

Bricklayers working on one of plant buildings for Brazil's new integrated steel mill. Page 88

STEEL

The Magazine of Metalworking and Metalproducing

NOVEMBER 8, 1943

Volume 113—Number 19

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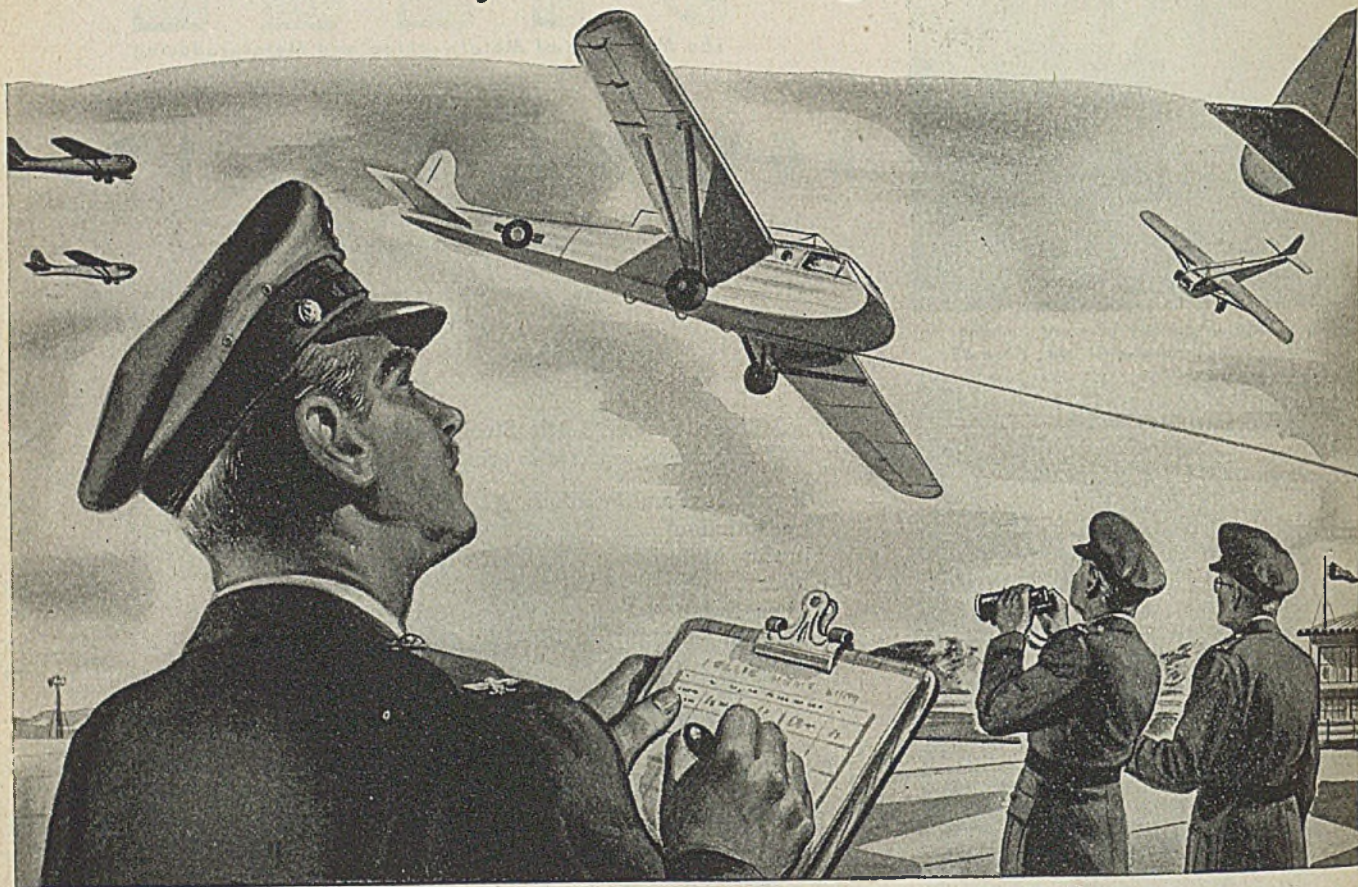
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How a "Holiday Crew" helped OK a Glider



A **Midwestern Glider Manufacturer** was readying a new model for important Army approval tests. At the last moment, the firm's regular source of aircraft wire was unable to supply the special kinds required for electrical circuits on the new "sample". Short lengths of four different sizes were needed... and needed fast... to complete the glider for test.

A **Hurry Call to Graybar** came just before Labor Day. On Saturday the needed wire was located at a New England factory. By telephone, an emergency man at the plant was asked to cut the required lengths of wire from reels, and arrangements were completed for priority Air Express shipment. On Sunday, the wire was delivered, making it possible to complete the wiring job over Labor Day. "Holiday crews", both at GRAYBAR and the wire plant, had seen the job through.

In serving as a regular supply source for hundreds of the electrical items which go into planes, ships and other war equipment, GRAYBAR makes every effort to work out a plan of *scheduled delivery*, keyed to your production, to avoid emergency shortages. To meet the unexpected, however, GRAYBAR's nationwide warehouse facilities and intimate contact with leading suppliers offer an extra "safety factor" for the completion of vital war work.

If your product requires electrical parts or materials for wiring circuits or for lighting, communication or power supply, check with your local GRAYBAR office for this time-saving "mobilization" service.

MOBILIZED MATERIALS

No. 12 of a series of actual examples of GRAYBAR service, providing electrical materials to be installed in ships, planes and other war products.

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You're Fined If You Do It

Release No. V-139, issued from a regional office of the War Labor Board, dated Oct. 15, 1943, reads in part as follows:

"Hearings involving three . . . department stores will be held next Wednesday, Oct. 20. . . . It is alleged that the three . . . department stores, from June 9 until the middle of August, granted certain employes an extra day off each week, in addition to Sunday, without reducing their pay. Under War Labor Board policy a reduction in the hours of work, without proportionate reduction in compensation, results in an increase in the hourly rate, which must have prior approval of the War Labor Board."

The same release carries a sinister reminder that "cases of wilful violation may be referred to the Department of Justice for criminal prosecution. Criminal penalties fixed by Congress subject both employers and employes who wilfully violate the act to a fine of not more than \$1000 or imprisonment of not more than one year or both."

Last week, after irreparable damage to the war effort had been caused by a strike of coal miners, government and union officials agreed upon a program which would induce the striking coal men to return to work. The terms were calculated to give the miners what they wanted and were thimble-rigged to make the public feel that the War Labor Board's anti-inflation precepts were not being violated.

This strategy of chasing devil around the stump was accomplished by a series of too-clever moves. First the mines were taken over by the government. Then Harold Ickes and John Lewis went into a huddle. They came out with a scheme of portal-to-portal pay, shortened lunch period, elimination of certain tool and equipment charges and adjustments in vacation pay.

These moves add up to granting the miners more pay without a corresponding proportionate increase in production. There may be a slight increase in individual output per day, but it will not measure up to the increase in pay.

In short, the government, as an employer, has violated the rules it imposes upon private employers. It does with impunity—if not with boasting and self-righteousness—the very things which if done by a private employer subjects that employer to fine and imprisonment.

It is injustice of this kind, resulting from the bungling of bureaucracy, which sours the public on the current brand of planned economy. It is a contributing factor to the political trend manifested in last Tuesday's elections.

CUTTING BY FRICTION: Considerable interest is being manifested in a method of friction cutting employed successfully by the Bell Aircraft Corp. at Buffalo. A bandsaw, with the general characteristics of an ordinary handsaw, when operated at high speed cuts metals and other materials, including files, armor plate and plastics, without difficulty.

Experience in the Bell plant indicates that friction cutting by this method works best when three re-

quirements are fulfilled. First, the bandsaw blade must be operated at about 12,000 feet per minute. Secondly, the blade must be of a material that will withstand flexing around bandsaw wheels for a considerable period of time. Thirdly, safety guards must enclose the blade except at the point of cutting.

The high speed of the saw generates heat. Although the cut is actually burned, the heat penetration at the edge of the metal is surprisingly slight.

The best cutting occurs when the teeth of the blades are about one-third worn. Life of the blades averages about 24 hours of continuous cutting on light metals.

Obviously this type of cutting is not a cure-all for all cutting problems, but it has a sufficient number of applications to warrant investigation by many manufacturers. —p. 104

PROCEED WITH CAUTION: Appearance of catalogs of surplus materials offered for sale by supply depots of the military services is causing industrialists to wonder whether a wholesale "dumping" of materials, equipment and supplies is in prospect.

An air service depot in Memphis, Tenn., has issued a 32-page, profusely illustrated catalog offering a wide variety of items. Naturally industrial executives are interested in the manner in which this surplus stock is to be sold.

What prices will be asked? Will manufacturers of certain items be given an opportunity to bid for their own products? Will the items sold be identified as "salvage goods" or "government surplus"?

The Memphis offering, as well as a few others of prior date, may not be important individually, but if these instances constitute the beginning of a general dumping movement, it is only fair that industry be given a clear-cut statement of the government's policy. The situation is loaded with economic TNT. —p. 72

BACK-SEAT DRIVING: Much wordage has appeared in the public press as to difficulties at the plants of the Brewster Aeronautical Corp. This publicity, coupled with the fact that Henry J. Kaiser was called in to right the mess at Brewster, has given the man in the street the impression that the trouble lay in poor management.

Hearings before a subcommittee of the House Committee on Naval Affairs have brought out evidence that the chief culprit in the Brewster incident is not faulty executive management as much as it is abuses committed under the authority of the Wagner act. Back-seat driving by the Navy department, the War Labor Board and three feuding labor union groups was so pernicious that management by the executives of the company could not be effective.

The Brewster case is an excellent illustration of what happens when too many persons have too much authority. —p. 75

INDUSTRIALIZING BRAZIL: Until recently Volta Redonda was a flag-stop village on the main line of the Brazilian Central railway between Rio de Janeiro and Sao Paulo. Today it is the site of a steelworks project which when completed will have a capacity of 350,000 tons of steel ingots annually.

In undertaking to build and operate an integrated iron and steel establishment at Volta Redonda, Brazilians are making a bold move toward changing their nation from one that has been predominantly agrarian to one that will rely more heavily upon a modern industrial society.

At the present time Brazil's steel facilities consist of a few small mills whose total output of rolled steel is about 200,000 tons annually. Brazilians hope that the Volta Redonda works, with its output of diversified steel products, may become the nucleus of a rounded out industrial development to serve the large population of the Rio and booming Sao Paulo areas. —p. 88

PROBLEM OF EDUCATION: Manpower shortages in the foundry and forging industries continue to constitute one of the most persistent problems in the war production program. The scarcity of competent men has slowed production of castings and forgings to the point where the effect has been felt by contractors making ships, landing craft, military trucks, mobile equipment, etc.

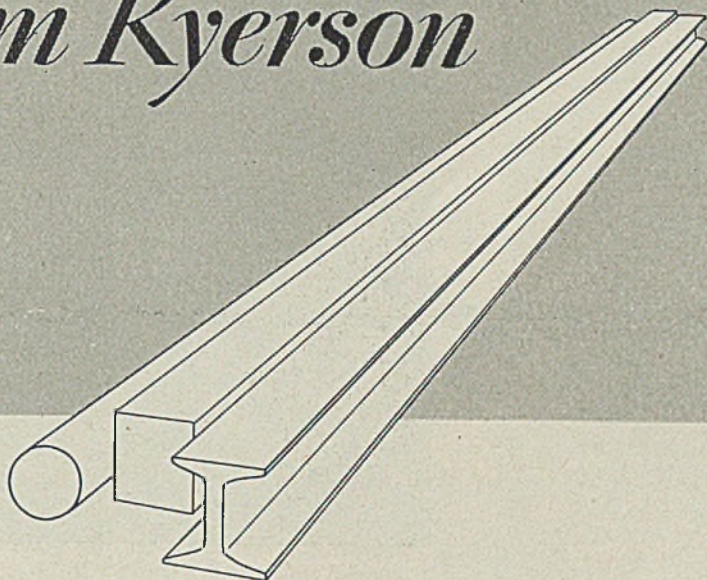
The War Manpower Commission, in co-operation with WPB and numerous other agencies, is undertaking a 12-point program to ease the situation. It provides for helping foundries and forge shops on an approved list to obtain and hold workers against the demands of other employers.

It is likely that the program will help considerably but it cannot solve overnight the fundamental difficulty which is that, rightly or wrongly, the working personnel of the country has gained the idea that jobs in these shops are unattractive.

There has been a marked improvement in working conditions in foundries and forge shops in recent years, but the old traditions linger in the minds of many workers. Leaders in both industries face the need of a long-term educational campaign which, if conducted intelligently, will pay big dividends. —p. 74

E. L. Shaner
EDITOR-IN-CHIEF

WAR STEEL... *quickly* *from Ryerson*



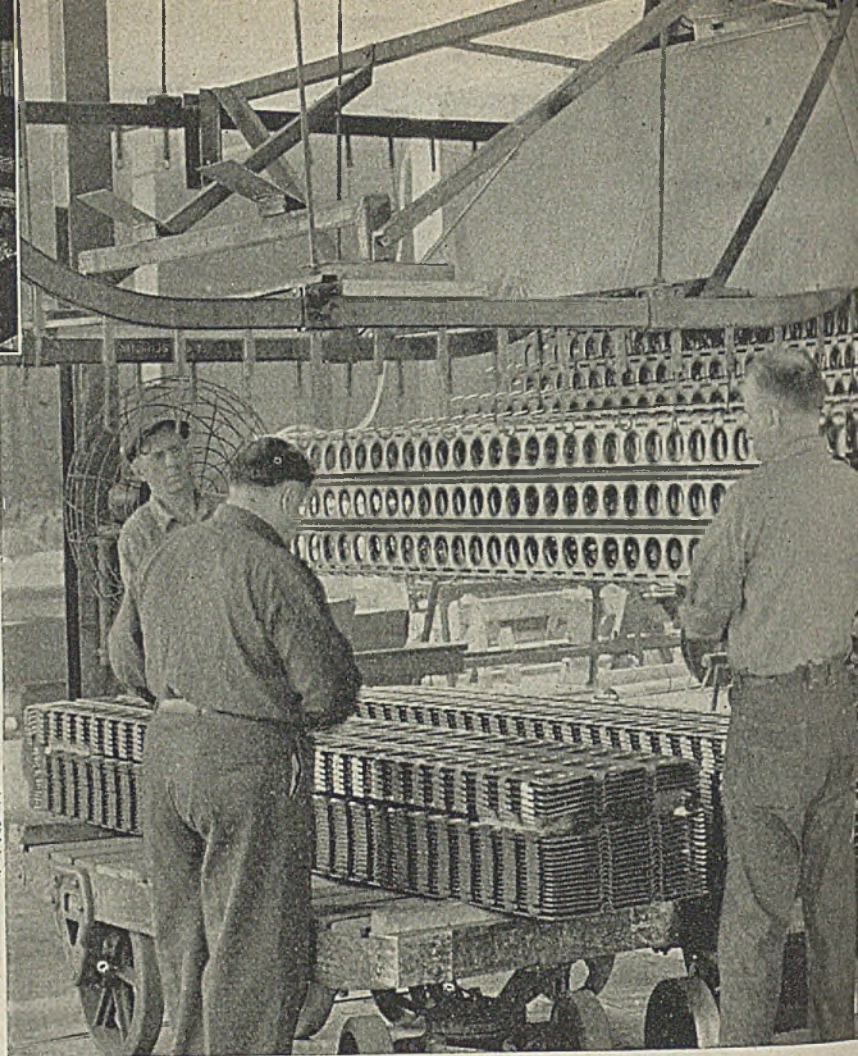
Steel for weapons—for essential industries—steels for maintenance—special aircraft steels and NE alloys—all are immediately available in Ryerson stocks! When shortages occur, Ryerson technical experience finds an alternative. When speed is paramount, Ryerson operating men make delivery on time. Call Ryerson first, whatever your steel requirements, for prompt, effective cooperation! Joseph T. Ryerson & Son, Inc.; Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

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The press stamps landing mat sections out of heavy gage Inland sheets. The much-needed scrap goes back to the steel mills.

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of landing mat sections. The remarkable speed with which air bases are built with steel mats assures our fighting men maximum air protection in the shortest possible time.

Production of landing mat sections is only one of the many war-time uses for Inland's entire sheet output. Among others are: blitz cans, shell cases, bombs, bomb racks, pontoons, ammunition boxes, and parts for airplanes, trucks, jeeps, etc. While producing at maximum capacity for Victory, we are also preparing to supply steel for the needs of America at peace.



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Strike Settlement Cracks "Little Steel" Formula

Other unions expected to use concessions granted miners as opening wedge in demands for wage increases. . . Full impact of year's fourth mine walkout not immediately visible, but will be reflected in war production for months to come

NINETEEN FORTY-THREE'S fourth nation-wide coal strike has been settled—at a price.

The cost was a devious but actual break-through of the "Little Steel" wage formula and of the hold-the-line-against-inflation policy.

Whatever disavowals may be made by the administration, the National War Labor Board, and Fuel Administrator Harold L. Ickes, the new contract signed by the United Mine Workers of America and the government as operator of the mines is definitely inflationary.

It will increase the cost of mining coal by an estimated 23 cents to 60 cents a ton, depending on local mine conditions. Administrator Ickes said he will request OPA to allow an increase in the selling price of coal. This will increase the cost of conducting the war and will advance the cost of living.

It opens the doors for other labor unions who have been demanding wage increases, or who have been awaiting the outcome of the coal mine dispute before issuing formal demands.

Full impact of the mine shutdown was not immediately reflected in steelmaking operations. However, a number of blast furnaces were banked and coke oven operations were curtailed at several centers. Coal stocks, which had not recovered from the effects of the earlier strikes, were further depleted, and effects of the latest strike probably will be reflected in war production for the next several months.

Coal destined for the upper lakes was frozen almost as soon as the government seized the mines, and held in reserve for emergency calls from war plants.

In the East, coal stocks were fairly comfortable, but the strike settlement came just in time to avert serious disruption in iron and steelmaking.

At Chicago, the resumption of shipments averted programmed banking of at least four blast furnaces. Coke production was reduced by from 20 to 25 per cent.

At Pittsburgh, Clairton coke works of Carnegie-Illinois cut production by 50 per cent. Carnegie-Illinois banked ten blast furnaces at Pittsburgh and Youngstown and took off 49 open hearths. All beehive coke operations in the district were halted. Other companies made

lesser reductions in operations.

Mr. Ickes, federal custodian of the seized mines, agreed to a contract between the government and the miners' union granting a wage increase of \$1.50 a day. Previously the miners had been granted an increase of \$1.50 a week for blacksmithing, safety equipment and other incidentals. In effect the new contract gave the miners the same increase as was proposed in the original Illinois agreement, but which was disallowed by the WLB.

Mr. Ickes was authorized by the President to sign a contract with the miners for the duration of operation of the mines by the government, but was instructed to follow the provisions of the modified Illinois agreement approved by the WLB. This complicated formula was said to have allowed an increase of \$1.12½ cents a day to the miners, but was estimated by WLB Chairman William H. Davis to increase the average weekly earnings of miners who worked a full 6-day week by \$10 and to place such average weekly earnings at approximately \$60.

The contract between Mr. Ickes and the United Mine Workers raises the daily wage increase granted the miners by 37½ cents by the expedient of reducing the lunch period from 30 to 15 minutes. Presumably this will add \$2.25 weekly to the miner's pay envelope or raise the average weekly wage to \$62.25.

Complicated Solution

The steps leading to the resolution of the coal wage dispute are both complicated and confusing. Under their former contract, the miners worked a basic 7-hour, 5-day week and received a basic wage of \$1 an hour. In recent months, their basic wage of \$35 has been added to by overtime work at time-and-a-half.

The WLB recognized the miners' demands for a wage increase as a hot potato, and after much intricate reasoning brought up a proposition which on the surface appeared to be no violation of its own "Little Steel" formula but which allowed the miners wage increases by two devices: (1) Payment for an assumed average traveling time for which they previously had not been compensated; (2) extension of the work week to afford greater benefits from overtime rates for extra productive work and also



HAROLD L. ICKES

"Coal prices will be higher"

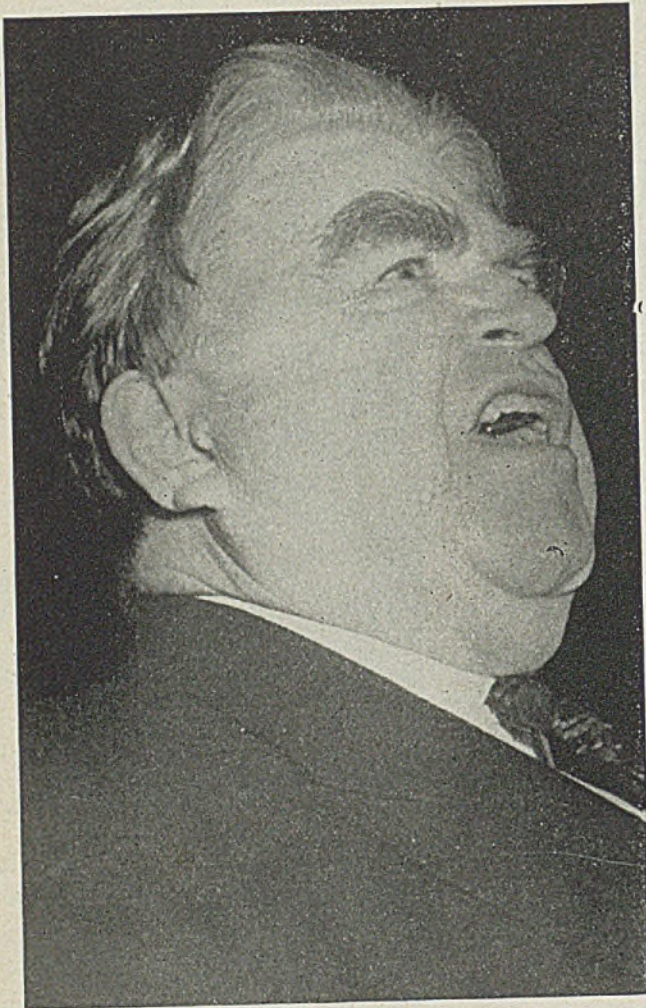
to throw all travel time into the time-and-a-half bracket.

This formula, known as the modified Illinois agreement, basically provided the miners work a 51-hour, portal-to-portal week for which they would receive \$54 plus the \$1.50 previously allowed for incidentals.

Deducting the 45 minutes allowed for traveling time from mine entrance to working locations, the 51-hour week was equivalent to 46½ hours actual working time. At former rates—\$1 an hour for the basic 35-hour week and \$1.50 for overtime—a 46½-hour work-week would have netted the miners \$52.25. These are basic and not average figures.

Presented thusly, the formula appears not to grant the miners any considerable increase. In fact, John L. Lewis, president of the United Mine Workers, complained, after some mathematical calculations that even government statisticians could not comprehend, that the formula reduced the miners' base pay by 4½ cents an hour.

Following the complaint of Mr. Lewis, WLB Chairman Davis pointed out that



JOHN L. LEWIS He won again



WILLIAM H. DAVIS His formula weakened

the formula would increase the average weekly wage of the miners by at least \$10 above their former average earnings.

The contract signed by Mr. Ickes for the government raises the figures of the WLB formula by \$2.25 a week at least and the miners can be assumed to have won an average weekly wage increase of at least \$12.25.

WLB economists delved into the files of the Bureau of Labor Statistics and came up with figures showing that if the bituminous miners had been working in August under the terms proposed by the Illinois agreement their average weekly earnings would have ranked third among the 37 leading industries. Actual earnings in August were \$46.24 a week, compared with \$26 in January, 1941, the base month for the "Little Steel" formula. This was a gain of 78 per cent.

With the additional increase granted under the new contract, average weekly earnings will be well over 100 per cent above January, 1941. Much of the increase, of course, is due to the longer work-week.

The contract between the government and the UMW was termed "satisfactory" by Mr. Lewis and the miners were ordered to return to work.

The contract is good only for the

period that the government operates the mines. What the ultimate solution will be still is uncertain, although many observers believe the terms of the present contract will be foisted upon the private operators when the mines are returned to them.

The circuitous concessions to the miners were watched closely by other labor leaders who are impatient to receive concessions for their followers.

Pressure for the breaking—openly—of the "Little Steel" formula is being brought by all major unions.

The Congress of Industrial Organizations meeting in Philadelphia last week demanded the formula be abandoned and that labor "be permitted to secure wage adjustments through the sound and stable process of collective bargaining."

Railroad union leaders now are polling their members on a strike ballot in protest against what they consider inadequate wage increases allowed them. The 1,000,000 nonoperating employees are fighting an attempt to scale down an 8-cent hourly increase voted them by a Presidential board last May but vetoed by Economic Stabilizer Fred M. Vinson. The 350,000 operating employees are rejecting a 4-cents-an-hour increase awarded them. The operating employees are asking a 30

per cent flat increase with a \$3 daily minimum raise; the nonoperating employees originally asked for an additional 20 cents an hour.

Much Steel Consumed in Other Than War Industry

To sustain the war effort and civilian economy, approximately one-fourth of current record-breaking output of steel is allocated for purposes other than the primary production of goods used directly or indirectly for war, according to the American Iron and Steel Institute.

Included are shipments to such consuming groups as petroleum and mining, the public utilities and railroads, the farm market, and manufacturers of containers for food and other products.

In 1940, those industries consumed nearly 40 per cent of the steel then produced. In 1943, with overall industrial production higher than ever before, those same basic industries will receive only about 75 per cent of the tonnage of steel they got in 1940.

Shipments of steel to all consumers now are averaging about 5,000,000 tons per month. Of that total, about 1,250,000 tons is used to maintain the efficiency of industry and the public.

Constitutionality of Act Tested In Suit Filed by J. F. Lincoln

Cleveland industrialist opens another round in fight against bureaucratic decision. . . Action is first of kind and seeks to bar enforcement of Navy finding ordering repayment by company of \$3,250,000 in "excess profits"

IN the first action of its kind, injunction suit was filed last week in federal court in Washington by J. F. Lincoln, president, Lincoln Electric Co., Cleveland, seeking to have the Renegotiation act of 1942 declared unconstitutional.

It marked the opening of another round in the battle between Mr. Lincoln and government bureaucracy stemming from the recent renegotiation action in which the Lincoln company was ordered to return to the government \$3,250,000 held to be "excess profits" on war contracts.

Judge F. Dickinson Letts refused to act immediately upon the filing of the suit stating legal notice had not been given to the Navy in time to permit it to answer the complaint. Judge Letts, however, set Friday morning for a hearing on whether or not to issue a preliminary injunction. Secretary of the Navy Knox and Under Secretary Forrestal are named defendants in the action.

In a letter dated Oct. 23, Under Secretary of the Navy Forrestal had informed the Lincoln company that as a result of the renegotiation findings, unless the Lincoln company took action no later than Nov. 5 to eliminate such excessive profits (\$3,250,000) in a manner satisfactory "to me," appropriate action would be taken without further notice to the company, by directing the withholding of amounts otherwise due the Lincoln company as a contractor or subcontractor, by the government and by prime contractors with the government.

