., 210 Crocker building, San Francisco, for modernization of engine test cells, at cost of $546,872.

LOS ANGELES—Y-W Trailer Parts & Equipment Co. Inc. has been incorporated with $25,000 capital by Helen Horwitz, Harry Rabwin and Harold W. Nash. Company is represented to Marcus, Rabwin & Nash, 608 South Hill street, Los Angeles.

MODESTO, CALIF.—Pacific Can Co., 290 Division street, San Francisco, will erect plant building 250 x 600 feet, bids now being asked. Plans are by Ellison & King, engineers, 500 Sansome street, San Francisco.

RIVERSIDE, CALIF.—Colonial Radio Corp., 254 Rano street, Buffalo, has bought 13-acre site for postwar plant construction estimated to cost $150,000.

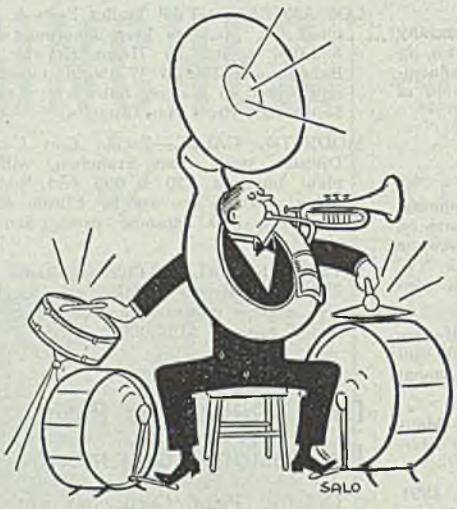
DPC Authorizes Plant Expansion, Equipment

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

Allied Chemical & Dye Corp., New York, $200,000 to provide plant facilities at Birmingham, Ala., for production of naphthalene.

Breeze Corp. Inc., Newark, N. J., $70,000 increase in contract to provide additional equipment at a plant in Elizabeth, N. J., making overall commitment $375,000.

Iron Fireman Mfg. Co., Cleveland, $145,000 increase in contract to provide additional equipment at a plant in Cleveland, making overall commitment $760,000.



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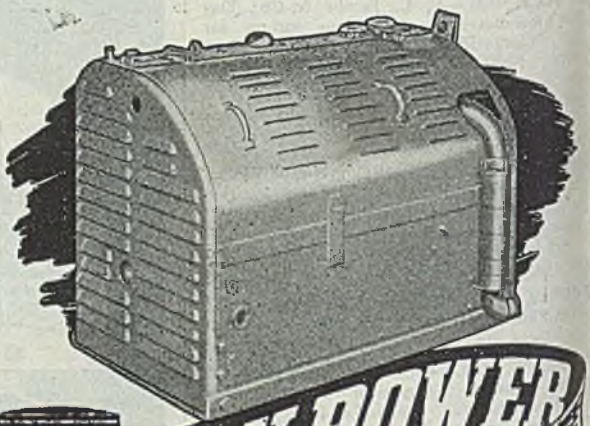

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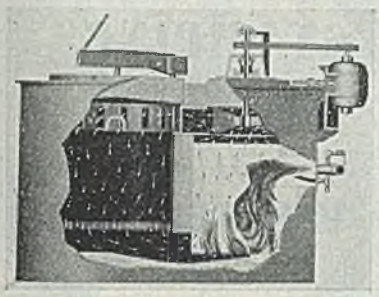

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SHEARS, Alligator 1"—4".
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DESIGNER, DRAFTSMAN AND ESTIMATOR WANTED

Must have full knowledge of construction of all types pressure vessels, storage tanks, general steel plate construction. Plant located in Alabama. Statement of availability required and prefer young engineer. Address Box 998, STEEL, Penton Bldg., Cleveland 13, O.

WANTED—CARBIDE TECHNICIAN. WELL-known eastern company with established sales outlet has excellent opportunity for Chief Technician to develop carbide line, especially for wear resistant applications. Fundamental processing equipment installed. Company also interested in cast tool developments, precision and centrifugal castings, with particular reference to special heat resisting applications, such as gas turbines. State age, education, experience, salary desired and draft status. Address Box 903, STEEL, Penton Bldg., Cleveland 13, O.

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Well established heavy industry making equipment for cutting and forming sheet metal has opening. Give details of education, personal qualifications and work history in letter of application which will be held in confidence. Employment in accordance with existing W.M.C. regulations. Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, N. Y.

Help Wanted

Wanted
METALLURGIST

Thoroughly experienced in powder metallurgy development and production. Must have good background of experience with ferrous powders, pressing, pressing tools, sintering, heat treating, etc. Good opportunity with expanding firm in New York City. Excellent postwar future. Replies held confidential. Address Box 105, STEEL, Penton Bldg., Cleveland 13, O.

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Must be thoroughly familiar with foundry maintenance, all phases. Prefer man with conveyor experience. Southern Location, excellent opportunity. Good salary and working conditions for right man. In replying give complete details of experience, salary requirements, furnishing names of three references. Address Box 100, STEEL, Penton Bldg., Cleveland 13, O.

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WANTED: MAN WITH GENERAL OFFICE or field sales experience by large reputable manufacturer of seamless and electric welded tubing, alloy and carbon steels. Please apply giving full information, experience, etc., to Box 754, STEEL, Penton Bldg., Cleveland 13, O.

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