Responding to this letter Mr. Lincoln on Oct. 29 said he did not agree with the conclusions cited by Under Secretary Forrestal, and protested the findings "on all grounds available, constitutional or otherwise."

In his suit, Mr. Lincoln charges the Renegotiation act is arbitrary, unreasonable and in contravention of the fifth amendment of the Constitution in depriving Lincoln of his property without "due process." He also asks for a temporary restraining order and appointment of a special panel of three judges for final hearing on the contention that the act is "unconstitutional, null and void and unenforceable." He asks specifically that enforcement of the decision of Oct. 23, which would compel the Lincoln company to pay \$3,250,000, be barred.

Lincoln's petition maintained that the so-called "excess profits" sum was arrived at by the government without a hearing, without evidence and on the basis of secret information which was withheld

from the plaintiff. It maintains the Renegotiation act to be a taxing measure.

Lincoln attacked the constitutionality of the act on the bases:

THAT it deprives the company of property without due process of law under the fifth amendment.

THAT it unlawfully delegates legislative power to Secretary Knox and Under

Secretary Forrestal and their assistants.

THAT it exercises a power not delegated to the federal government.

THAT it fails to guide the Navy secretary by policy, rules or otherwise in determining whether excessive profits have been earned.

THAT in failing to provide for a hearing, reception of evidence and right to cross-examine it violates the fifth and tenth amendments of the Constitution.

Ashley M. Van Duzer of the Cleveland law firm of McKeehan, Merrick, Arter & Stewart, Lincoln's representatives in the suit, estimated that between 40,000 and 80,000 prime manufacturers and subcontractors holding war contracts were affected by the suit.

Lincoln estimated that in his own case about 5000 of his customers, through whom the government could act in impounding his funds, were affected.

Present, Past and Pending

■ WILL INVESTIGATE HEAVY INDUSTRY CENTRALIZATION

WASHINGTON—Senate Committee on Interstate Commerce has ordered favorable report on Senator McCarran's Senate resolution 190, asking appointment of committee to investigate effect on interstate commerce of centralization of heavy industry, including steel. Sum of \$5000 was appropriated for the investigating committee's expenses.

■ PLATE SHIPMENTS EASE SLIGHTLY IN OCTOBER

WASHINGTON—October plate shipments totaled 1,147,150 tons, based on preliminary reports, compared with 1,101,392 tons in the same month last year, according to the War Production Board.

■ SHIPYARDS DELIVERED 163 NEW VESSELS IN OCTOBER

WASHINGTON—Maritime Commission reports that in October merchant shipyards delivered 163 cargo vessels totaling 1,675,311 deadweight tons. This construction raises the 1943 total to 1524 ships, aggregating 15,501,624 deadweight tons.

■ CARNEGIE-ILLINOIS SETS ALL-TIME INGOT TON RECORD

CHICAGO—Carnegie-Illinois Steel Corp. last month produced over 2,000,000 tons of steel ingots, an all-time world's record exceeding the company's previous monthly record, in August, by more than 71,000 tons.

■ AJAX ENGINEERING CO. CLOSED FOR DELIVERY FAILURE

CHICAGO—Ajax Engineering Co., navigation instruments, was closed by the Navy, Nov. 2, and its contracts canceled for failure to meet delivery schedules. Navy-owned equipment and materials are being moved.

■ CENSUS BUREAU CONDUCTS CIVILIAN GOODS SURVEY

WASHINGTON—Bureau of the Census has started a nationwide consumer survey to check availability of 115 types of civilian goods and services used in homes and on farms.

■ MAY RESUME PRODUCTION OF ELECTRIC FLATIRONS

WASHINGTON—Production of electric flatirons will probably be resumed early in 1944, according to War Production Board information. Irons have been placed near the top of the WPB list of essential civilian commodities due for early production.

■ STEEL IMPORTER GIVEN DECISION IN CUSTOMS CASE

WASHINGTON—United States Court of Customs and Patent Appeals rules in favor of Globe Shipping Co. Inc., importer, in case involving merchandise invoiced as "cold rolled steel sheets lacquered one side one color" which customs officials assessed at 45 per cent as "manufactures of metal not specifically provided for." The importer claimed the shipment was dutiable as steel sheets.

Industry Speculating on Possible Wholesale "Dumping" on Market

Army Air Forces catalog listing excess equipment and supplies available at Memphis depot marks first concerted disposal effort of military services. . . Clear-cut controls of such sales seen as imperative to orderly economy

MARKING one of the first concerted efforts by the military services to dispose of surplus materials now on hand, and hinting at similar disposal programs to come, is issuance of a "Catalog of Available Material of the U. S. Army Air Forces" by the 830th Army Air Force Specialized Depot, Air Service Command, 3300 Jackson avenue, Memphis 1, Tenn.

The catalog is a 32-page profusely illustrated and photolithographed brochure which lists literally hundreds of parts, materials, equipment and supplies now evidently available in large quantities at this air depot.

Included in the listings are: Rubber hose and couplings; tanks for gasoline or oil, aluminum, steel and self-sealing; portable air compressor; hand and electric fuel pumps; multiple refueling funnels; drain cans and lubricators; gasoline meters and nozzles; manual and hydraulic airplane jacks; fuselage cradles and engine stands; airplane wheels and engine dollies; film projector; testing equipment of assorted types; flying clothes; electrically heated flying suits.

Much Excess Equipment Available

Also there are scores of engine parts for Pratt & Whitney, Wright and other engines; oleo strut packing rings; cabin heaters and airplane accessories such as de-icer equipment, regulators, gages, windshield wipers, etc.; assorted airplane seats, cushions and safety belts; landing gear accessories; field service tools; field and hangar equipment such as maintenance frames, crew chief stands, stationary engine winch and wing cradle dolly; gasoline-electric generator; electrical accessories such as lamps, armored cable, sockets, switches, etc.; tube bending table; buffer and polisher head; electric concrete drill; reel and tool box; assorted hammers, saws, blades, knives, plumbers' tools, machinists' tools, carpenters' tools; hand tools with drills, reamers, cutters, etc.

In the preface to the catalog, it is explained that, "It is deemed essential to the successful prosecution of the war and protection against shortages of needed materials that all property not immediately needed by the AAF be returned to industry for use directly or indirectly in manufacturing or other activities connected with the war effort.

Industry is immediately speculating on the possible effect of wholesale "dumping" of the wide variety of products involved on the industrial market. Questions

naturally being asked are: What prices will apply to such material? Were the manufacturers of the products advertised offered a chance to buy back their own merchandise before it was offered for sale? Is this the forerunner of wholesale dumping of surplus parts and materials on the market at "cut rate" prices which might lead to the disastrous conditions prevailing for long periods of time

TAKING ACTION

The AAF Central Procurement District at Detroit has taken steps to recover a portion of the \$1,400,000 worth of cutting tools sold last August as scrap to Detroit tool dealers. Army trucks last week were being loaded with crates of the material from a tool warehouse.

Maj. Gen. C. E. Branshaw, commanding general of the AAF Materiel Command, announced that an appraisal of the sale had been made and an unstated part of it ratified. All the tools still in dealers' hands were frozen pending the appraisal last month.

Meanwhile a WPB-appointed committee has worked out a plan for equitable disposition of such surplus cutting tools as may become available in the future. Details of this plan are expected to be announced shortly.

According to reports in Detroit, not all the tools in question were accumulated from the Studebaker aircraft engine project (see STEEL, Oct. 4, p. 81). Some of the crates reclaimed by the AAF were stamped, "Light Armored Car", indicating that they represented surplus tools from another undisclosed contract.

after the last war? Will all this material be plainly marked as "Government Salvage"?

Take the single case of bolts and screws. A separate sheet inserted in some copies of the catalog advertises in bold type: "Tremendous stock of screws—machine, set, wood. Brass screws. Steel screws. All new! All made according to government specifications. In this enormous quantity of screws, you can certainly find types and sizes to meet your particular requirements. Screws are all

new and all are made according to government specifications, under rigid supervision. They are available in various types of heads and a broad range of sizes. Made of brass or steel, they are designed to hold their loads in shear. Check your stock list today, and determine your requirements . . ."

And more, on washers: "Large quantities of washers of every kind and size. Just what you've been waiting for! Washers for every purpose! Here's the answer to your cry for washers! Here are steel washers and brass washers . . . all new! These washers are precision made, from select stock, to comply with the exacting requirements of U. S. government specifications. There is a wide range of sizes . . . all U. S. standard. They are available in many sizes and in the various types; therefore, from this tremendous lot, you can obtain the assortment to meet the requirements of your firm . . ."

Sales of the material are stated to be governed by "existing regulations" which implies that OPA price ceilings will be observed. What industry is more concerned about is whether there will be any "price floors" established. When supply exceeds demand, there is little need to worry about price ceilings.

While it may be a little premature to worry about flooding the market with surplus industrial commodities, this Memphis sale is probably "only the beginning," with total amounts of material to be disposed of running into billions of dollars. Clear-cut controls covering such disposals are imperative, if only to maintain industrial employment, now.

Suggest "Buying Pools"

One suggestion advanced to handle disposals of these surplus materials from service depots is for industry to organize "buying pools" to absorb the total quantities of commodities in various classifications and then supervise the resale. This would simplify the problem for the services which in general are not qualified to handle such disposals, and also would help industry to maintain the maximum level of production.

On the favorable side of the ledger it is known that the Air Service Command from its headquarters at Wright Field, Dayton, O., has approached a number of vendors to obtain distributors' prices on various types of surplus material, indicating the effort would be made to avoid any "fire sales."

The Memphis depot's catalog, it develops, is not the only compilation of this sort. Several of the West Coast aircraft companies are circulating catalogs of surplus material running to millions of dollars in value. Nash-Kelvinator Corp. has a surplus material catalog the size of the Detroit telephone directory. Republic Aviation is reported to have a 450-page surplus material listing.

Now in the hands of WPB officials and administration leaders at Washington is a concrete proposal for disposition of surplus cutting tools in possession of service depots.

Production of Aluminum Tops Essential Needs

Priority controls must be maintained to insure supply against depletion by wastage

TOTAL supply of aluminum for 1943 will exceed allotments by about 160,600 tons, according to an estimate by A. H. Bunker, director of the Aluminum and Magnesium division, War Production Board.

The fact there now is enough aluminum, both primary and secondary, does not mean it is available in adequate quantities in all the required shapes and sizes, Mr. Bunker said. To overcome occasional bottlenecks, capacity is being expanded for forgings and extrusions.

In reviewing expansion of the aluminum and magnesium industries, he revealed aluminum production now is about seven times that of 1939 output and magnesium about five times.

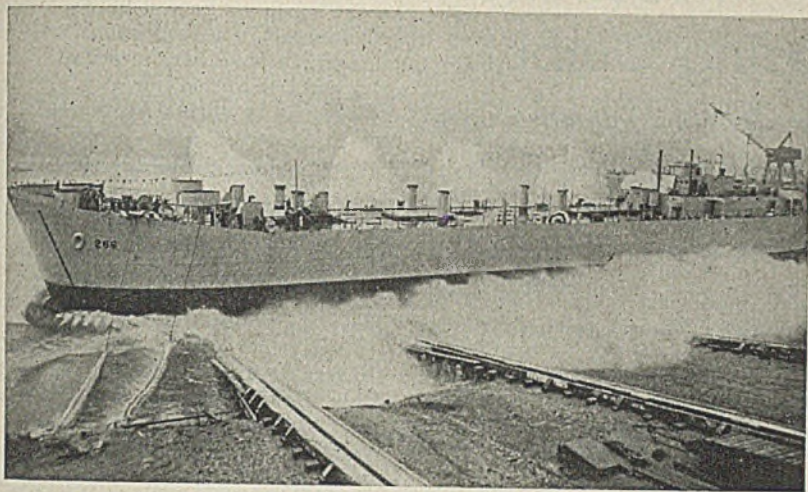
Because of wartime demands for stronger alloys, the aluminum industry had to discard its peacetime fabricating machinery and begin extensive building of new plants. Development of fabricating facilities was done at a cost of more than a billion dollars, 80 per cent of which was supplied by the government.

Some idea of the result of this development may be obtained from the estimated 1943 output compared to 1939: Tubing, 13 times; sheets, 7 times; rod and wire, 12 times; extruded shapes, 10 times; forgings, 45 times.

The manpower problem is still acute in the light metals industry. From a total of 30,000 employees in 1939 the labor force in the industry has grown to an estimated 200,000 in March, 1944. The following figures present the picture for the last half of 1943: Additions required, 67,520; replacements for turnover, 79,970; new hiring needed, 147,490. The manpower problem is part of the overall squeeze in such labor-short areas as Detroit, Cleveland, Buffalo, Los Angeles, and Bridgeport, Conn.

The Army and Navy has been encouraged to expand their uses of secondary aluminum in items such as gun director parts. The steel industry has been permitted to use increased quantities of secondary aluminum for deoxidizing; Russia has agreed to accept one-third of her fourth-quarter requirements in secondary, instead of 100 per cent primary; and a program is being pushed to eliminate specifications calling for primary metal when secondary would do.

It is likely that the over-supply of scrap in fabricators' and dealers' hands, amounting to 10,000,000 pounds on Sept. 1 will be dissipated by year's end.



INLAND LAUNCHING: Tank-carrying ship hits the water at the Ambridge, Pa., shipyard of the American Bridge Co., United States Steel Corp. subsidiary. The LST will be floated down the Ohio and Mississippi rivers on its way to foreign service

Idle Steel Inventories Heavier

Over 500,000 tons tabulated by one WPB regional office alone as result of changes in war production program. . . Alloy steel surplus presents difficult redistribution problem

CLEVELAND

REVISIONS in war materiel design, order cutbacks and cancellations resulting from fluidity of military demands, has in turn made available a substantial tonnage of idle steel inventories in war contractors' plants. However, the trend in this direction has tended to level off in recent weeks.

More than 500,000 tons of excess steel inventories occurring from revisions in the tank, shell casing and other war programs have been tabulated by one WPB regional office alone. Half of this tonnage is said to fall in the alloy steel category.

An intensive effort is being made to redistribute these inventories.

Some difficulty is being experienced in the redistribution of the alloy steel inventories due to the easing in demand for these steels in recent months. Overall consumption of alloy steels for the war program is currently estimated at about 400,000 tons quarterly below the peak demand experienced last spring.

Inability of some war contractors to obtain capacity production schedules because of the manpower shortage and tendency on the part of others to hold down inventories due to the uncertain future demand, have combined to curtail somewhat the volume of new orders placed recently. The 60-day inventory ruling under the Controlled Materials Plan has also been a factor in retarding the placing of new orders.

In the face of this somewhat easier demand for alloy steels a substantial increase in production facilities has oc-

curred. This has permitted a more rapid delivery situation.

Perhaps indicative of the easier situation in alloy steel demand is the report that one large producer has been asked to stockpile a portion of its output to maintain capacity production. The trade believes this to be but a temporary move to tide the producer over the current period of easier demand as a hedge against a possible sharp upturn in military requirements within the near future.

WPB Issues Directive

In line with the current alloy steel situation and to release urgently needed open-furnace capacity for carbon steel production, the War Production Board recently issued directive No. 2 to supplementary order M-21-a, notifying steel producers and customers that hereafter seven specified types of alloy steels are to be produced only in electric furnaces, except in unusual circumstances.

Types of alloy steel ordered in the direction to be produced only in electric furnaces are: (1) All airborne aircraft steel where aircraft quality is specified. (2) Airborne aircraft tubing. (3) Armor piercing shot body and cap steel, 20MM and larger. (4) Steel for integral parts of small-arm rifles and machine guns, up to and including 60 caliber, excluding mounts and tripods. (5) Steel for integral parts of guns, cannons, rifles and howitzers, 20MM and larger, excluding mounts and cartridges. (6) Bearing steel, including carburizing grades. (7) Gear steel, excluding gears made from plate.

Manpower Shortage in Foundries, Forging Shops Impeding Output

War Manpower Commission, in co-operation with other agencies, formulates 12-point program to alleviate situation. . . Workers in approved plants may be granted special consideration on selective service deferments

MANPOWER shortage in the foundry and forging industries continues one of the most critical bottlenecks in war production.

Output of ships, landing craft, military trucks, mobile equipment and other war implements is being impeded by inability of foundries and forge shops to meet projected schedules, largely because labor is not available to sustain operations at desired levels.

Determined efforts in both industries to solve the problem have brought some relief, but the situation continues critical and the outlook is not too promising for substantial betterment in the near future. For one thing recruitment of labor is difficult in both fields because of the unattractiveness of many jobs which are open. Further, the War Manpower Commission has been unable to eliminate the high rate of job turnover in both fields.

Some 200 shops, scattered over the country but most of them in the six states in WMC regions 5 and 6, have been definitely labeled "critical." These shops now are being surveyed. However, the listing is only preliminary. It will be revised from time to time since the overall manpower situation in both industries is so serious, with operations below capacities, that additional plants are expected to be added to the list right along.

Procurement agencies and prime contractors are experiencing difficulty in placing new orders with malleable foundries. Lagging production of certain gray iron items is reported. Some nonferrous foundries are producing exclusively for war work; many of these shops are new, having been built exclusively to take care of the needs of the increased aircraft program.

To offset the labor shortage in these industries the War Manpower Commission has developed a program in co-operation with War Production Board, Army, Navy, Maritime Commission and the Office of Price Administration. The program follows:

1. WPB, in co-operation with the Army, Navy and Maritime Commission, is preparing a list of critical foundry products.
2. These agencies will indicate to WMC those foundries which apparently are at present producing a critical item and are behind schedules due to manpower difficulties.
3. WPB, through the procurement and other agencies, will guide subcontracting into group 3 and 4 labor areas insofar as

possible; and where this is impossible, will provide additional facilities for existing plants.

4. WMC will complete labor utilization studies and recommendations for improvement for those foundries that produce a critical product and are apparently in manpower difficulties.

5. WMC's labor utilization staff will certify individual foundries that: (a) Produce solely items on the critical list of foundry products; (b) have done or are doing everything within reason to solve their own manpower problems, through proper labor utilization, training, recruitment, and labor relations.

6. Foundries producing solely a critical product and certified as making maximum utilization of their labor, will be listed by WMC as "approved foundries."

7. The Selective Service system will devise a procedure whereby workers in approved foundries will be given special consideration for occupational classification whether skilled or unskilled. Foundries must have on file a replacement schedule to be eligible for this consideration.

8. Foundries on the approved list will be entitled to: (a) Permission to clear workers outside of their area; (b) special consideration on deferment under the Selective Service system; (c) upon proper showing, will receive assistance from WMC in presentation of their requests for wage and price adjustments to the WLB and OPA; (d) WMC will ask the Navy, Army, Maritime Commission and WPB to make similar representations to WLB and OPA, on requests from approved foundries.

9. WPB will give increased emphasis to the improvement of labor relations and worker morale in approved foundries.

10. WPB will exert every effort to obtain proper plant facilities for approved foundries, including lockers, rest rooms, cafeterias, etc. When necessary, the government will assist in financing the costs of such improvements.

11. WPB will seek out, plant by plant, methods of increasing production through

(Please turn to Page 174)



BOYPOWER: Sixteen hundred Akron high school students are working a half shift before or after school at the Goodyear Aircraft factory. Youth shown above removing burrs from a bomber section is one of hundreds enrolled in the company's apprentice mechanics' course

Brewster Hearings Bring Out Shocking Effects of Wagner Act

Much of the trouble at aeronautical company's plants attributed to union activities made possible under Wagner law. . . . Former president tells House investigating committee of difficulties under which management labored

FANTASTIC picture of the labor situation which has prevailed at the three plants of the Brewster Aeronautical Corp. in Long Island City, Johnsville, Pa., and Newark, N. J., was developed recently in hearings of the Drewry subcommittee of the House Committee on Naval Affairs. The hearings were significant because they revealed to Congress the shocking consequences that follow when labor leaders choose to utilize their maximum powers under the Wagner act.

When Congress passed this law, said Henry J. Kaiser, the new Brewster president who has undertaken the management of the company without compensation to him, or to Henry J. Kaiser Jr., who is assisting him, it said to labor:

"Management has been tough with you long enough. Here are all the guns and ammunition you want; no responsibility, no secret balloting, no financial accounting. . . . Don't be afraid of management. We won't even allow them to talk to you for fear they might coerce you, and if management fails to produce we will investigate them."

Mr. Kaiser said he had promise of "wholehearted and effective co-operation" from Tom DeLorenzo, president of UAW-CIO 365, the local that has a maintenance-of-membership contract with Brewster. Questions that were asked of the former Brewster president, Frederick Riebel Jr., indicated that several members of the subcommittee at least did not entirely share Mr. Kaiser's optimism.

There are three groups of politically-minded members of Local No. 365, said Mr. Riebel: The A Row, an "internationalist group headed by Tom DeLorenzo; the B row composed of middle-of-the-roads; and the C Row of conservatives who are not so vociferous. The A Row members are bent on domination of the union and of management. Prior to the recent CIO convention at Buffalo there was a bitter election campaign on company time to get control of the convention delegation. The DeLorenzo A Row elected a majority of six delegates as compared with five elected by the B Row. Primary difference between the two sets of delegates was that the A Row men were pledged to go to Buffalo and ask for recall of the CIO no-strike pledge. The B Row men were in favor of retention of this pledge.

"Since the delegates returned from Buffalo, the grounds around our plants have been white as newly driven snow with thousands of circulars that the A

Row and the B Row, as the two groups identify themselves, have been putting out each day," declared Mr. Riebel.

"The latest DeLorenzo circular calls for two things: Discontinuance of the hearings of this subcommittee and trial of the five A Row delegates who opposed recall of the no-strike pledge. 'Remember,' the circular says, 'the fight against DeLorenzo is a fight against the people who built your union which serves as your protection.'

Urged Labor Day Absences

"The B Row circular says the union should be run on democratic lines, that DeLorenzo and the officers should serve the members of the union instead of trying to run them on a strong-arm basis."

As an example of the sort of thing that goes on at Brewster, Mr. Riebel stated that only 5 per cent of the employes came to work Labor day. The company had received a telegram from Charles E. Wilson, vice chairman, War Production Board, requesting that all employes work full-time Labor day. The management posted this telegram on its bulletin boards.

"Local 365 has its own bulletin boards

all over the place," said Mr. Riebel, "and posted on them was a suggestion which, as I recall it, read something like this: 'You will get straight time for Labor day if you do not work that day. If you work you will get time-and-a-half. That is, if you work, you will do it for half-time pay. Don't work!'

"There would be such demands as these on the union bulletin boards: 'If Riebel can get \$35,000,000 government money for the company why can't he get \$35,000,000 for Brewster men in the Army and Navy?'"

Testimony revealed that there are 350 shop stewards in Brewster plants who spend most of their time on union business.

"The shop stewards," explained Mr. Riebel in response to questions, "do some work, although I never saw any of them spend much time at other than union business. In addition there are shop committeemen and union officers."

On Congress Mr. Riebel squarely placed the blame for the fact that the unions have gotten out of hand. "The Wagner act," he said, "is the basis on which they have obtained their control. When the War Labor Board gave the union a maintenance-of-membership clause it had 1000 members. Automatically the other 21,000 employes had to join, or be threatened with bodily harm.

"Under the Wagner act an employer fears talking with his employes. During the August strike at Johnsville many employes came to me and asked me to do something as they did not want to strike; the majority went out through fear. And I was afraid to talk to them. I am sure that if I had felt free to talk with them there would have been no strike."

Freshet of Protests Against Curb On Marginal Mine Operations Seen

WHEN the War Production Board on Oct. 27 decided to curtail operations at marginal mines (STEEL, Nov. 1, Page 61) it made a courageous decision. This is because of the heavy pressure that has been exerted on and by Congress to keep these mines going, not only now but for a period of five years following termination of the war—and at premium war prices.

As soon as the release of the War Production Board covering this decision became available many congressmen, including the group of 74 senators representing states that have substantial mineral deposits, quickly drained off the entire run, so that it became necessary to order a large re-run. It can be expected that when copies of this release are circulated around the country there will be a freshet of protesting editorials in the newspapers in the interested areas.

The WPB release is couched in language which makes the decision appear

to be based on considerations that make for the country's best interest.

"The board has acted because of three changed factors in the mineral production program," states the release, "these being increased mineral production, revised military requirements, and a greater need for marginal manpower than for marginal minerals.

"The chief methods of conserving manpower in mineral production have been:

"1—Allocating soldiers who have been released to the Enlisted Reserve Corps (as well as other labor) under a system of mine labor priorities;

"2—Conserving the use of critical materials and equipment, and production of which requires labor, and

"3—Utilizing manpower in the mining industry in such a manner as to produce the required amount of minerals with the minimum number of men. By these means, labor can be most effectively employed to attain the goals."

Steel Producers' Nine Months Net Little Changed from Year Ago

COMBINED net income of the first 17 steel producers to report for the initial nine months this year amounted to \$129,919,580, substantially unchanged from the \$129,729,390 aggregate net profit recorded by the same group in the corresponding 1942 period.

Eleven of the 17 companies had lower net profits to date this year than a year ago.

In the first three quarters of 1941 and 1940 net earnings for these companies were considerably higher at \$215,164,736 and \$166,037,398 respectively.

Nine months tax provisions reported by 15 companies in the group totaled \$323,602,971, against \$414,716,976 and \$260,739,344 in same 1942 and 1941 periods. Decline in the latest tax provisions reflect lower earnings before taxes in most instances. Only four of those companies reporting taxes set aside larger sums than in the first nine months a year ago. Provisions for taxes last year were largely guess work, based on likely increase in the tax rates then in the process of being formulated by Congress.

Third quarter net profit for the group of 17 companies amounted to \$45,069,432, or slightly above the \$40,424,047 for the same group in the preceding period and \$42,395,841 reported in the second 1942 quarter. Despite the higher combined net profit for these

companies during the latest period, only seven of the group reported earnings above the previous quarter.

Sharp increase in payrolls, and to a lesser extent higher material costs, continue the chief factors limiting earnings. Profits are also subject to contract renegotiation.

New records were established in steel ingot output and steel produced for sale by these companies to date this year.

National Steel Corp.

September quarter net profit of National Steel Corp., Pittsburgh, totaled \$3,199,612, compared with \$2,538,015 in the preceding period and \$2,838,884 in the third quarter last year. Nine months earnings aggregated \$8,418,477, equal to \$3.81 a share on capital stock, against \$8,265,166, or \$3.75 a share, in like 1942 period. Tax provisions for the first three quarters amounted to \$18,400,000, compared with \$19,250,000 a year ago.

American Rolling Mill Co.

Net profit of American Rolling Mill Co., Middletown, O., totaled \$5,404,405, equal to \$1.35 a common share, for the first nine months this year. This compares with \$6,075,321, or \$1.59 a share, in

corresponding 1942 period. September quarter net amounted to \$2,174,708, against \$1,694,492 in the preceding period and \$2,740,998 in comparable 1942 period.

Granite City Steel Co.

Nine months net profit of Granite City Steel Co., Granite City, Ill., totaled \$337,450, equal to 88 cents a common share, compared with \$405,108, or \$1.06 a share, in like period a year ago. Indicated third quarter earnings totaled \$115,538, against \$100,352 in the preceding period and \$150,618 in the corresponding 1942 quarter.

Acme Steel Co.

Acme Steel Co., Chicago, reports third quarter net income of \$483,902, against \$509,554 in the preceding quarter and \$354,460 in the like 1942 period. Indicated nine months net amounted to \$1,415,772, compared with \$1,251,423 a year ago. Tax provisions for the first three quarters totaled \$4,474,634, against \$3,690,230 last year.

Copperweld Steel Co.

Copperweld Steel Co., Pittsburgh, reports nine months net profit of \$563,926, equal to 95 cents a common share, compared with \$873,336, or \$1.54 a share, in corresponding period last year. Tax provisions for the first three quarters amounted to \$249,491.

Comparison of Steel Producers' Nine Months and Quarterly Earnings

	—Third Quarter—		Second	—Nine Months—		Taxes	
	1943	1942	Quarter	1942		—Nine Months—	
			1943	1943	1942	1943	1942
United States Steel Corp.	\$19,166,596	\$12,628,836	\$15,679,456	\$50,252,649	\$46,495,743	\$79,500,000	\$161,600,000
Bethlehem Steel Corp.	6,573,892	7,444,870	6,614,210	19,416,795	19,656,471	93,030,000	84,370,000
Republic Steel Corp.	2,452,869	2,581,100	2,337,175	8,456,601	10,653,221	38,050,000	54,200,000
Jones & Laughlin Steel Corp.	2,249,964	2,539,716	2,411,248	7,060,581	7,470,186	15,953,000	17,000,000
National Steel Corp.	3,199,612	2,838,884	2,538,015	8,418,477	8,265,166	18,400,000	19,250,000
Youngstown Sheet & Tube Co.	2,098,786	2,459,652	2,257,425	6,503,234	7,327,350	17,353,000	22,448,000
Inland Steel Co.	2,930,777	2,608,409	3,011,333	8,738,431	8,079,890	11,047,000	13,638,000
American Rolling Mill Co.	2,174,708	2,740,998	1,694,492	5,404,405	6,075,321	.....	.....
Wheeling Steel Corp.	843,165	839,659	1,329,010	3,133,566	2,835,307	3,155,000	6,701,000
Crucible Steel Co. of America	1,291,361	1,560,063	1,798,164	5,005,430	5,406,838	26,312,580	17,460,068
Copperweld Steel Co.	119,785	275,468	227,809	563,926	873,336	249,491	1,037,509
Sharon Steel Corp.	273,911	311,387	489,971	1,209,347	948,589	4,515,000	2,442,000
Allegheny Ludlum Steel Corp.	1,051,452	904,370	1,164,079	3,634,771	2,874,626	14,708,200	11,709,400
Granite City Steel Co.	115,538	150,618	100,352	337,450	405,108	215,000	324,000
Continental Steel Corp.	147,280	218,251	216,179	481,618	621,999	417,700	1,432,999
Keystone Steel & Wire Co.†	236,152	191,576	414,358	871,364	1,221,195	.....	.....
Alan Wood Steel Co.	143,584	130,190	112,565	430,935	519,044	697,000	1,104,000
Total	\$45,069,432	\$40,424,047	\$42,395,841	\$129,919,580	\$129,729,390	\$323,602,971	\$414,716,976
FINISHING CAPACITY ONLY							
Acme Steel Co.	\$483,902	\$354,460	\$509,554	\$1,415,772	\$1,251,423	\$4,474,634	\$3,690,230
Eastern Rolling Mill Co.	22,727	61,567	48,158	194,111	236,972	.....	1,810,000
Superior Steel Corp.	134,410	211,237	203,458	488,882	455,094	4,820,275	.....
PIG IRON CAPACITY ONLY							
Interlake Iron Corp.	\$126,278	\$311,521	\$230,397	\$617,105	\$1,004,123	\$1,117,000	\$1,549,000
Pittsburgh Coke & Iron Co.	153,539	103,400	191,374	502,224	439,472	275,000	473,425
Woodward Iron Co.	884,816	618,184	300,283	1,396,914	948,282	575,517	2,130,201

†Fiscal year ends June 30.

POSTWAR PREVIEW

SURPLUS MATERIALS—Concern is shown in industrial circles with respect to disposal programs of the several government agencies as surplus materials begin to pile up at various points. See page 72.

ALUMINUM—Total supply of aluminum for 1943 will exceed allotments by 160,600 tons. There is now enough metal for all wartime demands. See page 78.

ELECTRONICS—After the war this country will have a large force of electronics technicians who today are learning all the tricks of the trade on the fighting fronts. In radio the United States should be the world's outstanding country both from the standpoint of design and quality. See page 78.

CERAMIC STOVE—Agamatic Range Corp., Cranford, N. J., in cooperation with the ceramic stove development program of WPB, has developed a new ceramic stove. It is compact, streamlined, equipped with two hot plates and two ovens. Contains 80 pounds of metal, mostly cast iron. The model it will replace contains 1085 pounds. See page 78.

PRESSED METAL—Research division of Pressed Metal Institute is being organized with a view to developing opportunities for pressed metal in postwar production and speeding up conversion and redesign activities. Plastics, glass, sintered metal, resin, plywood, metal alloys, etc., will be studied with respect to their use in civilian goods. See page 84.

STEEL CAPACITY—Progress is reported on construction of Brazil's new steel mill at Volta Redonda. Plant will have annual peak capacity of 350,000 tons of steel ingots and is scheduled to be in operation by the end of 1944. See page 88.

AUTOMOTIVE PROSPECTS—Industry's executives optimistic; believe market may be double peacetime peak. Doubt airplanes will be serious competitors for passenger cars. New gasoline developments may affect future vehicles. See page 91.

METAL CLEANING—Recent development shows promise of future application in the improved deep-drawing of steel sheets for parts such as fenders, body panels, etc. See page 92.

AUTO BODY PLANTS—Chief bottleneck in re-establishing passenger car production seen in the reconversion of body plants. Facilities for motors, frames, transmissions, axles and related chassis parts are expected not to be so troublesome. See page 92.

WILLOW RUN—Postwar role of huge Ford airplane plant cause for much speculation. Opinion is varied but general view is plant will continue on Army bomber production, either standby or on a limited basis employing 10,000. Ford not expected to take over the plant for manufacture of automobiles. See page 99.

FRICITION CUTTING—Increasing band saw speeds from 100 to around 12,000 feet per minute produces a "magic saw" that cuts everything from thinnest sheet to heaviest armor plate with amazing speed. Structure of material cut is unaffected. See page 104.

FLAME CONDITIONING—Developed within the past few years, mechanical flame conditioning of semifinished steel has expanded rapidly; is now being used in more than 30 plants. New developments are expected to extend scope of the process to stainless steels within the next few months. See page 112.

HIGH-SPEED HEAT TREATMENTS—Newly modified gas burner designs produce heat penetration rates so high existing test-book limits may have to be revised substantially. Result is heat-treating cycles are shortened appreciably, production per square foot of factory floor space increased. See page 114.

New Charcoal Iron Stack Is Projected

Removal of idle furnace at Pembroke, Fla., to Rusk, Tex., reported approved by War Production Board

APPLICATION for establishment of a charcoal furnace at Rusk, Tex., has been approved by the War Production Board, the matter now awaiting action by the Defense Plant Corp.

Application was made by the McCrossin Engineering Co., a New Jersey corporation, and involves dismantling and removal of a stack at Pembroke, Fla., originally set up to produce elemental phosphorus from phosphate rock and blast furnace coke. This furnace was originally built by German capital, but did not prove commercially successful and has not been in operation since 1932. In fact, it saw very little actual service. Blast furnace engineers declare all that is needed to make it an effective producer of charcoal pig iron is a different hearth jacket. It will have a production of 36,000 tons of charcoal iron annually, it is estimated.

The carburizing and charcoal by-product chemical plant formerly operated by the Delta Chemical & Iron Co. will be moved to Rusk from Wells, Mich. Last January the Wells stack was blown out as the supply of hard wood in that area had become depleted.

The proposed project is being established in an area where hard wood supply is abundant, and while there are no definite indications yet as to when the plant will be ready to operate, its production should prove valuable, as output of charcoal pig iron has dropped sharply from the 102,000 gross tons produced last year, and is said to be far short of needs.

In addition to the Wells stack which went out in January, the Antrim, Mich., furnace is said to have been closed down permanently around the middle of last month, leaving only one charcoal furnace in operation in the north, that of the Newberry Lumber & Chemical Co., Newberry, Mich., which has an annual capacity of 29,000 tons.

The only other furnace in the country producing charcoal iron is Wrigley stack of the Tennessee Products Co., at Lyles, Tenn., which is now said to be running on part coke and part charcoal, with an annual production of around 24,000 tons.

The present scarcity of charcoal is indicated by prices of \$40 a ton in Michigan and \$27 in Tennessee and Arkansas, and shortage in charcoal pig iron by a price of \$34 northern furnace, effective last September, against a previous price of \$28.

WINDOWS of WASHINGTON

Too Many Quits

FOR EVERY two women hired for war production in recent months a little more than one other woman quit her job. In July the "quit" rate for women was 6.2 per cent as against 3.9 per cent for male workers. A survey by the Bureau of Training of the War Manpower Commission indicates that where adequate introductory training was provided the attendance record of women workers has been much better. Accordingly, the bureau is about to get out an operations bulletin, *Training Womanpower*; copies may be had by writing to Miss Flora G. Orr, Information Manager, Bureau of Training, War Manpower Commission, Room 330, 1778 Pennsylvania avenue, N. W., Washington. Another pamphlet, *Training Women for War Work*, may be had on request to Mrs. Mary Curran, Apprentice Training Service, War Manpower Commission, Washington.

Heavier Coatings

In a recent meeting at Pittsburgh a subcommittee of Subcommittee 6 and Committee A-5, American Society for Testing Materials, drafted a suggested specification which, after being recirculated among the members for final recommendations and comment, is expected to become a tentative emergency specification for hot-dipped, lead-alloy coated steel sheets. In the specification no weights of coating are identified but it carries a footnote to the effect that customers who think they need a heavier coating than commercial coatings now produced may consult with suppliers. Bend tests and selection of test specimens are covered by the specification. It includes several tables of lead-alloy coated steel gages to cover the weight per unit area of the coated sheets. Another table sets forth permissible variations from the specified gage weights. Another table specifies permissible variations in widths, lengths and out-of-square.

Ceramic Stove

A threat to the cooking stove industry as it has existed up to this time is seen in a new ceramic stove developed by the Agamatic Range Corp., Cranford, N. J., in co-operation with the ceramic stove development program of the WPB. It is a compact, streamlined unit equipped with two hot plates and two ovens. It contains 80 pounds of metal, mostly cast iron. The prewar model which it supplants weighs 1085 pounds. Tests conducted by the Bureau of Standards show the stove is fully as efficient as the cast iron stove; in fact the bureau says it is superior in some respects. Because the heat is retained by the refractory clay the new stove is very economical—using about 10 pounds of anthracite or coke in 24 hours. Each hot plate has its own insulated cover, to be let down when the plate is not in use. Both the hot plates

and the ovens can be heated to higher temperatures than those of metal stoves. One of the hot plates can be heated to 725 degrees Fahr., enough heat to bring two quarts of water to the boiling point in 4 to 5 minutes. The other hot plate heats to 460 degrees. The ovens heat to 500 and 240 degrees, respectively. Special cooking utensils for use with the

POSSIBLE NOMINEE

Washington newspaper columnists in several instances lately have mentioned Eric Johnston, president of the Chamber of Commerce of the United States, as a possible Presidential nominee in next year's campaign, also the chance that he might run for election as a senator. Although not very well known to the public, those who are on close terms with Mr. Johnston are satisfied that he has everything it takes to be a successful executive.

He has very definite ideas about domestic and international policies. What is more, he is not given to pussyfooting—he is a frequent speaker and never hesitates to state just what is on his mind. A first-class showman, always brilliant, able to inject a note of gaiety here and there, he has a speaking personality that is regarded by many as matching that of the old master, President Roosevelt.

A leading businessman of Spokane, Wash., Mr. Johnston came up the hard way. He served six years as a captain in the Marines, an experience that would have political values. At Washington he gets along well with leaders of labor and farm organizations.

stove will be included in the price. The price of the new stove has not yet been determined but is expected to be lower than that of a comparable cast iron stove.

Air Transport

After the Civil Aeronautics Board completes its present inquiry into the use of local and feeder air lines in the postwar period in order to bring the benefit of modern air transport to small cities and towns, it will organize a series of hearings on our future position in international air transportation. While CAB cannot make any decisions at this time for the reason that the whole matter of foreign policy remains to be determined, nevertheless, it has reason to feel, from the passage of the Fulbright resolution by the House, that it is justified in assuring that the United States will have a lot of interest in international postwar aviation.

More Suggestions

Suggestion that production of small differential-type chain hoists be discontinued has been turned down by the Chain Hoist Advisory Board, WPB, after it had been shown these hoists are needed in certain military establishments. Proposal of Office of Civilian Defense to resume manufacture of some of the more essential domestic motorized appliances has been rejected by the WPB Fractional Horsepower Industry Advisory Committee because the supply of ball bearings is tending to retard production of motors; lack of manpower is the reason. This committee recommended that civilian goods production programs be continuously studied and that decisions to resume production of certain items be made beforehand.

Technicians Galore

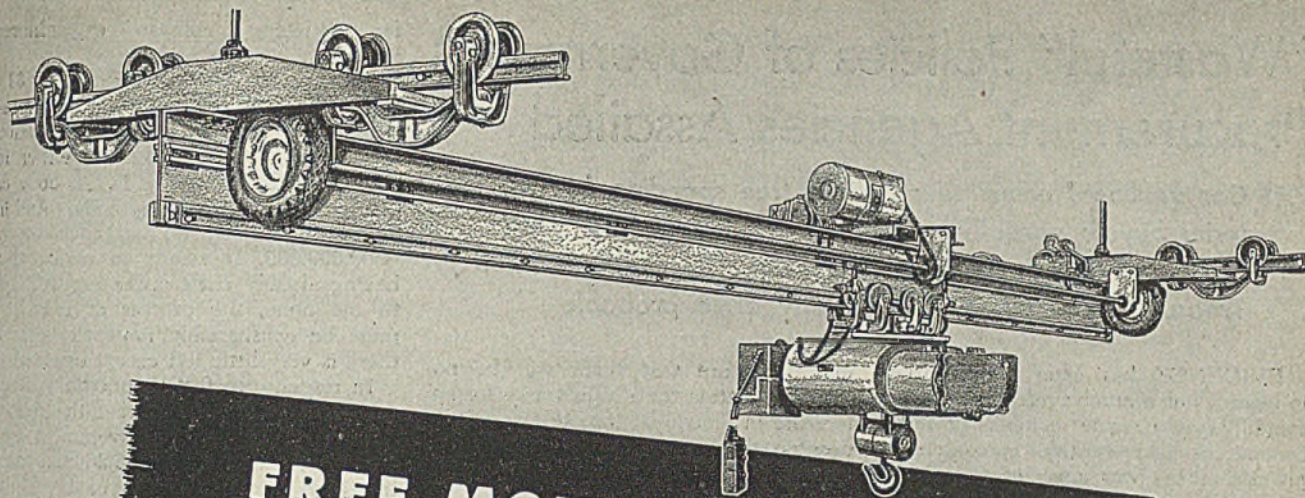
After this war the United States will have a large force of superb electronics technicians who today are learning all the tricks of the trade on the fighting fronts. In radio we should be the world's outstanding country both from the standpoint of design and quality.

"German radio equipment is five years behind our own, in design, construction and components," according to a report by Capt. James P. Lipp, Army Signal Corps, just back from North Africa. "Examination of the Nazi radio sets captured revealed them to be obsolete compared to present American standards. The Italian radios were definitely inferior, even to that of their erstwhile allies.

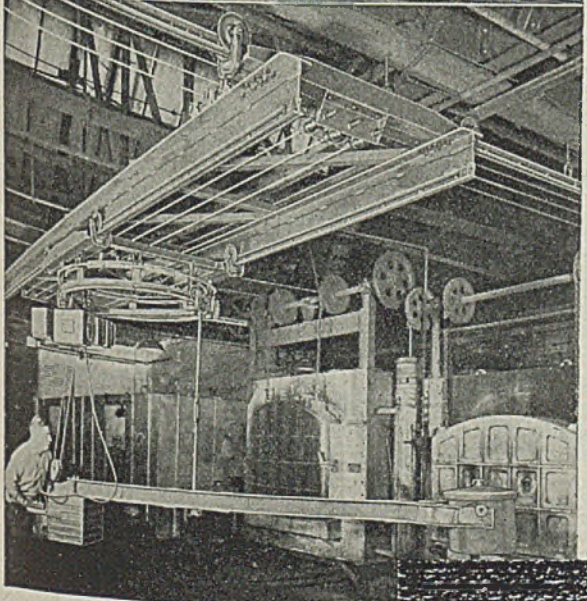
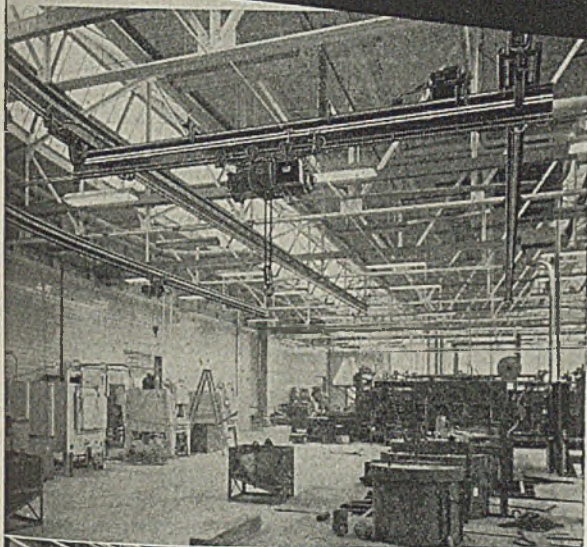
"German signal prisoners of war whom I have had a chance to interview did not seem to be very well trained along technical lines. In many cases we have picked up radio sets that were intentionally sealed to prevent tampering so that German operators could not attempt their own repairs. Our own boys, of course, having 'Yankee ingenuity,' think nothing of repairing their own equipment."

Foreign Holdings

The Treasury Department has asked the help of the business press to speed up returns for the census of American-owned property abroad. Every person subject to the jurisdiction of the United States who owns foreign bonds payable in United States dollars is required to file this report with his nearest Federal Reserve Bank before Dec. 1, 1943. Other persons whose foreign assets have a value in excess of \$10,000 are required to file reports in the same manner. Citizens of the United States in enemy-occupied territory and persons in the armed services are exempt from filing. Practically every type of property must be reported—not only real estate holdings and tangible possessions abroad, but also cash assets in foreign countries, holdings of foreign currency and foreign securities, interests in foreign organizations, patent and trademark agreements and contracts.



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"Wasteful" Policies of Government Procurement Agencies Assailed

Congressional committees believe free spending by war materiel buyers partially responsible for inflationary trends. . . New tax bill likely to be far short of \$10,500,000,000 asked by Treasury Department. . . Economy drive probable

EVIDENCE has been accumulating in hearings of a number of congressional committees that some members of these committees fear wasteful procurement policies of the war agencies to a large extent are responsible for the trend toward inflation. This fear has been encouraged by the recent attack of the comptroller general on the War Department, charging that the latter has been placing contracts at inflated prices. It is because of this "wasteful" spending that the comptroller general insists that settlements of terminated contracts be not made finally until after Government Accounting Office audit checks have been made.

Questions asked recently by members of different committees indicate their belief, in at least a number of important instances, that present procurement policies encourage contractors to set up high costs and that out of this whole set-up come most of the problems that are encountered by the various agencies.

The fact that the large majority of requests for wage increases made to the War Labor Board and the Treasury come from employers is seen as support for the belief that the employers are encouraging higher manufacturing costs. Most members of Congress returned from the summer recess with first-hand information about wasteful utilization of labor. They have reported cases where men and women "soldier" on the job, where efficient workers are told to slow down, where workers produce in 8 or 10 hours work they could do in two. They have the impression that there is labor hoarding on a large scale and that there is featherbedding. All this, they suspect, combines to provide impossible problems for the War Manpower Commission, the Office of Economic Stabilization and the other agencies charged with making our economy work smoothly.

The nature of the questions shows clearly that many members of Congress are well aware of many bad things that now are going on. It was persistent questioning rather than voluntary testimony, for example, that brought out the fact that the Brewster Aeronautical Corp. paid wages and salaries, between Jan. 1 and Sept. 19 of this year, of \$540,000 to men who spent all or most of their time working for the union.

It still is too early to predict just what sort of a tax bill will emerge from the present executive sessions of the House Ways and Means Committee. Present

indications are that there will be no recommendation for a sales tax or for an increase in individual income taxes. It is possible that corporation taxes may be increased to some extent but this cannot yet be stated definitely.

The outlook is that nowhere near the additional \$10,500,000,000 asked for by the Treasury Department will be approved by Congress. Rather, indications are strong that a real economy drive will be launched and that every effort will be made to outdo the economy record that was established in the first half of this year.

And current indications are that this economy drive will be aimed at direct war spending. A number of congressmen have the idea that drastic slashing of prices on war contracts would force manufacturers to be cost-conscious in the same way as they have to be cost-conscious in order to meet competition and stay in business in normal times of peace. They have indicated their belief that the manpower shortage would be much less acute if manufacturers were cost-conscious during the war and that, therefore, the demands for higher wages would not be so widespread.

Taxpayers Complain of Waste

Recently, at a hearing of the House Ways and Means Committee, Chairman Robert L. Doughton (Dem., N. C.) complained politely but forcefully to Chairman Clarence Cannon (Dem., Mo.), of the House Appropriations Committee about the great increase in the number of letters he gets from taxpayers. "They say that they do not mind paying taxes but that they do object emphatically to paying needless taxes because of wasteful government expenditures," he said.

In answer to questions by Mr. Doughton and other members of his committee, Mr. Cannon promised that greater care would be given to studying requests for additional military appropriations in the future. "We are finally in a position where we can examine a little more leisurely the war estimates, and we expect to scrutinize them accordingly. In the beginning," he said, "the house was on fire and we did not have the opportunity always to stop long enough to figure the cost of hiring men to carry water to put it out."

Another reason for expecting the coming economy drive to be aimed at war expenditures is seen in Mr. Cannon's statement that there is not much chance

for reducing nonwar expenditures further.

"In the last session we reduced by \$1,395,000,000 the estimates for nonwar expenditures," he said. "Such a reduction has never been made before, either in amount or in percentage, in this body or in any other parliamentary body. And in the previous session we had reduced it by \$500,000,000. It stands to reason that having already cut nonwar expenditures to the bone, the process of reduction must be considerably impeded because there is very little left except essentials."

In response to further questions, Representative Cannon said that the reduction in the number of government employees from 3,300,000 to 3,200,000 during July, the first month of the fiscal year was a good beginning, but that "we expect to reduce the number drastically from now on." One of the reasons, he said, was that a good many people are being released from government service as the construction and tooling-up phase of the war effort tapers off.

Another reliable omen that the coming economy drive will be in earnest is the recent expansion of the staff of experts of the House Committee on Appropriations, a move now being followed by the hitherto less economy-minded Senate Committee on Appropriations. Members of these committees, during the hearings early this year, complained again and again that when the different government agencies come in to ask for their appropriations the committee members lacked sufficient detailed information to give intelligent consideration to the requests of the agencies. The present move is to have expert investigators step into these agencies and find out just what is being done with government funds—and then enable Congress to act wisely in appropriating the taxpayers' money.

Naturally, no reliable preview of the coming economy drive can be presented at this early date. However, war contractors in all cases will be heeding the signs of the times if they give less emphasis to costs allowed by the Army and the Navy, and place more emphasis on competitive costs—as they do in times of peace.

One congressman recently said in a private conversation: "Manufacturers generally in thinking about their business costs and expenses have the high income and excess profits in mind when they talk about spending 10-cent dollars. That sort of thinking, in connection with the huge government spending program, does not encourage cost reductions. Surely it does not reflect a truly patriotic attitude. It fails to take into account a realization that the more money we waste in the war, the more money will have to be collected in taxes."

While the real economy drive will be shaped up by the two appropriations committees, other committees are conducting investigations of alleged wasteful expenditures by the procurement agencies. The Truman committee now

Navy Contract Bill Introduced

House proposal virtually the same as Army bill offered by Senator Murray. Authorizes 90 per cent payment of contractors' claim in advance of final audit

has investigators in the field to get the facts in cases where surplus lumber, steel tubing, steel nails, steel reinforcing bars and other items at the Pine Bluff, Ark., arsenal were reported sold to a dealer as junk, also where the Detroit Ordnance Office is said to have sold critical tools at the price of scrap.

It also is likely that, on the basis of a resolution by Rep. Robert F. Jones (Rep., O.), that expenditures of the Maritime Commission and the War Shipping Administration will be investigated. "The regular House and Senate Merchant Marine Committees have been dilatory about watching the expenditures of \$11,276,650,000 appropriated to these agencies," Jones said, citing some instances that have come to his attention recently.

When the House Committee on Appropriations starts its hearings, the ranking minority member, John Taber (Rep., N. Y.), will be ready with a program to reduce war expenditures by \$4,658,000,000 in the fiscal year ending in 1945.

Mr. Taber, one of the most studious members of the House, is on the warpath on wastage of manpower by government agencies. "Absences on account of sickness and accidents in the Treasury run 12.45 per cent," he declared, adding that "absences on that account in the General Motors airplane plant in Baltimore are 0.45 per cent and for the entire Du Pont setup, with all of the chemicals and powders and dangerous things they use run 1.9 per cent."

A BILL to govern termination of Navy contracts was introduced in the House last Monday by Rep. Carl Vinson (Dem., Ga.), as chairman of the House Naval Affairs Committee. Known as H. R. 3518, it is substantially the same as the Army modification of S. 1268 (STEEL Oct. 18, p. 60) which was introduced in the Senate some months ago by Sen. James E. Murray (Dem., Mont.) as chairman of the Contracts Termination Subcommittee of the Senate Military Affairs Committee. The latter bill now is under study by the House Military Affairs Committee.

H. R. 3518 would authorize the Navy to make final settlement of canceled contracts, allowing payment of 90 per cent of the contractor's claim in advance of an audit and final settlement. Subcontractors would be paid either directly or through prime contractors, but the latter would not be held liable for excessive payments to the subcontractors; it thus answers arguments advanced by a number of prime contractors at recent hearings. Excessive payments to subcontractors would be refunded to prime contractors by the Navy and the excessive amounts would be held against the sub-

contractor as a government "loan." The bill also authorizes the Navy to make loans to contractors at not more than 6 per cent.

One feature connected with contract termination procedure is whether or not to allow the procurement agencies to handle all transactions without subsequent audits by the comptroller general. At House Naval Affairs Committee hearings last week a number of congressmen indicated they do not want to go along with this proposal. After witnesses had again made the point that subsequent reviews of terminations by the Government Accounting Office will only scare the procurement officers and thus prevent them from making prompt settlements.

"If you shut the comptroller general out of the picture, what protection does the public have in cases where mistakes are made?" asked Rep. Andrew J. May (Dem., Ky.). Rep. Charles H. Elston (Rep., O.) declared these witnesses were "asking us to grant more power to one department than has ever before been contained in a single bill."

Bill Passed Extending Tax Relief Application Period

The Treasury bill, H. R. 3363 providing for extension beyond Dec. 31 of the period over which applications for relief under the excess profits law may be received by the commissioner of internal revenue, has been passed by the House.

"If a constructive average base period net income has been determined . . . the commissioner may, by regulations approved by the secretary (of the Treasury), prescribe the extent to which the limitations prescribed by this subsection may be waived for the purpose of determining the tax under this subchapter for a subsequent taxable year," the bill provides.

Other Treasury bills approved by the House and slated for a favorable vote in the Senate are H. R. 3338, H. R. 3381 and H. R. 3309. H. R. 3338 amends the tax on transportation of property by providing that "the tax imposed under this section shall not apply to amounts paid for the transportation of property to or from the government of the United States, or any state, territory or political subdivision thereof, or the District of Columbia, or to amounts paid to the Post Office for the transportation of property."

H. R. 3381 allows taxpayers to claim full credits against the Victory tax irrespective as to how much money he is investing in War Bonds or in insurance or what amount of debt he is retiring.



ADVISE PRESIDENT: This informal advisory council of businessmen appointed by Mr. Roosevelt are pictured at their first call at the White House to discuss their participation in the war program. Left to right: Cason Callaway, cotton textile manufacturer, Hamilton, Ga.; Eric Johnson, president, Chamber of Commerce of the United States; George H. Mead, president, Mead Corp., Dayton, O.; F. C. Crawford, president, Thompson Products Inc., Cleveland and National Association of Manufacturers; David Sarnoff, president, Radio Corp. of America, New York; K. T. Norris, president, Norris Stamping Co., Chicago; Jesse Jones, Secretary of Commerce; Richard R. Deupree, president, Procter & Gamble Co., Cincinnati; and Benjamin F. Fairless, president, United States Steel Corp. NEA photo

PRIORITIES-ALLOCATIONS-PRICES

Weekly summaries of orders and regulations, together with official interpretations and directives, issued by War Production Board and Office of Price Administration

INSTRUCTIONS

CLAIMANT AGENCIES: The term "procuring claimant agencies" has been clarified by the War Production Board and covers: (1) War Department, including Ordnance, (2) Navy Department, (3) Maritime Commission, (4) Aircraft Resources Control Office, (5) the Office of Lend-Lease Administration.

In some instances, the treatment of orders by such claimant agencies differs slightly from that in the case of other claimant agencies. The term is used in direction No. 3 to CMP regulation No. 3, which points out that all procuring claimant agencies must place allotment numbers on their orders. Claimant agencies other than those appearing above are referred to sometimes as "non-procuring claimant agencies."

NICKEL CHEMICALS: Consumers of nickel chemicals and nickel catalysts are no longer required to file form WPB-287 to obtain supplies under provisions of direction 1 to order M-6-a. In lieu of WPB-287, purchasers should file end use and preference rating information with orders to the suppliers. The only form to be sent to WPB hereafter will be made out by the supplier.

L ORDERS

CONSTRUCTION: Following changes have been made in the revised and simplified regulation covering construction: (1) Limit on farm construction, including residential, is placed at \$1,000; (2) limit of \$200 is placed on any type of construction for which a higher specific limit is not authorized by the order; (3) exception for the insulation of buildings, originally made by order L-41-b, has been liberalized while the exception covering the conversion of heating equipment from oil to coal has been eliminated; (4) minor capital additions under CMP regulation No. 5 in certain of the more essential industrial plants are excepted from the L-41 restrictions; (5) in calculating costs to determine if a job is within specified L-41 limits, the cost of used materials, or the value of labor furnished free, need no longer be included; (6) cost limits now refer to the calendar year, instead of to any consecutive 12-month period; (7) installation of plumbing equipment rated on WPB-2631 (formerly PD-851) is permitted if the cost is under \$200; (8) schedule B, listing various kinds of construction relating to operations of farms, railroads, utilities, mines, etc. which may be started without WPB specific permission, has been altered in several respects. (L-41)

REFRIGERATION AND AIR-CONDITIONING MACHINERY: Revision of order L-126, Refrigeration and Air-conditioning Machinery, includes the following changes: Manufacture of water regulation valves of nonferrous metal, $\frac{1}{4}$ -inch or smaller is permitted; suction pressure regulators are removed from the restrictions of schedule IV (specification for refrigeration valves, fittings, accessories and other parts); two sizes of valves are added to the permitted sizes of item 11 of list A; sleeves, guides, packing nuts and adapters are added to the list of parts that may be made of nonferrous metal for use in accessories itemized in list D; and additional size flare nut is included in item 3 of list C. (L-126)

TURBO-BLOWERS: Order L-163, which controlled the distribution of turbo-blowers, has been revoked. Scheduling provisions for turbo-blowers are now contained in general scheduling order M-293. (L-163)

PENCILS: All kinds of non-mechanical pencils having a sheath of more than 0.01-inch

thickness are "restricted pencils" and as such are included under controls of order L-227-b. This order prohibits the use of certain critical materials in the production of wood cased and other non-mechanical pencils and pen holders and limits quarterly production for each manufacturer to 20.25 per cent of the number of restricted pencils and 24 per cent of the number of pen holders made by him during 1941. (L-227-b)

ELECTRIC MOTOR CONTROLLERS: To prevent unnecessary use of oversize contactors on electric motor controllers, order L-250 has been amended. The order formerly permitted use of oversize contactors for any controllers in appendix A under specified conditions. As amended, the order now permits their use under the same specified conditions only for controllers listed in tables 1 and 4 of the appendix. In addition, the same size controllers must be used for 380 volt service as for 440 volt service,

INDEX OF ORDERS REVISIONS

Subject	Designations
Aluminum	M-1-1
Chains	L-302
Chemicals Industry	P-89
Construction	L-41
Controllers, Electric Motor	L-250
Machinery, Refrigeration and Air-Conditioning	L-126
Magnesium	M-2-b
Mines	P-56
Natural Gas	U-7
Pencils	L-227-b
Turbo-Blowers	L-163
Price Regulations	
Furnaces	No. 188
Machines and Parts	No. 136

except that the next larger size may be used where the full-load motor current at 380 volts exceeds the rating of the controller. Controllers covered by the order include both those assembled with other apparatus and those mounted individually. (L-250)

CHAINS: Use of single-refined bars in the manufacture of dredge and crane chain now is permitted by WPB. This is permitted because chain producers have been finding difficulty in obtaining double-refined wrought iron bars. In the list of types of chain excluded from the order, the pocket wheel chain listing is expanded to include chain for other wheel mechanisms. Ring dogs and chain dogs for salt water use in mahogany and similar lumber operations are necessarily heavier than the styles prescribed in the order, so exemption from size and specification restrictions is made in the order. (L-302)

M ORDERS

ALUMINUM: Use of aluminum in additional types of war and some essential industrial production is now permitted since the position of the metal has improved substantially. Aluminum may be used for the following: Data and instruction plates not exceeding 0.035-inch in thickness; electric bus bars; bare electrical conductors and current-carrying accessories for conductors; cooling fans for electric motors as well as structural parts where lightness is an element to be taken into consideration.

The order also permits aluminum ingot to

be added to galvanizing baths, permits the manufacture of aluminum bottom boards for use in foundries and aluminum jigs and fixtures for use in production of aircraft, as well as the use of aluminum in the manufacture of portable forest fire-fighting equipment and portable power-driven tree-felling saws.

Other new permitted uses of aluminum are for coils and fins for refrigeration and heating equipment, for certain types of safety equipment and for X-ray equipment.

Special consideration will be given to requests for the use of aluminum in connection with approved programs of WPB, where the use of aluminum would mean a substantial saving in man-hours from ore to finished product, the saving of scarcer material, an increase in production or increased efficiency of the product. (M-1-1)

MAGNESIUM: Manufacturers of parts, accessories and end products requiring basic magnesium materials in their production are no longer required to file magnesium inventory reports or the monthly report on WPB-702. Producers, fabricators and smelters of basic magnesium materials are unaffected by the amendment. (M-2-b)

P ORDERS

MINES: Preference rating of AA-5 has been given to all non-serialized mines now having a rating of AA-2 (P-56)

CHEMICALS INDUSTRY: A method for obtaining specific MRO ratings under order P-89 by members of the chemicals industry has been established. This new method may be used to obtain materials on the B list of priorities regulation No. 3. For ratings specifically assigned under paragraph (e) or (f) of the order for specific kinds and quantities of the items, applications should be made directly to the P-89 unit of the Chemicals Division. (P-89)

U ORDERS

NATURAL GAS: All industrial consumers of natural gas in the Appalachian area who have facilities capable of burning residual fuel oil have been ordered to operate those facilities to the limit during the coming winter. Delivery of natural gas to consumers in the area has been prohibited from Nov. 15, 1943, to March 31, 1944, to the extent that their standby facilities will meet their fuel demands.

Order U-7 has been substituted for order L-31 which had covered the distribution of natural gas. (U-7)

PRICE REGULATIONS

MACHINES AND PARTS: For purposes of simplicity, WPB has established maximum prices for new machinery and parts under price regulation No. 136 by reference to "established prices" in effect on the applicable base date instead of confidential list prices. All persons covered by the regulation who have not already done so are required to file with OPA on or before Dec. 3 all published list prices and discount sheets in effect on the base date for the sale or rental of machines and parts. (No. 136)

FURNACES: Manufacturers of coal-fired, oil-fired, and gas-fired steel warm-air furnaces have been authorized to increase by 9 per cent their maximum prices for these products on which manufacturing costs have risen. Copies of all current catalogues, price books, and discount sheets, unless previously submitted, must be filed by manufacturers with the Building Materials Branch, OPA, within 15 days after Nov. 2. (No. 188).

WPB Rules on Allotments For Deliveries Into Canada

Basic rules governing the issuance of preference ratings and allotments for deliveries to be made into Canada have

STEEL

been issued by the War Production Board. These rules are contained in Priorities Regulation No. 22.

Ratings and allotments for such deliveries will be authorized by WPB only upon the recommendation of the priorities officer of the Department of Munitions and Supply in Canada.

A standard form of certification appears in the regulation. This form is used in all cases where preference ratings and allotments are used in connection with deliveries to Canada. The regulation also informs suppliers of treatment to be accorded such orders.

Controlled Materials To Be Reserved for Construction

Beginning with the first quarter of 1944, all allotments of controlled materials for construction and facilities, except to certain specified military, naval and other programs, will be made from a central materials reserve to be established for this purpose by the requirements committee and administered by the Facilities Bureau, J. A. Krug, program vice chairman of the War Production Board, has announced.

Within the reserve to be established, maximum quantities of controlled materials will be earmarked for each claimant agency, including firm allotments for approved programs and a modest allowance for miscellaneous non-programmed requirements, Mr. Krug said. The central reserve will exceed the aggregate earmarked quantities of controlled materials by an amount calculated to satisfy emergency requirements.

The new controls set for the first time an overall limit on the amount of materials that will be available for construction and facilities. Previously, a claimant agency, once it had been allotted its quarterly share of controlled materials, could apply them as it wished to its approved programs.

WPB Strives To Increase Output of Ball Bearings

In a move to step up production in certain types of ball bearings, the War Production Board has called a conference of a segment of the antifriction bearing industry in Washington on Nov. 12.

Members of the industry have expressed the opinion that a further program should be undertaken to remedy the "short-run" situation in the production of certain types of antifriction bearings.

The specific purpose of the conference will be to discuss the possible concentration in sizes of radial and angular contact ball bearings, where "short-runs" of such sizes now are being produced by two or more companies and where one or more of these companies feel their production could be increased by discontinuing the size and let one producer continue its production.

Specific Ceiling Prices Set for Principal Steel-Alloying Metals

New regulation, No. 489, is effective Nov. 8 and provides same maximums with minor exceptions as those established previously under general maximum price regulation. . . Coverage includes tungsten, vanadium, molybdenum, and cobalt

A SPECIFIC regulation providing dollars-and-cents ceilings for a group of important alloying metals used in making steel was issued last week by the Office of Price Administration. Regulation No. 489, effective Nov. 8, was issued to make prices better known to consumers.

Previously these alloys and metals were covered by the general maximum price regulation, and ceilings were the highest prices individual sellers charged during March, 1942.

The ceilings prices provided by the new regulation, with minor exceptions, are the same as those previously provided by the general maximum price regulation.

The new dollars-and-cents ceilings for some of the more important of the alloys and metals are as follow:

Tungsten: Ferrotungsten, \$1.90 per pound of contained tungsten in quantities of 10,000 pounds or over.

Molybdenum: Ferromolybdenum, 95 cents per pound of contained molybdenum; molybdic oxide and calcium molybdate, 80 cents per pound of contained molybdenum.

Vanadium: Ferrovandium, open hearth, \$2.70, crucible \$2.80, primes, \$2.90, per pound of contained vanadium.

Cobalt: Cobalt metal for metallurgical use, \$1.50 per pound in kegs 500 to 550 pounds.

These are only some of the dollars-and-cents ceilings established by the regulation.

Other specific prices are provided for smaller quantities and different grinding sizes of the foregoing alloys and metals. In addition, specific premiums are allowed for spot sales of ferrovandium and cobalt metal.

Dollars-and-cents prices also are established for ferrophosphorus, simanal, alsi-fer, calcium metal, calcium-silicon, and calcium-manganese-silicon.

Maximum prices for alloys and metals covered by the regulation for which no specific prices are established, OPA said, are to be determined on the basis of the highest prices charged by the seller during the months of January, February or March, 1942.

The pricing base period for such alloys and metals was broadened to the first three months of 1942, contrasted with the month of March, 1942, under the general maximum price regulation, because of the infrequency of sales of some of the items.

If the seller cannot determine his maximum price for any type, grade or size

of alloys or metals by either the dollars-and-cents pricing provisions or on the basis of January-March 1942 prices, he shall submit a proposed price to OPA.

Organization of Foreign Economic Agency Completed

Organization and staff of the Foreign Economic Administration have been announced by Leo T. Crowley who was appointed administrator of that agency upon its creation Sept. 25.

A complete unification and streamlining has been made of the foreign economic operations formerly carried on by the Office of Economic Warfare, Office of Foreign Relief and Rehabilitation, Office of Lend-Lease Administration, such parts of the Office of Foreign Economic Coordination as may be transferred from the State Department, and the foreign procurement activities of Commodity Credit Corp.

The administrator has been given authority for foreign economic operations of the consolidated agencies in conformity with our foreign policy as defined by the secretary of state.

Six staff offices will include those of the General Counsel, Economic Program Staff, Organization and Methods, Personnel, Finance, and Management Services. The Bureau of Supplies will include the following branches: Imports Procurement and Development, Requirements and Supply, Commodities Services.

The Bureau of Areas will co-ordinate the development of area programs, work with the State Department in obtaining policy determination, relate programs to military plans, and assist the administrator and deputies in the direction of operations. It will include the following branches: Liberated Areas, Enemy Areas, and General Areas.

Industrial Salvage Manual Published by WPB Division

A comprehensive practical manual on industrial salvage has just been published by the Technical Service Section, Industrial Salvage Branch, Salvage Division, War Production Board. The new book, *Salvage Manual for Industry*, contains 245 pages of systematically organized information and data on industrial salvage practice in all its ramifications.

Republic Lights 1300-Ton Stack

Defense Plant Corp. unit at Cleveland is third to be blown in by company since war started

FIRST cast of iron was taken from the new No. 5 stack of the Republic Steel Corp., Cleveland, Oct. 29. It was lighted the previous day by T. M. Girdler, chairman, in the presence of several thousand employees. Seventy per cent of the iron produced by the new stack will go into ship plates.

The No. 5 furnace, part of a project erected by DPC at a total cost of \$29,000,000, is the third Republic has built and will operate under DPC, the other two being located at Gadsden, Ala., and Youngstown, O. The Cuyahoga river had to be moved westward to provide a portion of the site for the new stack, power plant and ore storage which has a capacity of 1,000,000 tons of materials. Three Bailey hot blast stoves serving the stack are of welded design.

Following the blowing in of the new stack the Maritime Commission presented the Maritime "M" pennant to the corporation and its employes in recognition of outstanding achievement in converting its 98-inch hot strip mill for the rolling of ship plates and the plant's production of plates for the shipbuilding program. Last month this mill rolled 115,000 tons of plates, breaking all previous plant records.

Mr. Girdler pointed out that there is hardly a single plant that has not seen substantial expansion and improvement so that a better job for our country could be done. Republic's steel capacity, he stated, has been increased from 676,350 tons a month in 1941 to 738,000 tons per month today—every ton of this steel being used directly or indirectly for war.

Mr. Girdler said in 1939 electric steel ingots made by the company amounted to 9400 tons per month whereas in the first nine months of 1943 it was 90,000 tons per month.

Pressed Metal Institute Moves Offices to Cleveland

Pressed Metal Institute has moved its headquarters from New York to 829 Union Commerce building, Cleveland, to facilitate service to members and to expedite the work of the research committee being organized.

W. W. Galbreath, president, Alliance Porcelain Products Co., Alliance, O., has been appointed executive vice president of the institute. Mr. Galbreath said recently that the research division of the group will be primarily concerned with opportunities for pressed metal in post-war production and speeding up conver-

sion and redesign activities of members. Plastics, glass, sintered metals, resin bonded plywood and paper, fire resistant wood and new metal alloys will be studied by committees of the institute regarding their use in the production of civilian goods in the postwar era.

Allegheny Ludlum Acquires Carbide Alloy Corp.

W. F. Detwiler, chairman, Allegheny Ludlum Steel Corp., Brackenridge, Pa., announced his company's recent acquisition of the Carbide Alloy Corp., New York city, the property to be operated as Allegheny Ludlum's Carbide division. The new division recognizes late developments in the field of metalworking, and is calculated to round out Allegheny Ludlum's service to the fabricating industries. Initial products of the company's new division will be a line of highly developed cemented carbides.

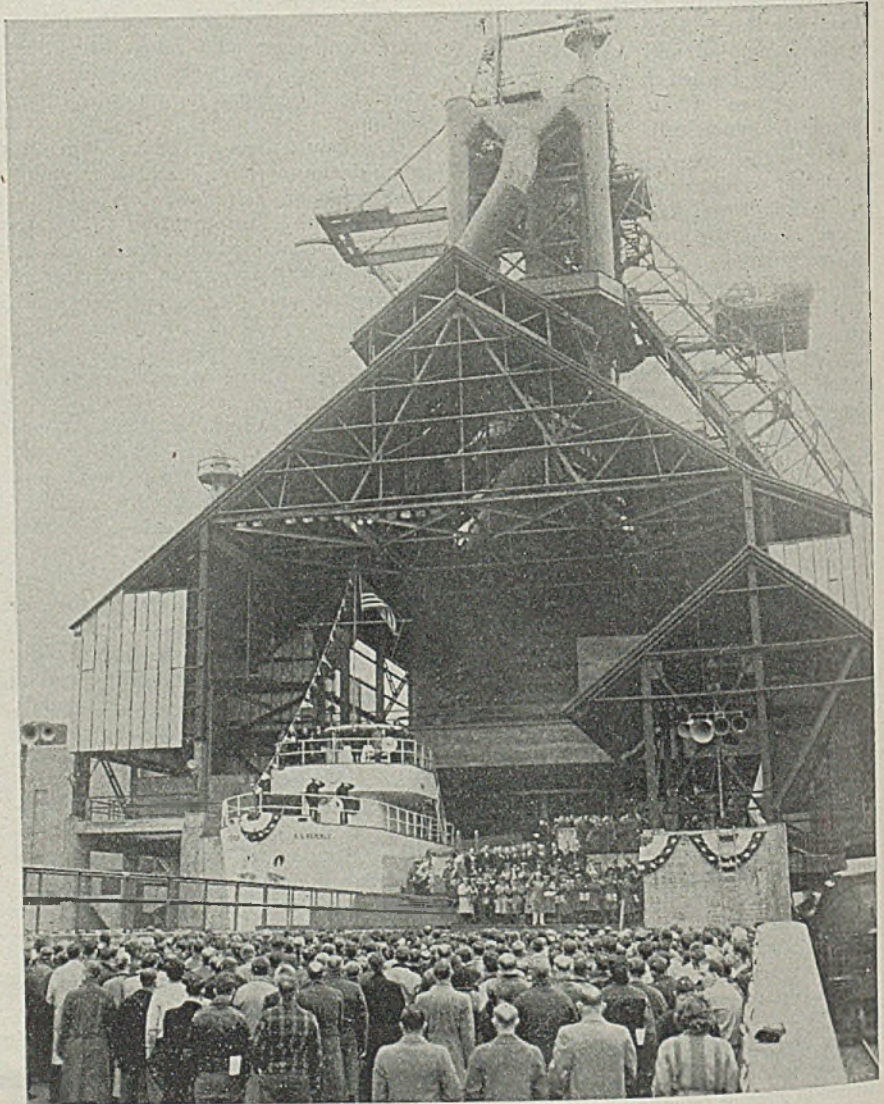
Scrap Institute Announces Chapters' New Officers

The Institute of Scrap Iron & Steel Inc., Washington, recently announced election of various chapter officers.

David B. Rosenthal, Eastern Iron & Metal Co. Ltd., Los Angeles, was re-elected president of the Southern California chapter. William M. Yaffe, W. M. Yaffe & Co., Los Angeles, is vice president, and Arthur Holtz, Industrial Salvage Co., Montebello, Calif., is treasurer.

Nathaniel H. Jacobs, Buffalo Housewrecking & Salvage Co., Buffalo, was elected president of the Western New York chapter. Harry Markowitz, A. Cooper Co., Syracuse, N. Y., was elected vice president, and Leo Chapin, Chapin & Fagin Inc., Buffalo, secretary-treasurer.

Garrison Siskin, R. H. Siskin & Sons, Chattanooga, Tenn., resigned the presidency of the Southeastern chapter. Pending an election, J. B. Knight, J. T. Knight



Four thousand employes of Republic Steel Corp.'s Cleveland district cheered the lighting of this 1300-ton blast furnace in double ceremonies Oct. 28 when they received the Maritime "M" in recognition of their record plate production. Rear Adm. Howard L. Vickery, vice chairman of the Maritime Commission, made the award from the bridge of the S. S. REPUBLIC built in the shadow of the stack for the presentation

& Son Inc., Columbus, Ga., first vice president, assumes the duties as president.

W. Alec Rawls, Alec Rawls Wrecking Co. Inc., Rocky Mount, N. C., was re-elected president of the Southern chapter. Other officers of this chapter are: Sol Katz, Katz Bros & Co. Inc., Columbia, S. C., first vice president; Joseph R. Sternberg, Consolidated Hide & Metal Co. Inc., Asheville, N. C., second vice president; Morris Brenner, Brenner Iron & Metal Co., Winston-Salem, N. C., third vice president, and Sol Levin, Levin Bros., Burlington, N. C., was re-elected secretary-treasurer.

John D. Schapiro, Boston Iron & Metal Co. Inc., Baltimore, was elected president of the Seaboard chapter. Israel D. Shapiro, United Iron & Metal Co., Baltimore, is vice president and Nathan Brenner, Joseph Brenner & Son, Baltimore, has been re-elected secretary-treasurer.

Milton Symansky, Symansky Bros., Troy, N. Y., was re-elected president of the Capitol district chapter. Following officers were also re-elected by the same chapter: Louis Contey, Trojan Scrap Iron Corp., Troy, vice president; Benjamin Apple, Symansky Bros., secretary, and Joseph C. Klein, Albany, N. Y., treasurer.

Warehouse Products Group Meets in Chicago, Nov. 19

Leaders of government and industry will discuss wartime problems and peacetime prospects at the annual meeting of the Steel Products Warehouse Association Inc. at the Drake hotel, Chicago, Nov. 19.

E. L. Shaner, editor-in-chief of STEEL, will preview the postwar picture, while current problems of manpower, materials, sales, and pricing, will be discussed by others prominent in government and industry. A highlight of the meeting will be the joining of the speakers with other government officials in a panel of experts to answer questions on manpower controls, Controlled Materials Plan, warehouse regulations, etc.

William Stout To Speak at National Founders' Meeting

William B. Stout, director, Stout Research division, Consolidated Vultee Aircraft Corp., will speak on "Research for Aviation Postwar" at the forty-sixth annual meeting of the National Founders Association at the Waldorf-Astoria hotel, New York city, Nov. 17-18.

Other speakers and their subjects are: George S. Benson, president, Harding College, "Preserving America's Private Enterprise System"; Sen. Alexander Wiley, Wisconsin, "The Washington Scene"; J. Harold Madden, industry member, region I, National War Labor Board, "Handling Dispute Cases Before the War Labor Board"; Gilbert H. Montague,

counsellor at law, New York city, "A National Labor Policy for Tomorrow"; L. W. Houston, executive vice president, Rensselaer Polytechnic Institute, Troy, N. Y., "Renegotiation and Corporate Taxes"; and Maj. Elbridge Stratton, New York ordnance district, "Termination of War Department Fixed Price Supply Contracts".

Galvanizers Committee To Hold Meeting, Nov. 17-18

The Galvanizers Committee, sponsored by the American Zinc Institute, will hold a wartime conference at the William Penn hotel, Pittsburgh, Nov. 17-18.

New operating processes and techniques will be discussed as well as current and future problems both in the producing and marketing divisions of the industry. The special program committee is headed by D. A. Russell, Youngstown Sheet & Tube Co., Youngstown.

BRIEFS . . .

American Can Co., Forest Park, Ill., has established an employes service bureau which is designed to maintain a low rate of absenteeism.

Thermoid Co., Trenton, N. J., has acquired the Joseph Stokes Rubber Co., Trenton, N. J., and its subsidiary at Welland, Ontario.

Cleveland Co-operative Stove Co., Cleveland, announces that its foundry division will henceforth operate as the Cleveland Foundry Co.

Bedaux Co. Inc., New York city, announces publication of a booklet entitled, *Production Management*.

E. Karelsen Inc., New York city, announces it has moved into its new plant at 125 West 45th street.

Pemco Corp., Baltimore, is the new title of the Porcelain Enamel & Mfg. Co. of Baltimore.

Fairbanks, Morse & Co., Chicago, is sending Christmas gifts to its 1500 former employes now in the armed forces.

American Standards Association, New York city, announces approval of revision of the abrasive wheel safety code.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., announces transfer of all heavy duty air conditioning and industrial refrigeration production from East Springfield, Mass., to Jersey City, N. J., to prepare for postwar expansion of air conditioning activities. Ross Rathbun has been appointed manager of the air conditioning division.

Allis-Chalmers Mfg. Co., Milwaukee, announces an improved automatically

controlled valve as a distinctive feature of the new type AO self-priming pump.

General Electric Co., Schenectady, N. Y., announces publication of a booklet entitled, *The Story of the Turbine*.

Sheffield Corp., Dayton, O., announces that there has been a rapid expansion of its activities in the development and production of certain types of machine tools.

Cincinnati Milling Machine Co., Cincinnati, announces that its plant guards were awarded the Auxiliary Military Police Guidon at special ceremonies recently.

General Electric Co., Schenectady, N. Y., has mailed an illustrated questionnaire to its 227,000 stockholders to determine what type of radio they would like to purchase in the postwar period.

United States Steel Products Co., New York city, announces that the plants recently purchased from the Petroleum Iron Works Co. near Sharon, Pa., and at Beaumont and Port Arthur, Tex., are manufacturing only steel barrels, drums and pails.

Porcelain Metals Inc., Long Island, N. Y., announces the development in maritime and naval construction of a single-sheet, lightweight bulkhead which does not require painting.

Isaacson Iron Works, Seattle, announces its new electric steel melting shop is in operation.

Carnegie-Illinois Steel Corp., Pittsburgh, announces its Wood Works plant, McKeesport, Pa., has not lost any time during the entire year because of accidents.

Link-Belt Co., Chicago, has purchased the manufacturing plant and inventory of Link-Belt Supply Co., Minneapolis, Minn.

Permanente Metals Corp., San Francisco, erected its one millionth ton of steel into a Liberty ship on Oct. 20 at Richmond shipyard No. 2.

Cook Electric Co., Chicago, held a two day engineering conference at the Drake hotel, Chicago, recently, attended by the company's entire engineering force.

Continental Can Co. Inc., New York city announces it is pooling its combined knowledge with Swedlow Aeroplastic Corp. and Marco Chemicals Inc. for production of airplane parts made from the new MR-type synthetic resins.

Western Gear Works, Seattle, awarded "No Lost Time" pins to 75 of its workers for a perfect six-month attendance record.

MEN of INDUSTRY



K. C. GARDNER



W. H. MAXWELL



JOHN C. REDMOND

K. C. Gardner, previously executive vice president and general manager, United Engineering & Foundry Co., Pittsburgh, has been elected president and general manager, succeeding the late George T. Ladd. F. C. Biggert, a former president who has been a vice president doing special work for the company, has been elected chairman of the board. Other changes are: John L. Young, vice president in charge of industrial research; George V. Lang, treasurer, a director and member of the executive committee; Carl T. Zinsmeister, secretary; C. W. Rebhun, assistant secretary, and E. S. Ward, assistant treasurer.

Vaughan C. Reid, who has charge of the metallurgical department, City Pattern Foundry & Machine Co., Detroit, has been elected a vice president.

Ray W. Turnbull, former executive vice president, Edison General Electric Appliance Co. Inc., Chicago, subsidiary of General Electric Co., has been elected president. A. D. Byler, who has resigned as president because of ill health, remains as a consultant to the president and also as a board member.

Wallace K. Brown, former vice president in charge of procurement, Crocker-Wheeler Electric Mfg. Co., Ampere, N. J., has been named manager of the New York district sales, Crocker-Wheeler division of Joshua Hendy Iron Works.

W. E. Worth has been elected vice president in charge of supply and inventory, International Harvester Co., Chicago, and will retain his present duties as director of purchasing, traffic and fibre.

Edward J. Burnell, former vice president and general manager in charge of Pershing road plant operations and Central division sales, Link-Belt Co., Chicago, has been appointed vice president in charge of sales for the entire Link-Belt Co. Harold L. Hoefman, former manager of the company's Atlanta plant,

succeeds Mr. Burnell as general manager of the Pershing road plant in Chicago, and succeeding Mr. Hoefman in Atlanta is Richard B. Holmes. David E. Davidson has been named district manager at Indianapolis.

W. H. Maxwell, since 1932 head of the eastern sales office, Wolverine Tube division, Calumet & Hecla Consolidated Copper Co., Boston, has been named general sales manager of the Wolverine division. R. F. Moody has been appointed assistant general sales manager.

John C. Redmond has been appointed research engineer and chief analytical chemist, Kennametal Inc., Latrobe, Pa.

Stephen Fitzgerald has resigned as deputy director of the Office of War Information to join Bell Aircraft Corp., Buffalo, as director of public relations.

L. F. McGlincy has been appointed assistant manager of operations, Pittsburgh district, American Steel & Wire Co., Cleveland, and Loren J. Westhaver has been named to succeed him as general superintendent, Donora (Pa.) Steel & Wire works.

Morton I. Dorfman, formerly associated with Coated Products Corp., Verona, Pa., which has been purchased by Koppers Co., Pittsburgh, and will be operated as the Coated Products division of Koppers, has been appointed manager of the new division.

Stephen B. Mambert, formerly on the supervisory staff of the Kingsbury Ordnance plant, LaPorte, Ind., has been named assistant to Alfred Marchev, president of Republic Aviation Corp., Farmingdale, N. Y.

John B. Jackson, staff assistant to the vice president in charge of operating and engineering, Commonwealth Edison Co., Chicago, will receive the Octave Chanute Medal for 1943, given by the Western Society of Engineers, Chicago. Mr. Jack-

son's prize winning paper is entitled "Relocation of Utility Substructures—Chicago Subway."

Victor P. Shaffer has been named engineer in charge of design, Process division, H. K. Porter Co. Inc., Pittsburgh.

C. W. Perelle has been elected a member of the board, Consolidated Vultee Aircraft Corp., San Diego, Calif.

Charles R. Ince, assistant sales manager, St. Joseph Lead Co., New York, has returned to his company after 16 months in Washington as special consultant, WPB.

Clarence B. Moore has been appointed head, Rubber division, research laboratories, Thermoid Co., Trenton, N. J., and Harry Bourne has been named engineer in charge of hose production, Rubber division.

Henry T. Moore has been appointed general sales manager, Briggs Clarifier Co., Washington, and E. K. Burgess and J. H. Nash have been appointed assistant sales managers for the newly-formed automotive and industrial divisions, respectively. J. M. Willis has been named Ohio representative for the company and J. J. Stroud has been made representative in Kentucky.

Roe S. Clark, vice president and treasurer, Package Machinery Corp., Springfield, Mass., has been elected president, Associated Industries of Massachusetts, succeeding Ira Mosher, vice president and general manager, American Optical Co., Southbridge. Other new officers are: William H. Collins, general manager, shipbuilding division, Bethlehem Steel Co., Fore River, Quincy, first vice president, and Harry E. Gould, assistant to the vice president, Bethlehem Steel Co., shipbuilding division, Quincy, honorary vice president. New directors are: Stanley C. Hope, president, Gilbert &



JOHN SMYLY

Who has been named director of sales, Detroit Gray Iron Foundry Co. and its subsidiary, Detroit Alloy Steel Co., Detroit, noted in STEEL, Oct. 11, p. 160.



JOSEPH B. TERBELL

Barker Mfg. Co., West Springfield; Donald G. Millar, president, Greenfield Tap & Die Co., Greenfield; George M. Stevens, manager, River works, General Electric Co., West Lynn; Joseph P. Spang Jr., president, Gillette Safety Razor Co., Boston; James G. Kennedy, manager, John P. Squire's, Cambridge, and John S. Keir, executive vice president, Dennison Co., Framingham.

Joseph B. Terbell, eastern sales manager, American Manganese Steel division, American Brake Shoe Co., New York, has been appointed first vice president, Manganese Steel division, Chicago Heights, Ill.

Col. Edwin W. Rawlings, formerly chief of the Resources Control Section, Materiel Command, Wright Field, Dayton, O., has been named administrator of the Aircraft Scheduling Unit, located at the Wright Field, succeeding Col. E. M. Powers. The A. S. U. is responsible for obtaining from WPB and scheduling for the entire aircraft industry the materials and certain critical components needed to maintain production schedules. The A. S. U. also operates under Aircraft Re-



EDWARD K. MYERS

Who has been elected assistant treasurer, Lukens Steel Co., Coatesville, Pa., as announced in STEEL, Oct. 11, p. 161.



RALPH E. KRUCK

sources Control Office as the CMP claimant agency for the aircraft industry.

Ralph E. Kruck has been appointed manager, product design department, Appliance division, Westinghouse Electric & Mfg. Co., and will make his headquarters in Mansfield, O. Succeeding him as a design engineer at the Westinghouse East Springfield (Mass.) plant is Anthony Naiden. R. F. Tucker and Adolph Frankel have been appointed staff assistants to the manager of the Westinghouse Lamp division, Bloomfield, N. J. C. A. Smith and H. W. Tenney have been named assistants to Thomas I. Phillips, vice president of the Westinghouse East Pittsburgh (Pa.) divisions.

Lawrence S. Martz has been named assistant to the president, Micromatic Hone Corp., Detroit, and Don S. Connor has been appointed director of field engineering.

David A. Nelson has joined Detroit Broach Co., Detroit, as vice president and will be general manager of the company's West Coast plant in Beverly Hills, Calif. Formerly Mr. Nelson was secretary-treasurer, Colonial Broach Co., Detroit.

Michael N. Brady, former central division sales manager, Detroit, United States Rubber Co., New York, has joined National Enameling & Stamping Co., Milwaukee, as vice president in charge of sales.

R. J. Russell, vice president and sales manager, Century Electric Co., St. Louis, has been elected president, Associated Industries of Missouri. Elmer Donnell was elected executive vice president of the organization.

James A. Kennedy has been named California field engineer with headquarters in Los Angeles, Spang-Chalfant Inc., Pittsburgh, succeeding George M. Eaton, retired. N. A. Rebarick succeeds Mr. Kennedy as field engineer with headquarters at Tulsa, Okla., while H. G. Texter has resumed his former position

as chief field engineer, Tulsa.

Reginald E. Sturdy has been appointed superintendent, Fairfield sheet mill, Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

Stanley B. Amidon has been appointed manager, New England division, Charles Dreifus Co., Philadelphia.

Stuart N. Hutchison Jr., a member of the law firm of Reed, Smith, Shaw & McClay, has been elected to the board, Pittsburgh Steel Co., Pittsburgh, filling the vacancy caused by the death of George T. Ladd.

OBITUARIES . . .

Caleb S. Bragg, 57, a director of Wright Aeronautical Corp., Paterson, N. J., died in New York, Oct. 24.

Francis R. Harris, 87, founder, Driver Harris Co., Harrison, N. J., died Oct. 24 in Arlington, N. J.

William E. Hedgecock, 75, vice president in charge of sales, American Car & Foundry Co., New York, died Oct. 26 in that city.

Lawrence Donahue Jr., 37, vice president, L. Donahue & Son Inc., Yonkers, N. Y., died Oct. 27 in Newark, N. J.

Charles W. Gennet Jr., 67, vice president in charge of the Chicago office, Sperry Rail Service, a division of Sperry Products Inc., Hoboken, N. J., died in Chicago, Oct. 26.

Frederick Darlington, 76, former assistant to the vice president, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., died Oct. 27 in Great Barrington, Mass.

Stephen A. Leeds Jr., 29, plant supervisor, Fresno (Calif.) plant, Vega Aircraft Corp., died Oct. 25 in San Francisco.

S. Bowles King, 64, former advertising manager for 31 years, Sullivan Machinery Co., Michigan City, Ind., died Oct. 25 in Chicago.

Edward S. Stickle, Pittsburgh representative of Delta-Star Electric Co., Chicago, and Simplex Wire & Cable Co., Cambridge, Mass., and transformer representative of the Pittsburgh works, Allis-Chalmers Mfg. Co., Milwaukee, died Oct. 25.

Herman G. Weber, 65, inventor, and president of H. G. Weber & Co. Inc., Kiel, Wis., died Oct. 25 in Sheboygan, Wis.

William M. Gale, 76, who retired in 1939 as secretary, International Harvester Co., Chicago, died Oct. 28 in that city.

BRAZILIAN STEEL

Work progressing on modern, integrated plant in face of difficulties traceable to war conditions. . . Epitomizes culmination of hopes for changing predominantly agrarian nation to a modern industrial society

ACROSS 1250 acres, of once sandy pastoral land in the broad valley of the Paraiba river the decade-old dream of Brazil is coming true. That dream is the \$65,000,000 Volta Redonda steel plant, symbol of Brazil's industrial coming-of-age.

Today, the green hills around Volta Redonda, 90 miles from Rio, reverberate with the clanking of metal and the hiss of steam-driven construction equipment. Thousands of workmen are busy digging, pouring concrete, assembling and installing machinery, and, in general, hastening completion of the biggest single industrial project in Brazil's history.

To Brazilians, Volta Redonda represents much more than just a steel mill. It epitomizes culmination of their hopes for changing Brazil from a predominantly agrarian nation to a modern industrial society.

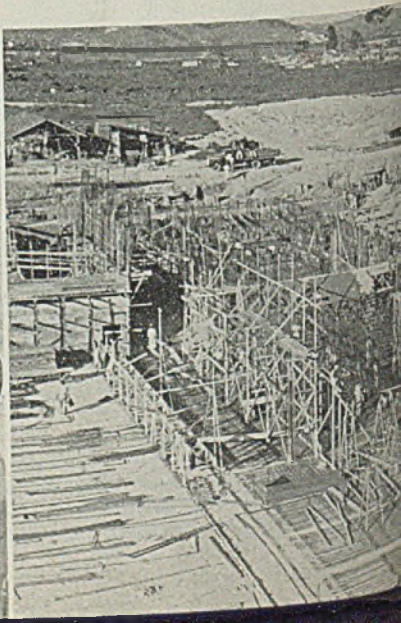
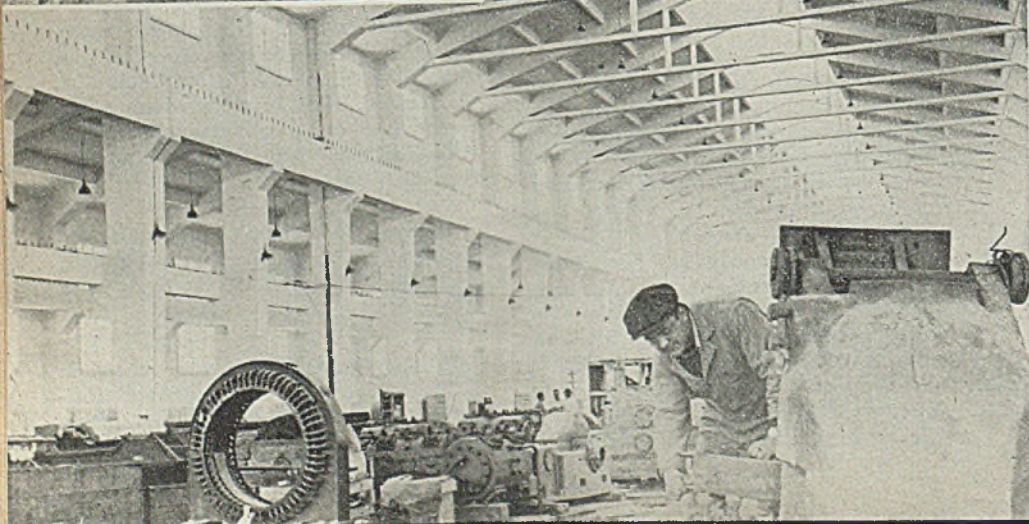
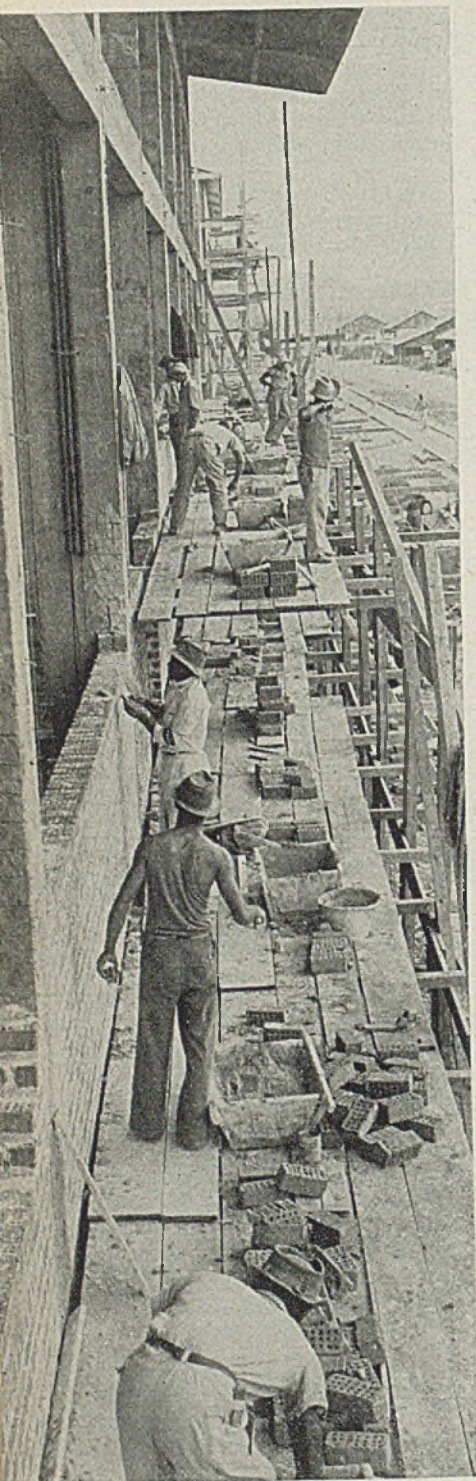
All the American republics are watching the Volta Redonda development, too, for it is a challenging test of industrialization in tropical regions. Social and economic theorists long have voiced the belief heavy machinery could never come

to the tropics. But Brazilians, backed by American technical and financial assistance, are out to prove them wrong. Results to date are satisfactory.

The Volta Redonda plant is not ready to start producing its annual peak capacity of 350,000 tons of steel ingots tomorrow. Building in the midst of global war is a difficult job at best, and an undertaking of the size and scope of Volta Redonda, distant from its North American suppliers of equipment, is just that much harder to complete. But progress is being made, and officials hope to have the big coke ovens and by-products plant in operation early next year, and the whole project in operation by the end of 1944.

Entering Volta Redonda is like going into a new Brazil. Side by side with the sleepy, whistle-stop village of Volta Redonda, the plant forms a startling contrast of the modern world to the old. Along miles of tracks which crisscross the huge plant site, squat yard engines shuttle freight cars loaded with materials. Powerful locomotive cranes lift tons of heavy equipment from car to building,

These pictures reveal how construction work progresses on the \$65,000,000 Volta Redonda steel plant in Brazil. Annual capacity of the new plant, which spreads over 1250 acres, will be about 350,000 tons of steel ingots. Left above, bricklayers work on a small machine shop. Machinery is put in place in the boiler shop, left below. The vast maze of construction, center below, is preparation for pouring concrete for the new pump house. At the far right, American machines and supplies are being unloaded. Thus Brazil takes steps for changing from a primarily agrarian country to a modern industrial nation aimed at filling some of her own needs



PROJECT PUSHED

By LIEUT. COL. MACEDO SOARES
E SILVA

Brazilian Army Engineer and Director
of the Volta Redonda Steel Plant
Project

and rail-mounted turnpulls, preparing additional building sites, sink their steel jaws into the ground, pulling out vast amounts of dirt with each bite.

Never before in Brazil has there been such a large concentration of modern construction equipment, and Brazilians have learned readily how to use their new machines well. They have smoothed the land (already have moved an estimated three-fifths of the necessary 2,500,000 yards of earth), have laid foundations, erected many of the re-inforced concrete structures, have broken ground for others.

Unlike United States plants which are built of structural steel, Volta Redonda will be built of reinforced concrete. While this process takes considerably longer to build officials expect to have all the concrete work, including the mile-long rolling mill, finished within a year.

Uncle Sam is doing his share to help his good neighbor and ally, Brazil, fulfill its industrial ambitions. In 1940, the Export-Import Bank of Washington made available \$20,000,000 in credits for purchase of equipment in the United States, and subsequently boosted this amount to \$45,000,000. Volta Redonda, started almost at the same time war came to the Americas, has had to face the complications of total world conflict. Nevertheless, the Brazilian project has been accorded the highest possible priorities on equipment by the United States, American experts have been sent to supply the technical "know-how", and cargo space has been allotted for regular shipment.

The Brazilians are going ahead rapidly with their building, keenly aware of the powerful influence Volta Redonda will exert in Brazilian life. They believe

heavy industry will usher in a new era of progress and productive knowledge with an accompanying rise in Brazil's standard of living.

Growing up simultaneously with the steel plant is a model low-cost workers' community of 1600 trim, brick and concrete houses. It's called Santa Cecilia, and it is complete even to a tiny 400-seat movie theater. Ultimately, Santa Cecilia will house all of the 4625 men and their families who will be needed to operate the plant.

Volta Redonda is designed with an eye to the future. Although initially only one blast furnace will be built, provision has been made for installation of three additional furnaces if the demand justifies, so that the mill ultimately can produce 1,000,000 tons of rolled steel a year. That is the long-range goal of Volta Redonda, but today's emergency has shifted the emphasis to the realistic task of finishing first things first.

Nearest completion is the coke plant with its 55 rows of coking chambers. An eight-ton coke pusher, made in the United States, has been installed, and workers are finishing the jig-saw puzzle assembly of tons of odd-shaped refractory brick.

Located on the main line of the Brazilian Central railway between Rio de Janeiro and Sao Paulo, Brazil's Detroit, Volta Redonda, as the basic industry will be able to supply structural steel to shipbuilders in the Brazilian capital and to manufacturers in the booming Paulista metropolis. In preparation for this, the railroad is being electrified and tunnels widened. Iron ore for the plant will be supplied by Brazil's rich deposits to the north, and Brazilian coal, which has been found to have suitable coking qualities, will come from the Santa Catarina fields

in southern Brazil. In both cases transportation will be an important factor.

While Brazil has several small steel mills operating now in the state of Minas Gerais, annual total output is limited to around 200,000 tons of non-structural steel. Volta Redonda will provide the structural beams, tracks and plates which Brazil needs.

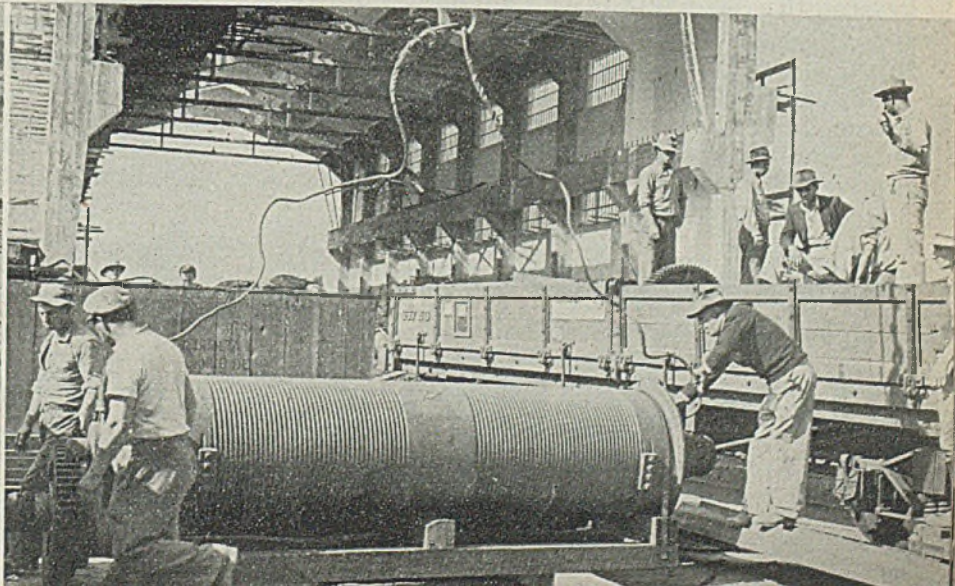
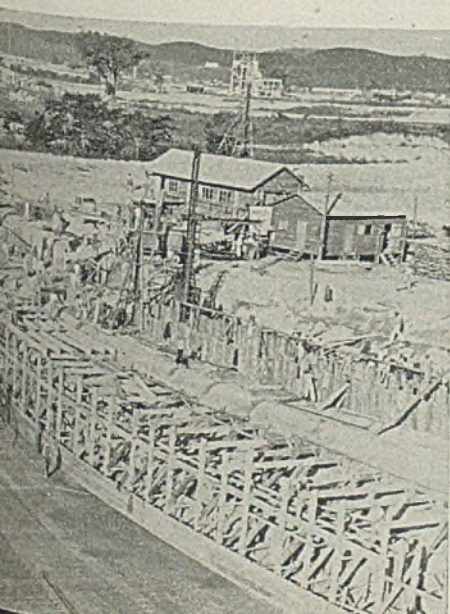
Steel's War Performance Extolled by Zimmerman

This country's ability to produce steel in the quantities and qualities needed for successful global warfare were featured recently in an address by Dr. R. E. Zimmerman, vice president, research and technology, United States Steel Corp. of Delaware at the second war conference of the National Association of Commercial Organization Secretaries at William Penn hotel, Pittsburgh.

"On the basis of work done to fulfill the requirements of peacetime manufacture, the steel industry learned to make products which were, for example, hard or soft, susceptible to deep drawing and forming or springy, resistant to wear and to impact, suitable for use at high temperatures or for welding, capable of withstanding stresses and conditions prescribed by a long list of services," he said.

"Hence, when this nation faced the war crisis and great quantities of steel were demanded for the engines of defense and of war, experience and specialized knowledge were available at once to assist in the transition."

He said that this same ability with the knowledge gained during the war will stand in good stead when we are called to convert to peacetime products.



HIGH SPEED
STEEL TIP

COPPER SHIM

Simple method of applying high speed tips

Information supplied by an Industrial Publication

Copper brazing offers a readily available means of mounting high speed steel tips on low alloy shanks for cutting tools.

The procedure is quite simple. A recess milled in the shank is thoroughly cleaned and coated with brazing flux. The flux is also applied to the high speed steel tip. A copper shim (0.003 to 0.005 in. thick) is cut to the size of the recess.

The shank is heated until the flux flows freely before the shim is fitted in the recess. After the shim and tip are put in place, the assembly is brought up to 1650° F., in a preheating furnace.

Then the assembly is transferred to a high heat furnace and held at quenching temperature (2200-2350° F.) until the tip is soaked through. Copper melts at 1980° F., therefore the shim will melt and spread over the interfaces, forming a firm bond.

After withdrawal from the furnace the tip is aligned and pressed into place to squeeze out excess copper and flux. As soon as the tip is well bonded to the shank, that end is oil quenched. Final operation consists of the usual high speed steel temper at 1000-1050° F.

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STEEL

MIRRORS of MOTORDOM

Automotive executives optimistic over postwar prospects. Believe market may be double peacetime peak. Doubt airplanes will be serious competitors for passenger cars. New gasoline developments may affect future vehicles

DETROIT

MOTOR company brass hats are doing a little more open speculating about the size and shape of things to come automotive-wise, for one reason because they doubtless believe now they can foresee fairly accurately the general outlines of the postwar economy, and for a second reason to pep up flagging interest on the part of their dealers throughout the country. Strange as it may seem, automotive dealers have not fared too badly since the suspension of new car manufacture. The old days of horse trading on new cars have gone, and the profit margin on repair business and parts sales has in many cases more than made up for lack of volume sales of new and used cars. Nevertheless, they are looking forward to the day when new cars will be available for sale.

There are rosy days ahead, in the opinion of Harry J. Klinger, general manager of Pontiac, who on the occasion of his tenth anniversary in this post took time out to observe that the peak of 30,000,000 cars in use during prewar years is perhaps no more than half of the sales possibilities ahead. He believes that with better highways and traffic control, using the through highways and eliminating grade intersections, there is no reason why this country cannot accommodate as high as 60,000,000 cars.

And Mr. Klinger also is convinced that increased use of planes will help rather than hinder the motor industry, for until an airplane can be stored in the back yard, the use of every plane will require an automobile to get to and from it.

The Pontiac chief also is a member of the "evolution not revolution" school of thought in respect to postwar cars. Noting that 50-octane gasoline was used in some planes in the first World War in comparison with 100-octane now, he points to the indicated fuel progress at the rate of two octane numbers a year over the intervening 25 years. Further improvement in octane rating of gasoline will have to be restricted to a pace that engines can match.

Harry G. Moock, vice president of Chrysler's Plymouth division, paid high tribute to the nation's 40,000 car dealers in an address last week before a Minneapolis group, declaring that "American automobile dealers set about to convert peacetime activity to wartime activity with the same alacrity and determination as the industry which supplied the peacetime vehicles. Forty years of peacetime experience provided dealers with the know-how and resourcefulness necessary to provide essential service requirements."

Looking to the future, Moock said, "Just as long as people in this country

want to go places sitting down, automobiles will be made and sold. This year Chrysler's war business will be greater than it was in 1942. In 1944 it will probably be still greater. But when the war is over, we will be back in the automobile business with as fine a line of passenger cars and trucks as we know how to build."

In reply to a question about what kind of a postwar car Chrysler will build, Moock replied: "We can't decide that until somebody answers the following questions for us—What are the taxes going to be after the war, how much will people be able to spend for new cars, what kind of sales and manufacturing restrictions will be in effect after the war, how long will the war last?"

Eye 150 Per Cent Production Level

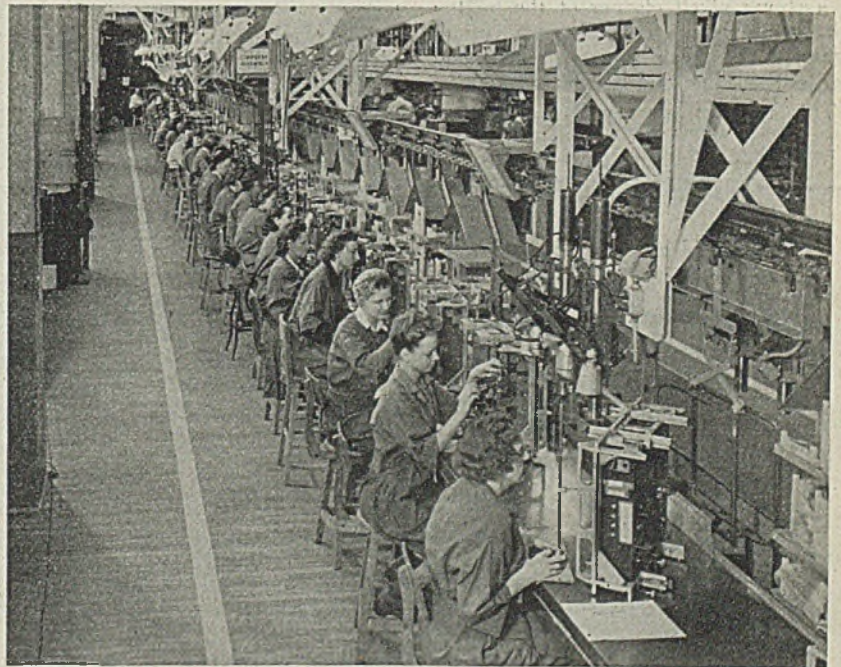
Alfred P. Sloan Jr., chairman of General Motors, in his most recent discussion of postwar probabilities, told a group in Lansing, Mich., that he figures car sales will increase by 50 per cent over prewar peaks during the first four years following the armistice. This confirms the report given here several weeks ago that GM divisions were setting their sights on a production level 150 per cent of that prevailing in 1941. Mr. Sloan

also indicated the corporation is planning to spend \$200,000,000 after the war to modernize its plants in connection with reconverting to peacetime production.

As of Sept. 30, General Motors had set aside for postwar contingencies and rehabilitation a total of \$65,837,767, or about one-third of the outlay proposed above. Out of third-quarter earnings alone the postwar provision was over nine million. Meanwhile GM also has set aside during the first nine months of this year a total of \$63,402,000 for retroactive price and other adjustments which may arise in connection with renegotiation of war material contracts applicable to sales for the period.

Total deliveries of war materials by GM in the three months ended Sept. 30 jumped to \$927,479,569, or 11.4 per cent over the total for the second quarter and bringing the nine-month total to just over two and one-half billion, better than twice the volume for the same period a year ago. The achievement for the third quarter is all the more favorable when it is considered that price reductions effected in that quarter amounted to about \$57,000,000.

It is interesting to note the sharp increase in accounts receivable in the GM Sept. 30 statement—from 368 million a year ago to over 502 million. This is accounted for altogether by increased receivables from the government in connection with the war program. Inventories on Sept. 30 likewise soared above the half-billion mark, comparing with



MASS PRECISION: Automotive manufacturing technique has been introduced successfully by AC Spark Plug Division of General Motors in producing bomb sights. Here is a section of one of the assembly lines (Mirrors of Motordom, Nov. 1, p. 77)

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about 450 million a year ago. One of the difficulties which the dopesters are now talking about in connection with resuming motor car production (and rumors are a dime a dozen that the government may authorize some new car assemblies in the near future) is the difficulty of reconverting body sources to automobile work. Practically all the leading body builders, such as Fisher, Briggs, the Ford Pressed Steel Shop, the Packard and Hudson Body plants, etc., have either been dismantled or turned over to airframe work. Particularly in the case of Briggs and Fisher Body would it appear a tedious job to set up equipment for stamping and assembling and finishing body parts. There have been reports that Briggs may reassume a principal share of the Ford body-building activity.

Body plants doubtless will be the chief bottlenecks in re-establishing car production. Facilities for motors, frames, transmissions, axles and related chassis parts will not be so troublesome as far as realigning for automobiles is concerned.

Recent development in metal cleaning shows promise of future application in the improved deep drawing of steel sheets for parts such as fenders, body panels and the like. In such drawing operations, there has been need for better drawing compounds, one of the most impressive being colloidal graphite. The only difficulty with this material is that it is next to impossible to remove it from the formed sheet, thus seriously interfering with subsequent rustproofing and painting. A suggested solution is the immersing of the graphite-coated parts in a strong alkali cleaner of the molten salt type, which effectively removes all traces of the lubricating compound and readies the sheet steel for finishing.

This type of cleaner has a host of

other uses which are now being pushed commercially. One is the "scouring" of the surfaces of gray iron castings to permit them to be tinned. A radiator manufacturer has adapted this process successfully, permitting a change from malleable iron to gray iron in outlet fittings for truck radiators. Another use is the cleaning of parts to be brazed, or welded assemblies which must be painted. A more recent development is the cleaning of parts to be electroplated, such parts appearing to take a plate much more readily than other methods of cleaning.

Use Heaviest Equipment

Chevrolet has initiated production in its fourth aluminum forge plant, at Anderson, Ind., a former wire mill covering 21 acres and out of use for several years. Some of the heaviest equipment of its type is used at the new plant, including hydraulic presses, large homogenizing furnaces and upsetters, one of which weighs a neat 177 tons. The latter, built by Ajax in Cleveland, has a cast housing which required 6 hours to pour and 18 days to cool in the sand. It was shipped to Anderson on a reinforced 16-wheel flat car. Rigging of cables, tractors and cranes to unload the equipment required 24 hours. It was slid off the car on steel skids smeared with banana pulp, and later installed on a reinforced concrete base extending 25 feet below ground level.

Four buildings make up the main production units. Two of them, each nearly 550 feet long, are used in processing work and heat treating, a third housing the heavy presses and other forging equipment, and a fourth the materials testing laboratories, kitchen and cafeteria.

Latest addition to the Ford electroplating department at the Rouge plant is about ready for operation. It is located on the second floor of the aircraft

engine building and comprises five bays, each 25 x 160 feet in size. The department will provide facilities for lead, indium, silver and lead flash treatment of bearings used in Pratt & Whitney engines built by Ford. Other electroplating departments are operated in the rolling mill, pressed steel building and driveaway garage, all at the Rouge, at the Highland Park plant, and at plants in Kansas City, Kans., Memphis, Tenn., and St. Paul, Minn.

Numerous shifts in the local office of the War Production Board have followed in the wake of the resignation of D. J. Hutchins, regional director, who has returned to his post with Firestone Tire & Rubber Co. New acting regional director was expected to be announced late last week. A. C. Ryan, deputy director in charge of production service, has resigned to become director of sales for the Houde Engineering division of Houdaille-Hershey Corp., and is succeeded by D. E. Meadows, who has been with machine and cutting tools staff in the local offices since February, 1942. R. F. Grindley, regional chief of the Redistribution Division since last November, has been named to succeed Mr. Meadows as manager of the Facilities Division. J. E. Adams succeeds Mr. Grindley in redistribution work, while John W. Votycka will continue as production department manager.

Lawrence S. Sheldrick, who as noted in these pages for Sept. 27 resigned his engineering post with Ford Motor Co. after 21 years' association with that company, is now affiliated with the general engines group of General Motors Corp. as assistant to R. K. Evans, vice president of GM and group executive. The group includes Allison, Electromotive Corp., and the Cleveland and Detroit Diesel divisions. Mr. Sheldrick's headquarters will be in Detroit.

—They Say:—

"The problem of a democracy is what to do with the idle rich and the worthless poor."—college professor quoted by C. E. Wilson, president, General Motors Corp., Detroit.

"In war, money is nothing and time is everything; but when war is over money is everything and time is nothing."—O. E. Hunt, vice president in charge of engineering, General Motors Corp., Detroit.

"In the last analysis, we have but one customer—Uncle Sam. Not only is he our only customer, but in addition, through OPA he fixes the prices at which we shall sell; he determines through WPB what materials we shall have and to what customers we shall deliver our goods, and when; he controls the wages and salaries we shall pay and the premium for overtime; he regulates our coming in to our plant and our going out; he sets standards of quality for our products; he tells us how we shall keep our books of account and the many additional records which he requires us to maintain. Finally, he takes in taxes about three-quarters of whatever profit may be left

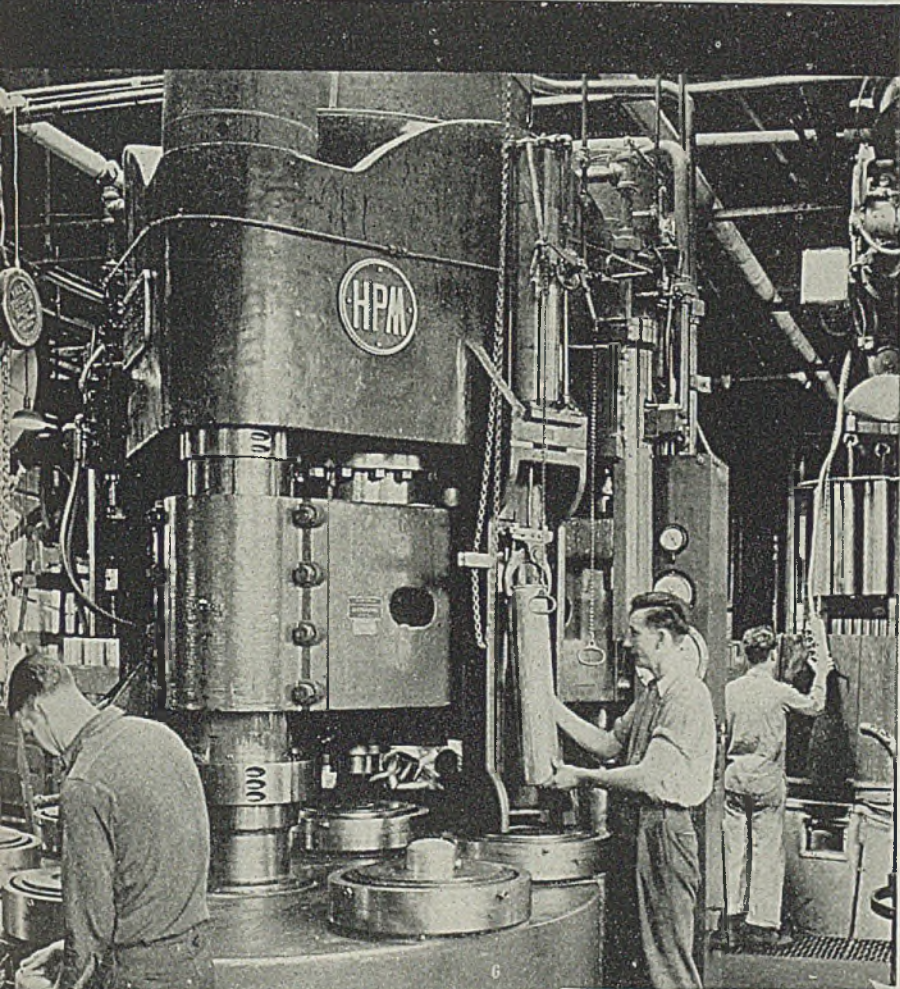
and then reserves the right through renegotiation of our contracts to take away whatever additional amount he sees fit. Such are the perplexities and hazards of business operation in time of war."—J. E. Otis, president, Dodge Mfg. Corp. in his annual report.

"I have had numerous people ask me what will happen to many of the airplane manufacturing companies and airplane accessory companies when they revert to their pre-war production volumes. What will happen to the millions of men and women now employed in this industry? My answer is simple. Many of these employes will return to former industries in which they were employed, such as the manufacture of automobiles, electrical refrigerators and other appliances and civilian goods. Many girls and housewives, I feel sure, will be happy to return to their homes at the end of the war. In fact, I have been recently informed that in England the agreements between the unions and industries provide that those who were not employed in industry prior to the war will be taken out of industry immediately upon the return of soldiers from the fighting fronts."—E. R. Breech, president, Bendix Aviation Corp.

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Above—A 2000-ton H-P-M cartridge case heading press equipped with a six station turret, permitting continuous production. Press will accommodate two heading tools which can be automatically operated in sequence.

Right—H-P-M FASTRAVERSE cartridge case presses drawing large artillery shell cases.

All presses illustrated are installed in the plant of one of America's largest producers of artillery shell cases

WING TIPS

Dispersal of manufacturing operations aids aircraft industry solve manpower shortage problem. Willow Run plant output of B-24 bombers reaches new record in September and October production is appreciably higher

IF you cannot bring the men to the work, then take the work to the men. That is the simple formula adopted by the West Coast aircraft industry in the face of a shortage of manpower, and more recently by the Air Forces' giant Willow Run bomber plant at Ypsilanti, Mich., operated by the Ford Motor Co.

Lockheed was one of the first companies to apply the reverse English to the manpower drought, setting up a dozen or so "feeder" plants in bowling alleys, distilleries, drill halls and other small buildings handy to the main plants at Burbank, Calif. Then Consolidated at San Diego adopted a similar technique, organizing numerous satellite plants in the area around San Diego, some of them 60 or 70 miles distant.

In recent weeks, Boeing at Seattle, facing a deficiency of 9000 in its working force, came up with another dispersal plan which promised to fill an estimated 3800 of the shortage by means of tributary plants in western Washington.

In the early days of the Willow Run bomber plant, the Air Forces were talking about peak employment of 90,000 men and women, and Ford employment people set out to scour the country for help, going into such remote sections as Kentucky, Georgia and Tennessee to recruit employes. Their efforts bore fruit, and employment climbed steadily but gradually the inroads of the draft, large numbers of "quits" among women employes, difficult housing and transportation conditions made it appear virtually certain the expected goal would never

be reached. In fact, labor turnover became so serious for a while this summer that employment showed a net loss until recently. Dispersal of manufacturing operations seemed the only sane solution, so this has been proceeding quietly for several months now. The result, so far, has been eminently successful, for September production of B-24 bombers, including both flyaways and knocked-down shipments to the Southwest, touched a new high and the present schedule for October, which is confidentially expected to be met if not exceeded, is up appreciably.

Tank Production Suspended

The farming-out of Willow Run operations was made considerably easier by the suspension of tank manufacture at other Ford plants, thereby releasing employes and floor space which could be switched to airplane work. The Ford Highland Park plant in Detroit, for example, once given over in its entirety to tank construction, now is gearing up to produce wing tips, outer wings and other assemblies for the B-24. Sections of the Ford Rouge plant in Dearborn are being transferred to such bomber units as the empennage (tail assembly), radio operator's, floor and other airframe elements which until recently have been completely foreign to operations previously carried out in these shops.

Scores of plants other than those in the Ford organization are now participants in the B-24 dispersal. Some are as far afield as St. Louis. All will feed

into Willow Run by rail and truck, permitting the latter plant to concentrate on final assembly operations. The problem of co-ordinating all these new suppliers with Willow Run, of scheduling shipments, unloading them and transferring them to final assembly, of following through on frequent engineering changes, of keeping a constant check on suppliers for quality of workmanship, of even such simple things as mail and telephonic communications with these new sources, is tremendously complicated.

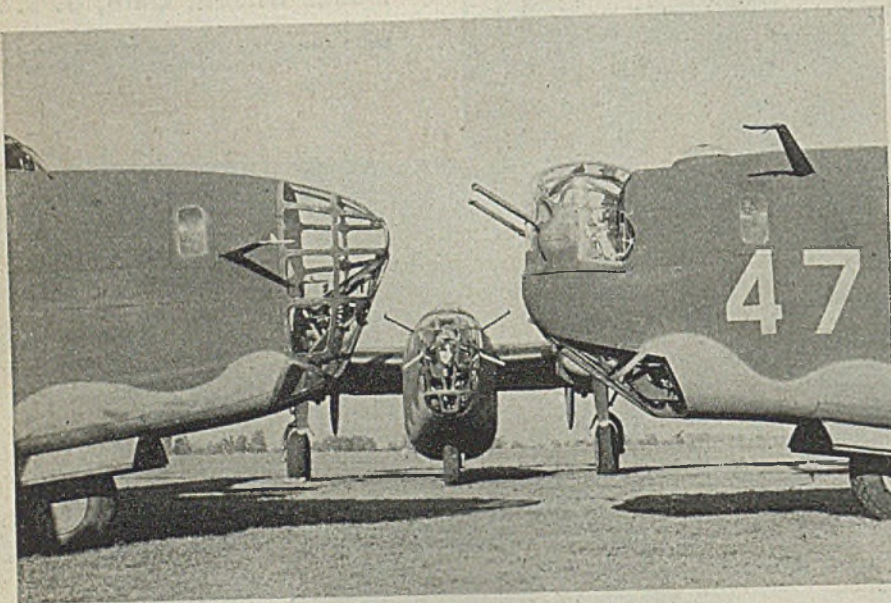
A new spare parts and storage building now is being constructed at the Ypsilanti property, adjoining a railroad spur, where efforts will be made to maintain a sufficient backlog of spare parts or float of outside assemblies and raw materials to avoid any disturbance to production, if there should be interruptions in some shipments. Construction of this new building, by the way, furnished fuel for the UAW-CIO in its latest blast against Willow Run, the union, seemingly entirely ignorant of the purpose of the building, charging that additions were being made to the plant while there were not enough workers to staff operations as originally planned.

Unfortunately, Willow Run has been the victim of bad publicity from its inception. In the first place, too many uninformed people, when they heard that it was to be a Ford plant, assumed bombers would be streaming out the back door in short order, much as the model A's streamed out of the Ford automobile assembly plants. Ford was a magic name as far as production was concerned, and no amount of logical reasoning could persuade these people otherwise. So, even now, they are sure there is something "wrong" with Willow Run, and will continue to believe so until the plant is turning out its "bomber an hour," a production figure which even certain Ford officials were guilty of discussing in the early days of the plant.

The facts are simply these: Willow Run is not a Ford plant; it is owned by the Defense Plant Corp. for the Army Air Forces. The latter agency in effect directs its operations, maps out its schedules, checks on materials and parts in process, approves the completed bombers, decides how many shall be assembled on the spot and how many knock-downs shall be shipped to Consolidated at Fort Worth and how many to Douglas at Tulsa. Ford engineers, it is true, laid out the production sequence, designed much of the equipment, directed employment of personnel and in effect translated the orders of the Air Forces to the production line. But they do not, in fact cannot, operate the plant as they would if it were a regular Ford peacetime production unit.

The question is continually being tossed at Willow Run operating officials: How soon will the plant reach its peak production? Well the answer is that Willow Run reaches its peak production every day of the week. Whether it will go higher—or lower—is entirely

(Please turn to Page 99)



Nose lifting process in the B-24 Liberator bomber has gone through three successive stages, shown here from left to right. Current model carries a revolving turret mounting two 0.50-caliber machine guns which can be elevated or lowered through a wide arc. Modifications such as these require countless engineering changes in the airplane

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Picture Above Courtesy Cincinnati Milling Machine Co.

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The built-up edge, during its existence on the cutting edge, exerts the pressure which does the actual cutting or shearing of the metal.

Sufficient build-up protects the cutting edge by localizing the rubbing action of the chip some distance from the cutting edge.

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- PRODUCTION MACHINE SHOP _____ ●
- FOUNDRY _____ ●
- HEAT TREATING OR ANNEALING _____ ●
- FORGING _____ ●
- SHEET METALWORKING (Stamping, Forming or Drawing) _____ ●
- PLATE OR STRUCTURAL SHOP _____ ●
- DIE CASTING _____ ●
- MAINTENANCE WELDING _____ ●
- PRODUCTION WELDING _____ ●
- PICKLING _____ ●
- METAL WASHING OR DEGREASING _____ ●
- SAND BLASTING _____ ●
- ELECTROPLATING _____ ●
- GALVANIZING OR TINNING _____ ●
- BUFFING AND POLISHING _____ ●
- PAINTING, LACQUERING, ETC. (on Product) _____ ●
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USUALLY thought of as *one* market, the giant metalworking and metalproducing industry actually contains many huge and important markets.

Visualize the postwar possibilities of just a few—automobiles, electrical appliances, building hardware, metal kitchen equipment, heating and ventilating, etc. Scan the list of industries and operations. Note the scope and importance of many of them to your postwar sales.

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- **FURNACES AND KILNS—Metallurgical Industrial**
- **AUTOMOBILE AND AIRCRAFT ACCESSORIES**
- **PARTS—Auto and Machine**
- **AUTO BODIES, TRUCK BODIES, TRAILERS, AIRCRAFT FUSELAGES**
- **SMALL TOOLS, CUTLERY AND FLATWEAR**
- **STEAM SPECIALTIES AND VALVES, PLUMBERS SUPPLIES**
- **AGRICULTURAL IMPLEMENTS**
- **CONTRACTORS EQUIPMENT**
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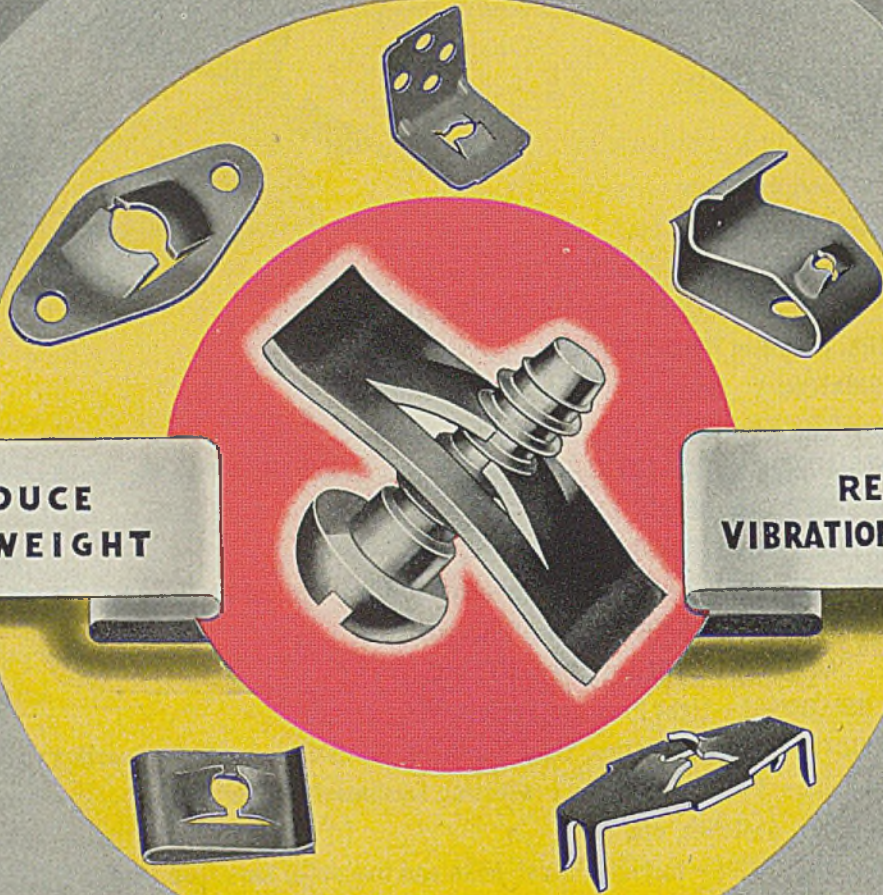
Write for your copy of "Markets After the War", an interesting new postwar study just completed. STEEL's research director has interpreted in chart form some of the problems facing industry. Charted also is the year-to-year relation of the metalworking industry to total business volume. You can use this study as a help in your own postwar planning.

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(Concluded from Page 94)

in the lap of the Army Air Forces. If the AAF, for example, should decide that for a time the bulk of the plant's output should be shipped knocked down to assembly plants in the Southwest, then it might even be necessary to close down part of the final assembly lines at the plant and concentrate attention principally on getting out the K.D.'s for Texas and Oklahoma.

Willow Run is now the largest single producer of four-motor bombers (assembled and knocked down) in the entire world, if a superlative is necessary in considering the plant activity. How much farther it will go in this direction, even with top employment not much over 40,000, remains to be seen. Potentially, with the new system of tributary supply plants fitting into the picture, it could proceed a considerable distance, perhaps to something like 500 bombers a month. There remains, of course, the very vital question as to whether this many B-24s are needed from a strategic standpoint in this length of time; also of whether additional design changes may be in place in production, thus slowing assemblies (right now the switch to a thermal de-icer system in wings and fins is no small revision to swallow).

Even now the B-24s coming from Willow Run are vastly different than the first ones off the line there. Nacelle designs have been changed several times. A new retractable ball turret in the belly called for major engineering revisions. Recently the Emerson electric turret has been installed in the nose, giving the nose gunner two 0.50-caliber machine guns mounted in a turret and capable of being swung to the right or left, up or down, almost instantly by means of an electric drive mechanism. Numerous changes have been made in the number and types of oxygen bottles and their supply system mounted inside the fuselage to furnish breathing oxygen for the crew. And along with these readily distinguishable changes has been a steady stream of minor modifications and revisions which the Air Forces throw in the specifications hopper and expect to see emerging on the assembly line almost immediately, often failing to realize the enormous amount of detail involved between blueprints and assembled bombers.

Handling of knockdown shipments to assembly plants in the Southwest has not been the least of Willow Run's headaches. A fleet of 75 specially designed oversize trailers, each accommodating the elements of a single ship, is now in service, shuttling back and forth between Michigan and Texas. However, this fleet has been hard pressed to keep up with shipments and so rail transport has supplemented their service. Center wing sections, for example, are shipped flat, three to a flat car, with suitable blocking between them. Fuselage sections are shipped one to a flat car. Even with this help, however, more trailers could be used advantageously, but their construction has been delayed because of difficulties over materials allocations.

The transfer of subassemblies to plants outside Willow Run naturally is going to add further complications to the shipping problem, particularly as winter weather advances. However, there is no feeling on the part of Willow Run production officials that these cannot be taken in stride, and they maintain that the switch from a fairly completely integrated operation to the new plan is being made with no adverse effects on final assemblies.

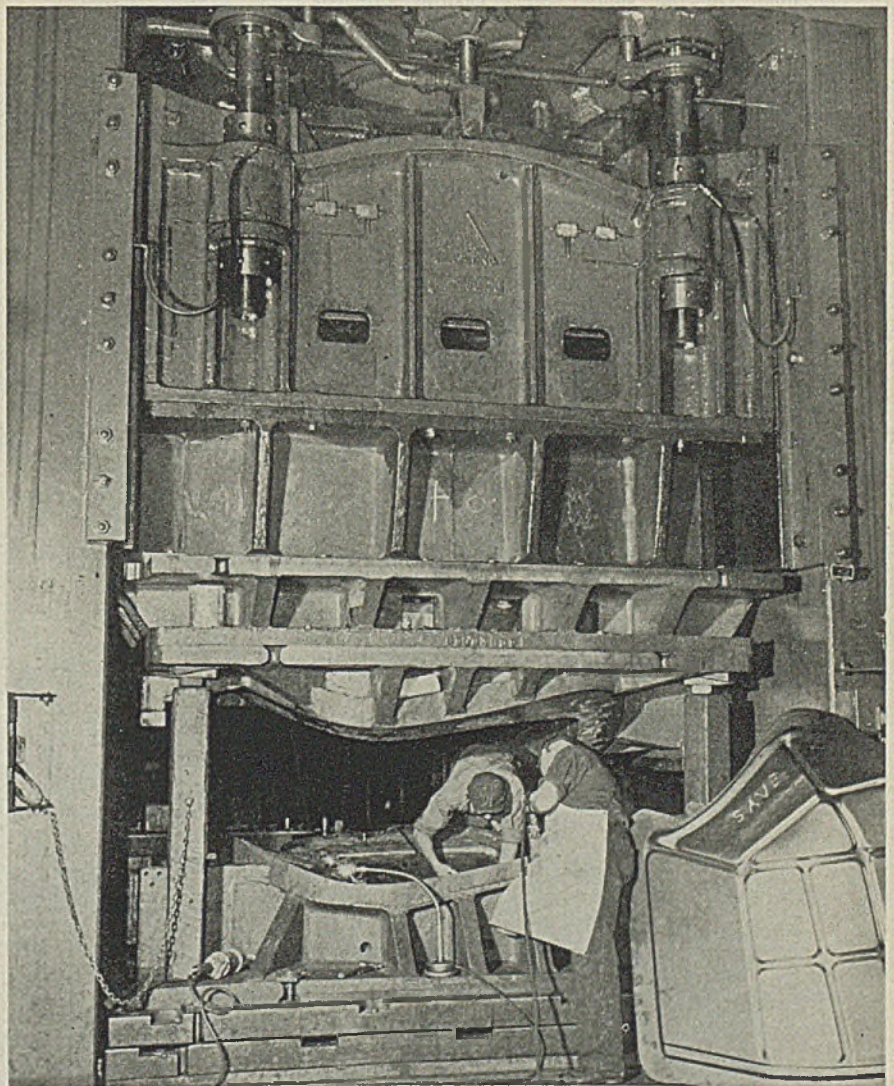
As the visitor stands in the bright October sun and views the broad panorama of manufacturing buildings, hangars, training school, administration building and other units of the Willow Run landscape, he finds his thoughts turning inescapably to the postwar role of this vast undertaking. Totalling up a maze of conflicting opinion and sprinkling liberally with conservative salt, the outlook, as seen by this writer, may be something like this: Willow Run will continue to be an Army bomber plant, either as standby or on a limited production basis, employing say, 10,000. It is virtually inconceivable to this observer that Ford will ever take over the plant, even on

the most generous basis, for manufacture of automobiles, and right now you can bet the smart automobile manufacturers are not swarming to get into the postwar aviation business, with 90 per cent of its bottom scheduled to drop out. Furthermore, at least as far as this war is concerned, it is difficult to see anything but B-24s or slight modifications thereof, rolling out of Willow Run.

U. S. To Reduce Plant Expansion in 1944

Government-financed expansion of industrial plant facilities will be sharply curtailed in 1944. Preliminary estimates indicate the government will spend only \$1,920,000,000 for facilities, less than half the \$4,770,000,000 spent in 1943.

This year, government spending for iron and steel expansion is estimated at \$605,000,000 and next year at \$220,000,000. For nonferrous metals facilities, \$540,000,000 was spent in 1943, compared with an estimated \$240,000,000 for 1944.



Typical large autobody press at Willow Run equipped with alloy iron dies, forms the frame for the pilot's enclosure in a single stamping, shown at right, eliminating composite construction

Fiftieth Milestone Observed by Large Midwestern Steelmaker

Completes half-century of operations with new record ingot production. . . Story is saga of American industry. . . From small beginning company has grown into fully integrated producer pouring 3,400,000 tons of ingots annually

INLAND STEEL CO., Chicago, last week observed the fiftieth anniversary of its founding. And it marked the event by reporting a new monthly record of ingot production, its Indiana Harbor works in October beating its previous recording production in March by 2738 tons.

The story of Inland Steel is a saga of American industry. From its beginning in 1893 with 40 carloads of miscellaneous machinery and no plant, the company developed into an integrated steel producer pouring 3,400,000 tons a year.

The company's story has been told before but it is worth repeating.

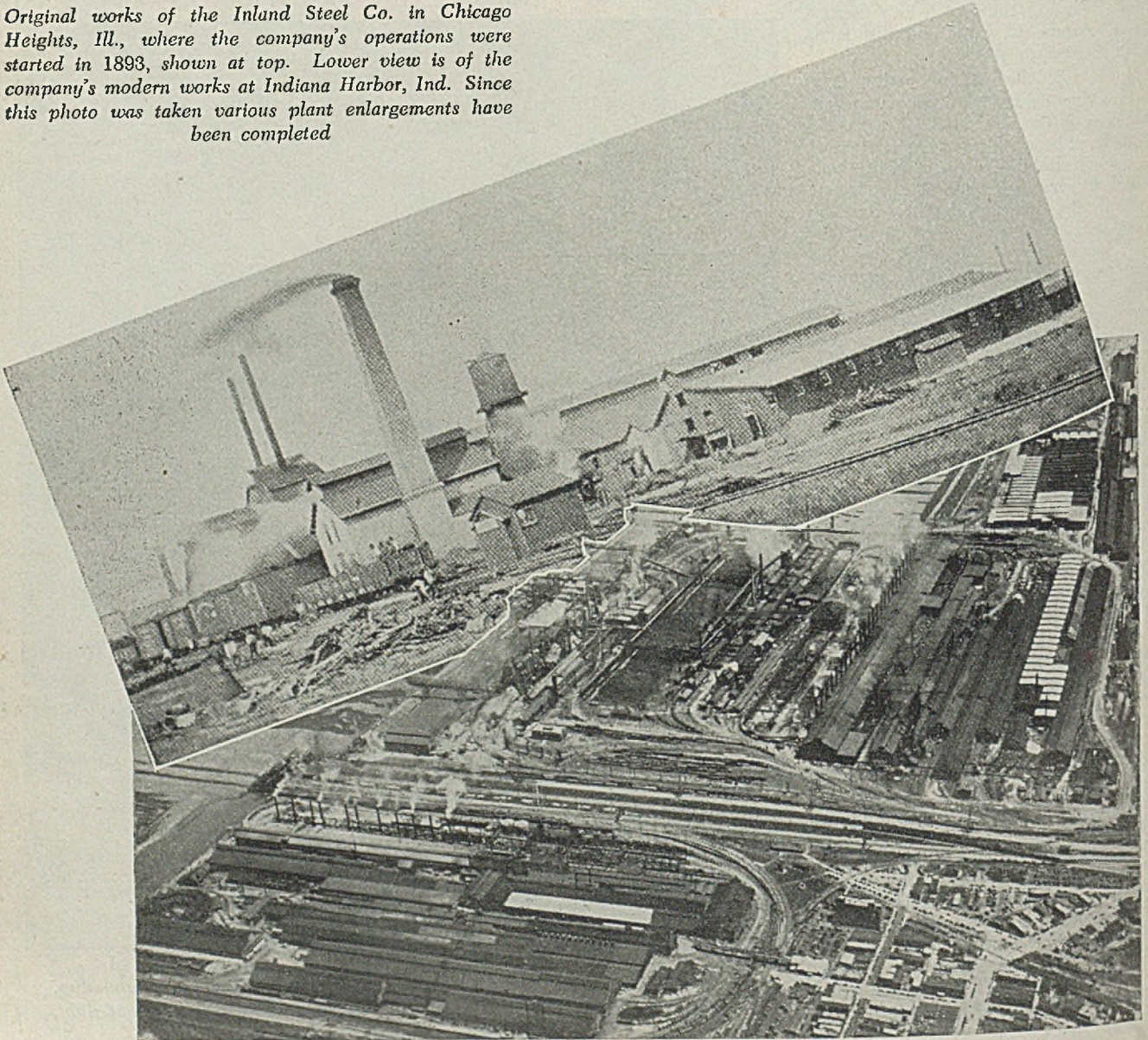
It took great courage and faith to launch a new business venture in 1893. That was a year of business panic when established steel companies were having a difficult time getting sufficient business on their books to keep in operation. Undaunted by the outlook, however, eight men with limited capital, but unlimited faith in the future of the nation, met in Chicago to map plans for engaging in the steel business. Chief among the or-

ganizers were: Joseph Block, a Cincinnati iron merchant; Joseph E. Porter of Ottawa, Ill., a tool manufacturer and Inland's first president; George H. Jones, a hardware salesman who became first vice president; and P. D. Block, 22-year old son of Joseph, who was named treasurer and works manager and who later became Inland's president and headed the company for 22 years in its great period of expansion. L. E. Block and E. J. Block, other sons of Joseph Block, joined the firm's official family a few years later.

Inland's operations began on six acres of land in Chicago Heights, Ill. Seven years later it acquired 50 acres of wasteland at Indiana Harbor, Ind., as a gift from the East Chicago Land Co., with the understanding Inland would spend a million dollars in plant development. By purchase and exercise of riparian rights, the company added acreage through the years. Today Inland's main steel plant covers more than 680 acres.

At Chicago Heights the company's products had been small bars, cross-arm

Original works of the Inland Steel Co. in Chicago Heights, Ill., where the company's operations were started in 1893, shown at top. Lower view is of the company's modern works at Indiana Harbor, Ind. Since this photo was taken various plant enlargements have been completed



braces, harrow teeth and other agricultural shapes, produced from railroad rails. At Indiana Harbor, at the turn of the century, Inland began large scale steel production.

Original units at Indiana Harbor were four open-hearth furnaces, a 32-inch blooming mill, a 24-inch universal bar mill and seven old-fashioned sheet mills. Three of the furnaces began operation in 1902 and the fourth the following year. Total annual capacity was about 20,000 tons.

Inland around the turn of the century began to develop into a unified organization as nearly as possible independent of outside supplies. This led to purchase of the Laura iron ore mine at Hibbing, Minn., in 1906. The first blast furnace was blown in the next year, and in 1912 its first coke ovens were built.

At the time of the first World War the fast-growing firm had acquired a fleet of ore boats and a well-developed harbor. Electrification of Inland's mills began under direction of Wilfred Sykes, who is today Inland's president, was completed in 1926. Limestone quarries were acquired two years later.

In 1930 coal mines were acquired at Wheelwright, Ky., and with them the town of Wheelwright, which Inland converted into a model mining town.

Increased outlets for Inland products were secured when the warehousing firm, Joseph T. Ryerson & Sons Inc., Chicago, became a subsidiary in 1935, and with the acquisition of the Milcor Steel Co., Milwaukee, in 1936. Ryerson's warehouses are located in ten key cities of the Middle West and the East. This merger brought to Inland its present chairman of the board, Edward L. Ryerson.

In 1939 an outlet for Inland's increased production of sheets was acquired with purchase of Wilson & Bennett Mfg. Co., now the Inland Steel Container Corp., with plants in Chicago, Jersey City, New Orleans and Richmond, Calif.

In addition to expansion through acquisition of these subsidiaries, Inland added to its production facilities galvanizing pots, continuous sheet and strip mills, rail and structural rolling mill, blooming mills, and a continuous merchant bar mill, new open hearth and blast furnaces, a coke by-products plant, and electrolytic tinning units.

With the purchase recently of the Hillside fluorspar mines in Rosiclare, Ill., Inland's integration of raw material sources was completed. Today it is independent, from the mining of ore, coal and limestone to delivery of finished products to the industrial consumer.

In the process of becoming a leading and independent producer in a field dominated by large companies, Inland has spent many millions out of earnings for improvements and additions. By the end of 1942 it had increased its production from 5500 tons in its first year to well over 3,000,000 tons.

Currently involved in maximum production for war, Inland has been anticipating pentup demands for postwar construction, residential building, household equipment and automobiles.

At the start of its second fifty years the company is ready for quick conversion to peacetime production, which it anticipates will be extensive and contributory to a better world.

Dispel Optimism About Civilian Goods Production

The Cleveland regional office, War Production Board, and the Smaller War Plants Corp. point out that the preliminary announcement of a program for manufacturing products for civilian use in 1944 has been interpreted with too much optimism by many small businessmen.

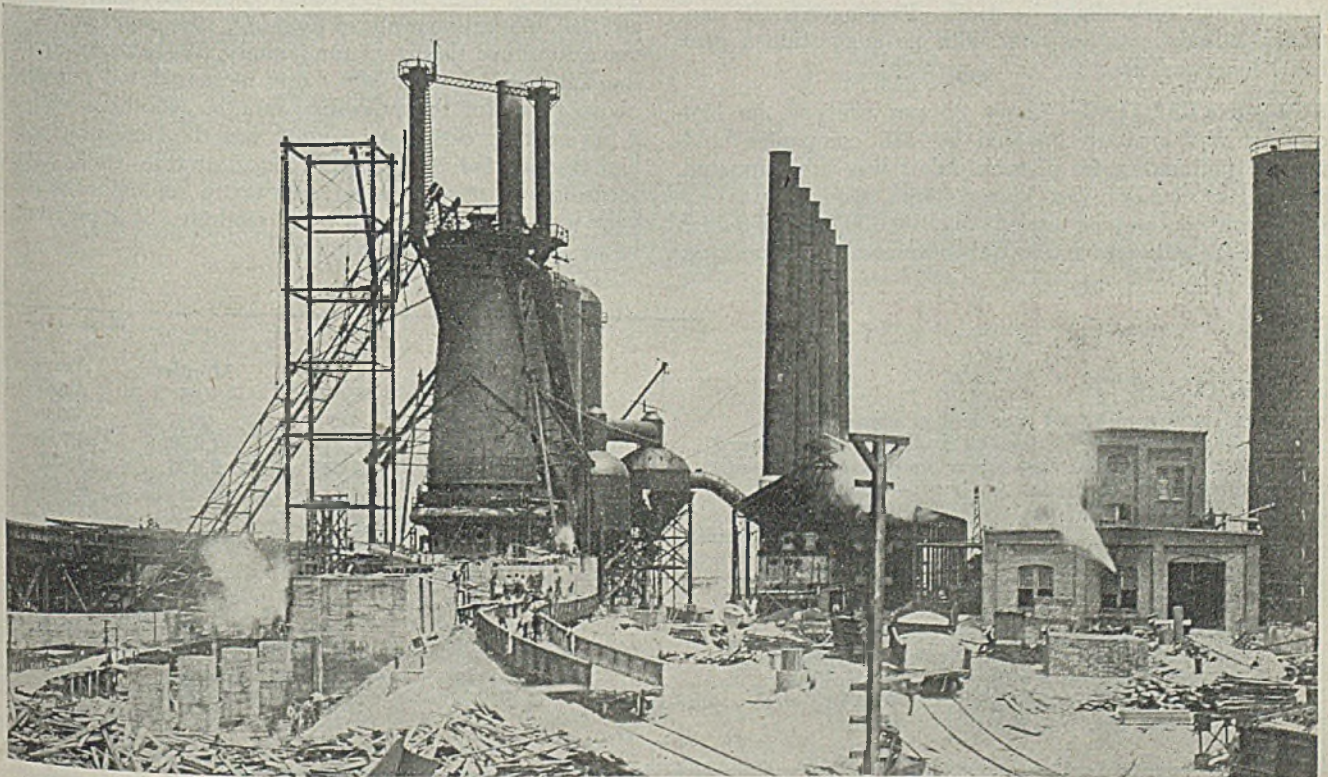
Extent of production of civilian goods relating to the health, safety and general welfare of the population will be determined only after war needs have been met, the agencies report. Little excess material will remain for the Office of Civilian Requirements' projected program in 1944 inasmuch as the 1944 production schedule calls for about \$72,000,000,000 in war goods.

War Congress of Industry Scheduled for Dec. 8-10

Second War Congress of American Industry, forty-eighth annual convention of the National Association of Manufacturers, will be held Dec. 8, 9 and 10, at the Waldorf-Astoria hotel, New York. Theme of the Congress will be: "Production for victory and postwar jobs."

Four of the headliners scheduled to speak are: Donald M. Nelson, chairman, War Production Board; Joseph D. Eastman, director of ODT; Wilfred Sykes, president, Inland Steel Co., Chicago, and Tom M. Girdler, chairman, Consolidated-Vultee Aircraft Corp. and Republic Steel Corp.

Inland Steel's first blast furnace went into operation in 1907 at Indiana Harbor. Shown here is a view of the original stack in the course of construction



Industry Ponders Future In Face of Uncertainties

INDUSTRY, confronted by labor crises and other potential threats to wartime production and postwar progress, this week looks speculatively toward the future. How quickly will effects of a nationwide coal strike be reflected in war goods output figures? To what extent will release of surplus stocks of government-owned steel and other products—already started—affect industry's sales volume?

One reassuring factor is October's production record of 8362 planes, compared with the previous high of 7612 units produced in August, as announced by the War Production Board. Furthermore, average weight per plane was nine pounds greater than for September production.

Production levels are being maintained fairly consistently. Average daily petroleum output declined somewhat for the week ending Oct. 30, and production of automobiles and trucks showed a good increase. Construction volume registered a sharp reduction.

RAILROAD EARNINGS, TRAFFIC—For the fourth consecutive month class I railroads recorded a decline in net earnings, showing for September an estimated total net of \$69,700,000, or 51.4 per cent of the \$135,538,275 earned last September. Estimated net income for the first nine months of 1943 was \$681,400,000, compared with \$709,230,885 for the corresponding period of 1942. Rate of return on railroads' property investment for the twelve months ending Sept. 30 averaged 5.86 per cent, against 4.57 per cent for the equivalent period ending Sept. 30, 1942.

Revenue freight carloadings are showing a tendency to level off, but reports indicate the ton-mile figure will continue to record an increase. The increase, and the higher grade of freight traffic being handled, will probably result in maintaining the amount of freight revenue even though carloadings level off. Passenger traffic continues at maximum capacity with no suggestion a peak has been reached.

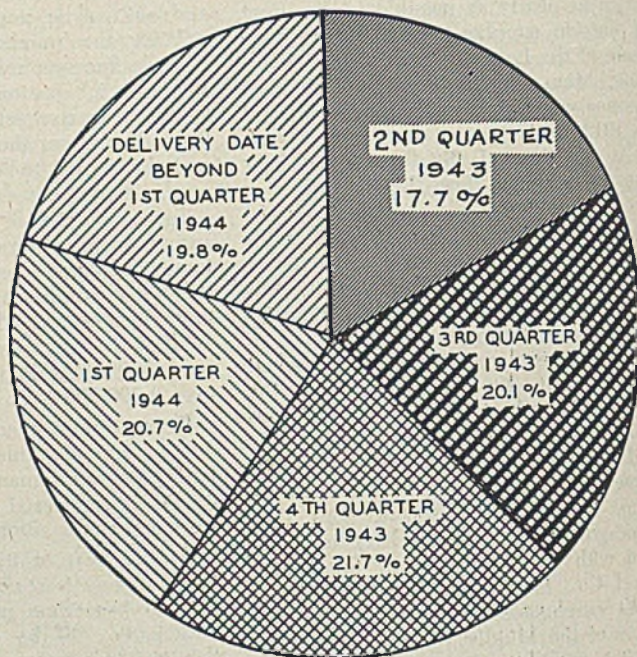
SUBCONTRACTING—About 35 per cent of the first-quarter war business handled by 289 companies holding the preponderance of such orders was subcontracted, reports the Smaller War Plants Corp. Contracts to major prime contractors totaled \$11,100,000,000, of which \$3,800,000,000 represented subcontracts. In turn, large

subcontractors derived about 13 per cent of their production from further subcontracting.

The 354 prime contractors (including 65 raw-material companies) had \$65,400,000,000 of unfilled orders on their books when the survey was made. About one contractor in every three indicated his volume of subcontracting would soon be expanded.

LIVING COSTS—Department of Labor index of living costs stands at 123.7 per cent for September (base, 1935-

DISTRIBUTION OF DELIVERY SCHEDULES OF UNFILLED ORDERS OF PRIME CONTRACTORS
\$63.4 BILLION=100%▲



▲ INCLUDES AN ADDITIONAL 65 RAW MATERIAL COMPANIES

Chart by the Conference Board

39 average). This is 5 per cent higher than for September of 1942, 6.5 per cent above the May, 1942 level, and 22.5 per cent above the figure for January, 1941, base date for the Little Steel formula. Costs increased 0.4 per cent above those for the preceding month. Clothing, with a 2 per cent increase since August, was the largest factor in higher costs for September. Since August, 1939, items recording greatest price increase up to September of this year are: Food, 47.0 per cent; clothing, 31.1 per cent; home furnishings, 25.5 per cent.

FIGURES THIS WEEK

INDUSTRY

	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity).....	99.5	99.5	99.5	99.0
Electric Power Distributed (million kilowatt hours).....	4,415	4,415	4,359	3,753
Bituminous Coal Production (daily av.—1000 tons).....	1,912	1,950	2,026	1,943
Petroleum Production (daily av.—1000 bbls.).....	4,383	4,415	4,324	3,901
Construction Volume (ENR—unit \$1,000,000).....	\$32.0	\$50.8	\$50.7	\$103.3
Automobile and Truck Output (Ward's—number units).....	19,135	17,785	21,265	20,925

*Dates on request.

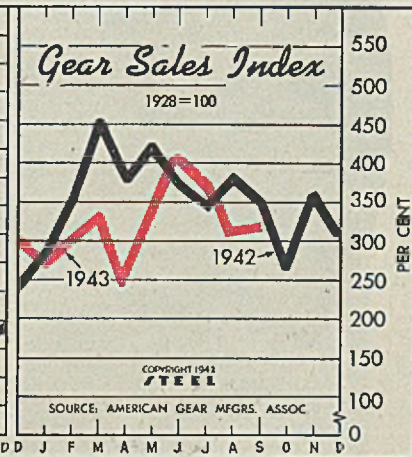
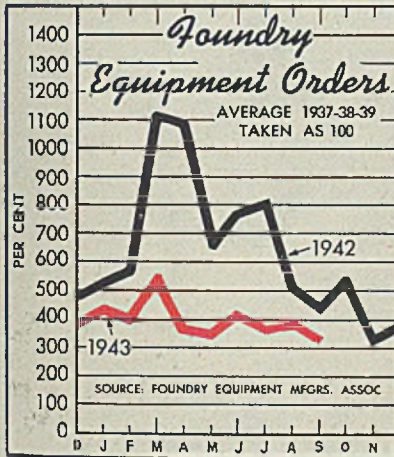
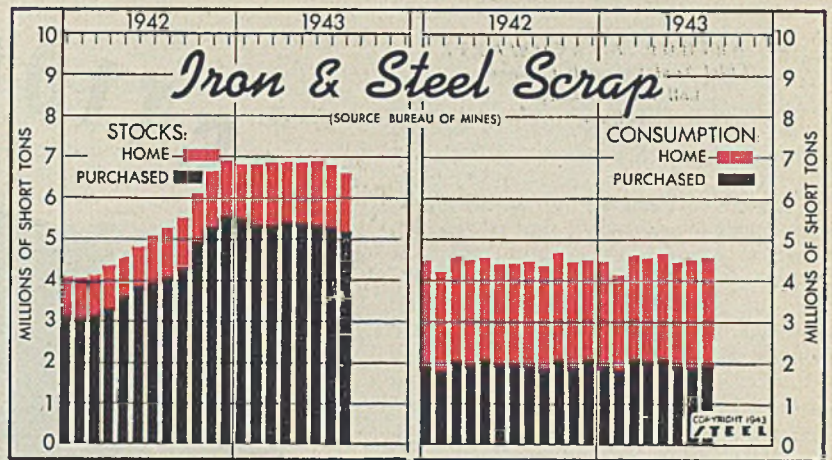
TRADE

Freight Carloadings (unit—1000 cars).....	904†	906	911	912
Business Failures (Dun & Bradstreet, number).....	49	34	42	85
Money in Circulation (in millions of dollars)†.....	\$19,090	\$19,019	\$18,818	\$14,082
Department Store Sales (change from like week a year ago)†.....	+13%	+9%	+17%	+17%

†Preliminary. ‡Federal Reserve Board.

Iron and Steel Scrap
Bureau of Mines
(Gross tons—000 omitted)

	Consumers' Stocks		Total Consumption	
	1943	1942	1943	1942
Jan.	6,877	3,503	4,492	4,956
Feb.	6,871	3,455	4,178	4,708
Mar.	6,850	3,460	4,787	5,221
Apr.	6,918	3,582	4,642	5,156
May	6,905	3,972	4,723	5,225
June	6,916	4,297	4,493	5,000
July	6,860	4,579	4,670	5,006
Aug.	6,778	5,279	4,686	4,478
Sept. ....	.....	4,993	.....	4,955
Oct. ....	.....	5,530	.....	5,342
Nov. ....	.....	6,078	.....	4,930
Dec. ....	.....	6,274	.....	5,037
Total ...	54,503	.....	60,551	.....



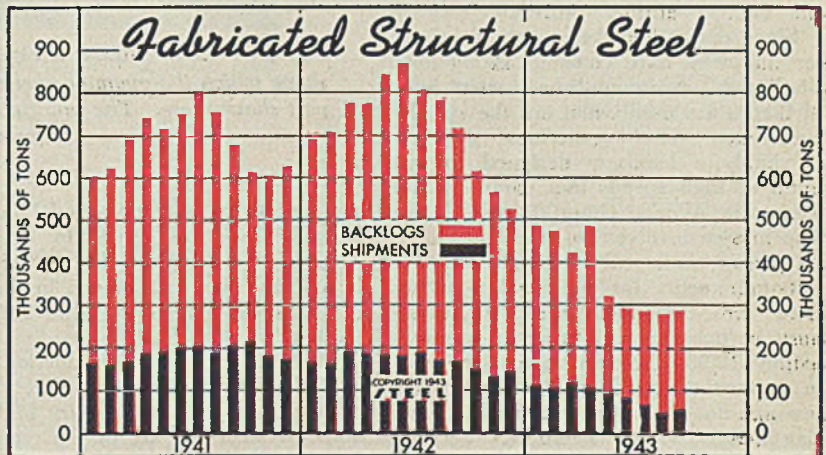
Foundry Equipment and Gear Sales

	Monthly Average (1937-38-39=100)		Index (1928=100)	
	1943	1942	1943	1942
Jan.	429.8	532.7	268	288
Feb.	399.5	567.9	303	353
Mar.	562.7	1122.4	334	455
Apr.	362.7	1089.3	240	378
May	348.9	653.6	342	421
June	413.6	774.0	401	373
July	379.4	800.8	374	344
Aug.	390.4	510.8	312	380
Sept.	346.6	446.4	320	351
Oct. ....	.....	540.6	.....	263
Nov. ....	.....	338.8	.....	359
Dec. ....	.....	382.5	.....	300
Year ....	.....	646.7 Ave. ....	.....	355

Fabricated Structural Steel†
(1000 tons)

	Shipments			Backlogs		
	1943	1942	1941	1943	1942	1941
Jan.	109.9	167.8	164.8	489.3	704.4	601.5
Feb.	109.1	184.6	181.4	475.6	708.7	624.2
Mar.	113.3	191.3	170.2	424.4	777.7	697.2
Apr.	102.5	187.2	189.8	385.3	772.4	741.9
May	94.9	184.2	191.9	306.6	843.8	718.9
June	81.8	182.7	200.5	290.3	849.8	747.4
July	61.9	189.9	203.0	286.3	808.6	802.7
Aug.	52.6	173.9	189.3	281.5	783.5	754.5
Sept.	56.4	169.8	204.1	294.2	716.0	678.5
Oct. ....	.....	152.9	217.7	.....	617.7	614.4
Nov. ....	.....	130.4	182.8	.....	566.6	602.9
Dec. ....	.....	145.3	176.1	.....	523.5	626.0

†Source: American Institute of Steel Construction.



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—billions).....	\$8,897	\$9,991	\$9,322	\$7,120
Federal Gross Debt (billions).....	\$168.9	\$168.6	\$160.7	\$96.3
Bond Volume, NYSE (millions).....	\$51.8	\$68.8	\$41.8	\$48.0
Stock Sales, NYSE (thousands).....	4,144	3,238	3,096	3,077
Loans and Investments (millions)†.....	\$53,477	\$51,648	\$50,124	\$37,549
United States Government Obligations Held (millions)†.....	\$38,682	\$36,698	\$35,947	\$23,786

†Member banks, Federal Reserve System.

PRICES

	Latest Period*	Prior Week	Month Ago	Year Ago
STEEL's composite finished steel price average.....	\$56.73	\$56.73	\$56.73	\$56.73
Spot Commodity Index (Moody's, 15 items)†.....	247.2	247.6	248.7	232.5
Industrial Raw Materials (Bureau of Labor index)†.....	112.2	112.2	112.6	102.8
Manufactured Products (Bureau of Labor index)†.....	100.3	100.3	100.1	99.8

*1931 = 100; Friday series. †1926 = 100.

By ARTHUR A. SCHWARTZ
Chief Tool Research Engineer
Bell Aircraft Corp.
Buffalo

FRICITION CUTTING

A STRANGER scanning the mail basket on this desk any morning would quite naturally form the opinion that a new "magic saw" has been developed here, because practically every day requests come in for information regarding friction cutting. Truth of the matter is that the machine many have dubbed the "magic saw" is nothing more than a bandsaw operated at extremely high speeds.

By accelerating the speed of the conventional bandsaw, metals and other materials, including cutting files, armor plate and plastics, may be cut without difficulty. In a paper presented before the American Society of Tool Engineers in Milwaukee in March (STEEL April 5, 1943, p. 68) I mentioned this fact. From that innocent statement has been born the mythical "magic saw", in reality, the friction cutting process.

Since that Milwaukee meeting, countless inquiries have come in asking how the "trick" is accomplished, what kind of blades are used, what are the speeds, feeds, etc. The "mysterious" machine is simply a bandsaw designed to operate at high speeds and made by the Tannewitz Works, Grand Rapids, Mich. The process involves no special machine, no special blade and no special setup.

Requirements for the friction-cutting "saw" are threefold. First, the blade must be operated at a speed of approximately 12,000 feet per minute or more in contrast to speeds of 100 to 500 feet per minute ordinarily employed in cutting metals with a bandsaw. Second, the blade must be made of such material as will stand flexing around the bandsaw wheels for a considerable period of time and the teeth must be partially worn. Third, the machine must have adequate safety guards, including a complete enclosure for the blade except at the section actually in use.

In running at a speed of around 12,000 feet per minute, the saw generates sufficient heat through the sliding action of the teeth to melt the metal being severed. In view of the heat generated, it might be assumed that it would affect the structure of the metal cut as well as the saw blade itself as in the case of ordinary metal bandsaw cutting. This is not the case for, although the cut or "slit" is actually burned, the heat penetration at the edge of the metal is so



Fig. 1—Friction process is especially advantageous for cutting pieces of odd shape which the operator may manipulate freely as in the case of the aircraft part shown here. The saw runs at 12,000 feet per minute against 100 to 500 for usual metal cutting

slight as to be negligible and "blue" or burned areas are rarely in evidence. This has been proved by cutting files in half and then using them in the normal manner right up to the verge of the cut.

The blades used in production work at Bell, largely involving sheet metal cutting, are made of ordinary high carbon saw steel and are of the type used for sawing wood. For this work, blades with 8 to 14 teeth per inch are used, and operators report best results are obtained when the teeth are about one-third worn. In fact, dubbing off sharp teeth actually improves the cutting or burning action. Temper of the blades should be a little on the soft side of usual spring temper. Blades with 6 to 10 teeth per inch seem to be better suited for cutting heavier sections.

The above does not mean that other blades with different teeth will not work. In some instances, others might work out even better—depending, of course, on the job to be done.

There is no such thing as feed in employing the process. A friction operation only is involved and

friction depends upon pressure. Pressure of about 20 pounds per inch depth of kerf works out to best advantage, it has been found, and operators try to maintain that pressure which, of course, may vary within reasonable limits.

In cutting stainless steel or aluminum alloy 1/16-inch thick, the speed of the operation is limited only by the ability of the operator to pass the metal through the saw.

One of the most important advantages lies in the fact that it is not necessary to hold the work solidly against the saw bed during the cutting operation. So slight is the resistance of the metal to the whirling saw band that the operator may freely manipulate pieces of odd shape in cutting irregular patterns.

Life of the saw blades in use at Bell averages about 24 hours of continuous cutting time on light metal. Oddly enough, the saw life is not limited by the wearing down of the teeth but by its ability to "take" flexing around the wheels which are constructed of solid steel 36 inches in diameter.

Friction cutting as employed by Bell, although it has become a regular produc-

... severs everything from armor plate to Christmas tree ornaments at extremely high speeds, is amazingly easy to control, requires only simple equipment and tooling

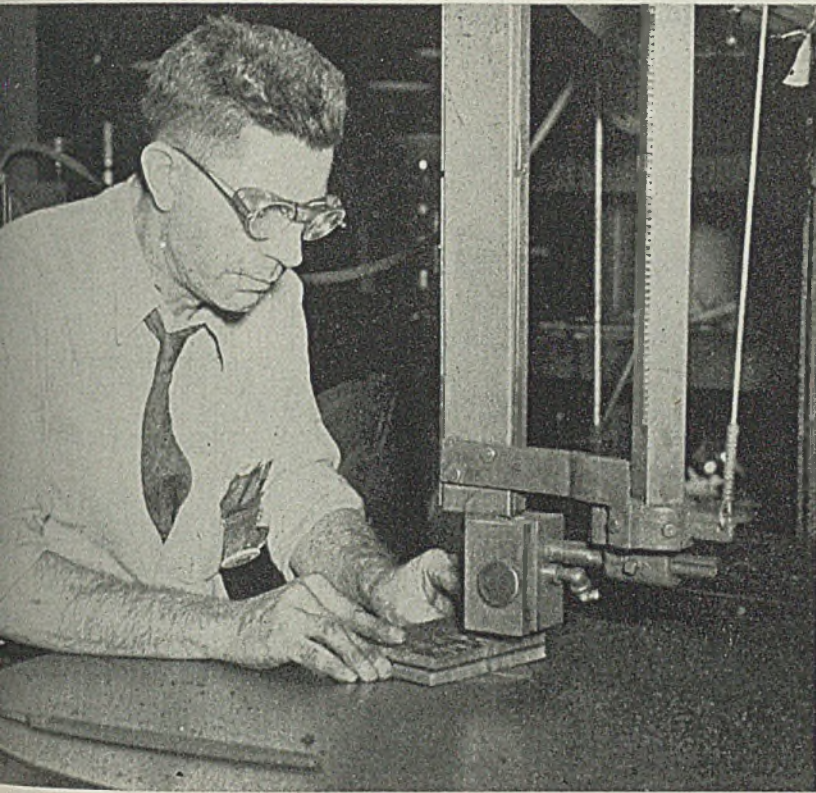


Fig. 2—Here the friction cutting saw is easily severing a piece of tough alloy steel. It will “burn” through the file at the operator’s right just as easily and without affecting the character of the material

tion technique, supplements rather than supersedes other metal cutting methods. The process is particularly advantageous for trimming, odd cutting jobs, shaping and other metal cutting operations where the number of pieces required is too small to warrant the cost of making stamping dies.

In production work, friction cutting is used in trimming formed parts of odd shape. The operation is conducted at a rapid rate because seldom does the saw operator rest the parts on the saw table. Nor, is it necessary to keep the work at right angles to the saw blade. It has been found that the angle makes no difference in friction cutting. Obviously, this speeds the work and allows the cutting of shapes that otherwise might present difficulties. Tests prove that scarfing cuts of any angle in any thickness of material can be made within limits of the machine.

Friction cutting does a remarkable job in trimming and other sawing operations for Bell, particularly on stainless steel parts. Eighteen machines are in use 22 hours a day, 7 days a week and maintenance has been very low.

Armor plate may be cut at the rate of about 14 inches per minute with a 10-tooth-per-inch saw. There are ac-

tually 1,440,000 tooth contacts with the material per minute which means that each tooth removes less than 0.00001-inch. There are no shavings.

Other companies already have found that the friction process provides the solution for difficult cutting problems. For example, a large company making a new and extremely tough laminated plastic material found the best a carbide tipped saw could do was to make an 18-inch cut in material 1½-inch thick. At that point the saw gave out. With friction cutting, the same material can be cut at the rate of about 18 inches a minute without damage to the blade.

Another interesting experiment performed was in cutting a piece of plate glass for a large glass manufacturing concern. Wet paper tape was placed ahead of the cut on both sides of the glass and surprisingly enough the glass did not crack. To prove further that friction cutting could be used in cutting glass, rings were cut from a thick bottle.

For a maker of aluminum, a bar 3 inches in diameter was severed in only 3½ seconds, proving that the saw will not run out but will make a straight cut provided the part is fed straight. In another case, a maker of a thin,

three-ply plastic material found it impossible to cut the plastic without bad fracture of the edge. The friction saw did the job without difficulty and with absolutely no fracture.

Regarding the fracture of materials, it has been found that even the thinnest and most brittle material can be cut without such fracture. As an extreme example, I believe it will be possible to cut fragile Christmas tree ornaments without the least fracture except at the immediate point of the cut.

One visitor brought a sample of a non-magnetic steel he believed could not be cut while another was just as certain a particular stainless steel could not be severed. Both were wrong. Still another produced some bronze pieces 4 and 5 inches thick. He was advised that this material could be cut by friction if he would build a special saw with 8-foot diameter wheels, providing a blade speed of about 18,000 feet per minute. Further, if a saw blade about 1½ inches wide were used it was felt that no trouble would be experienced provided slabs of the heavy material could be readily handled by the operator. Latest reports indicate that eight saws with these specifications have been built or are being built. It is assumed that the saws in use are performing satisfactorily.

Looking at the present status of friction cutting, I can say that while it serves well in many diversified industries in cutting many materials ranging from steel rails to overcoat cloth and insulation pads for refrigerators, it still is not a cure-all or a “cut-all”. For example, hard or soft rubber cannot be cut since “loading” occurs immediately and the saw breaks. Nor has it been possible to cut certain types of nonferrous alloy cutting tools, which do not provide sufficient friction. Other than these two items, everything submitted has been cut successfully provided the material was not over 1 or 1¼ inches thick.

It also has been found in cutting high carbon steels that the friction process is likely to result in hard spots in surfaces which have been in contact with the saw blade. I believe, however, that this problem could be overcome with proper attention to feeds and other factors.

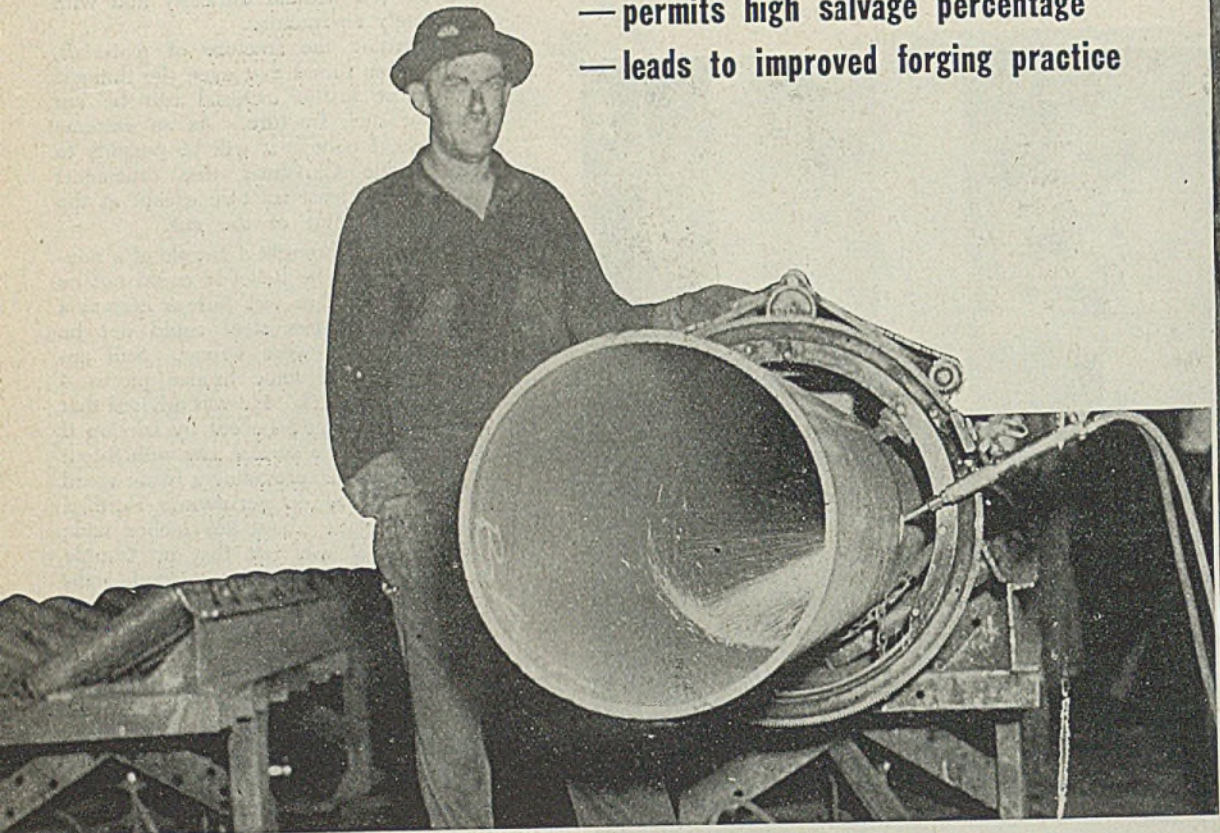
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A production increase of 25 to 50 per cent is reported to be obtained with the use of Speedaloy tools, manufactured by Tungsten Alloy Mfg. Co., Newark, N. J. According to the company, tools tipped with the new alloy can be run faster and used on all materials with exception of manganese steel and chilled iron, proving exceptionally suitable for chromium and nickel alloys, including stainless steel.

The alloy was developed to fill the gap between high-speed steels and tungsten carbide. It is a cast tungsten-chromium-cobalt alloy.

TWO-PIECE CASE DESIGN

- permits high salvage percentage
- leads to improved forging practice



Two-piece cases now in successful volume production permit reprocessing methods that are able to salvage most rejects, thus greatly decreasing amount of scrap. Plants making one-piece bomb cases send their rejects to Columbus for salvaging, because in the two-piece design any piece of tubing 17¼ inches or more in length can be utilized. In the one-piece design, all sections shorter than 57 inches must be scrapped

BACK in April, 1942, engineers from the Blaw-Knox Co. of Pittsburgh walked into the Ralston Steel Car Co. in Columbus, O., and proposed to officials of this latter plant, who had never come closer to a bomb than the news-reel at the neighborhood movie, that they should start work on an army order for two-piece 1000-pound bombs.

No new equipment was obtainable. No one had ever made a two-piece heavy bomb. Workers at the Ralston plant had no experience with producing anything more deadly than railroad cars.

Nevertheless, 45 working days after Blaw-Knox and Ralston first began to plan a bomb-making program, the first carload of two-piece bombs left the Columbus plant.

When Blaw-Knox engineers first surveyed the possibilities of the Ralston plant, there were only three old style, heavy duty, low clearance hydraulic presses on hand. These had been used

in fashioning railroad cars and were never thought to be adaptable to forging heavy bombs.

But the army was impatient for production. There was no time to buy new equipment, even if new equipment had been available. Therefore, the old equipment was rebuilt and adapted to this forging job in a reasonably short time.

So the engineers began to improvise. The decision to make this 1000-pound bomb in two pieces, something which had never been done before, meant that presses with low daylight clearance could be utilized. In another time-saving break with precedent, the engineers decided to utilize only a female die, using a process which required less pressure than in the method which employs both a male and female die.

In this one-die process, the nose of the bomb is heated to 1850 degrees Fahr. At this temperature, it is centered on a

platen and held in position by an ingenious set of spring clamps suggested by one of the colored workmen during the experimental period. The nose is forged by dropping a female die over the hot end to a position predetermined by rigidly set supporting blocks.

Each successive operation closes the nose from its original 18¾-inch diameter toward its final contour, which averages 2.5 inches at the blunt-pointed end. Originally eight such operations were necessary, but this number has been decreased to four as will be described more fully below.

Originally, the bomb casings were only forged in Columbus. The noses, which measure 33¾ inches in length, and the tails, 17¼ inches long, were shipped to the nine subcontractors in Indiana, Ohio and Western Pennsylvania to be machined.

Before going back to the job of re-conversion of the Columbus plants and discussing the way in which the companies have cut their scrap losses to what they believe is a record low, it might be helpful to trace the way in which the bombs are now being manufactured.

Step 1—Carbon steel tubing is shipped by the National Tube Co. to Columbus in lengths ranging from 22 to 33 feet. Diameter of the tubing is 18¾ inches.

Step 2—The tubing is carried by overhead cranes to racks and cut into proper

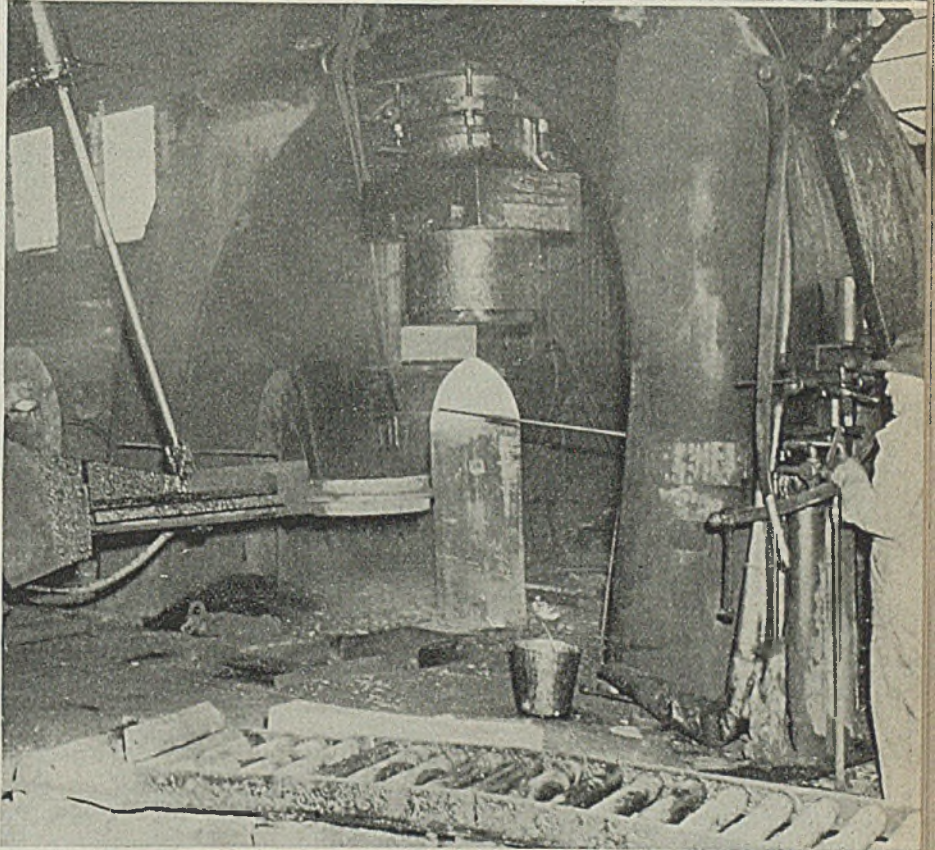
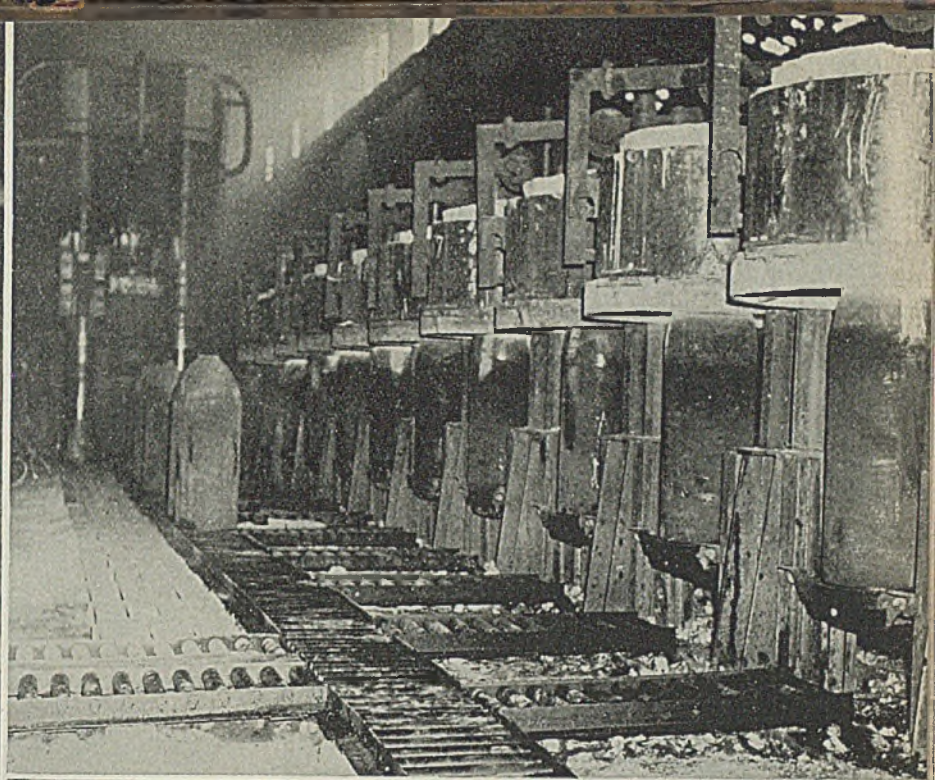
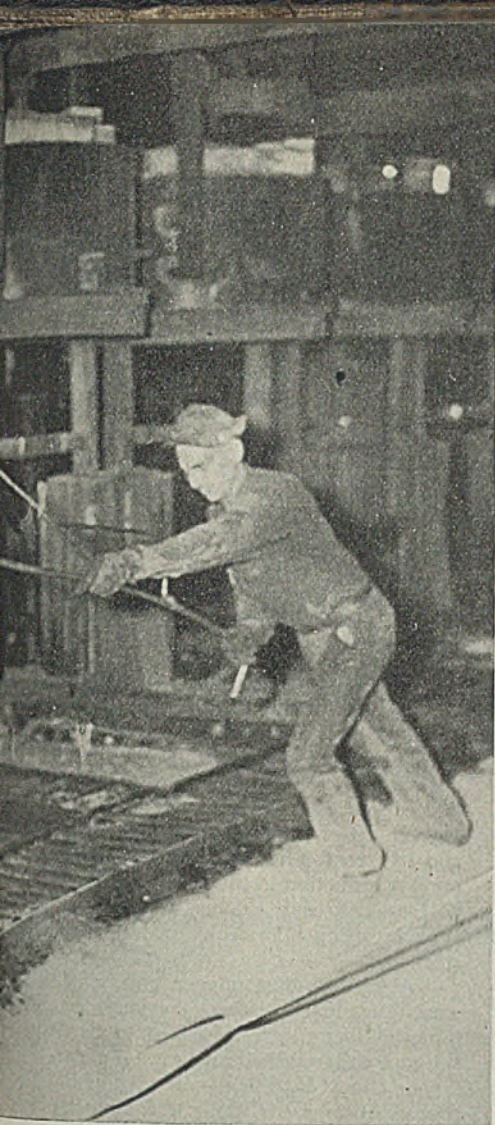


Fig. 1. (Left, opposite page)—This automatic machine is used to cut the tubing (see step 2) into correct lengths before forging operations begin

Fig. 2. (Directly above)—Heated length of tubing after removal from vertical furnace is pushed down roller conveyor to first nosing operation (step 4)

Fig. 3. (Right, above)—Coming from first nosing press in left rear, partly formed tubing travels down roller conveyors to the row of vertical gas-fired reheating furnaces before going on to the second nosing operation. Cases are raised into furnaces by pneumatic lifts. Battery of 20 of these furnaces is needed to feed one press (step 4)

Fig. 4. (Right, center)—Air-operated drop hammer for final nose forging operation has female die mounted on bottom of ram, uses male die inside the forging. Specially designed air lift feeds forgings to the press (step 5)

Fig. 5. (Right, below)—Horizontal gas-fired furnaces used to heat bomb tails for final forging. Note roller conveyor is in sections that rotate to facilitate pushing bombs into furnaces

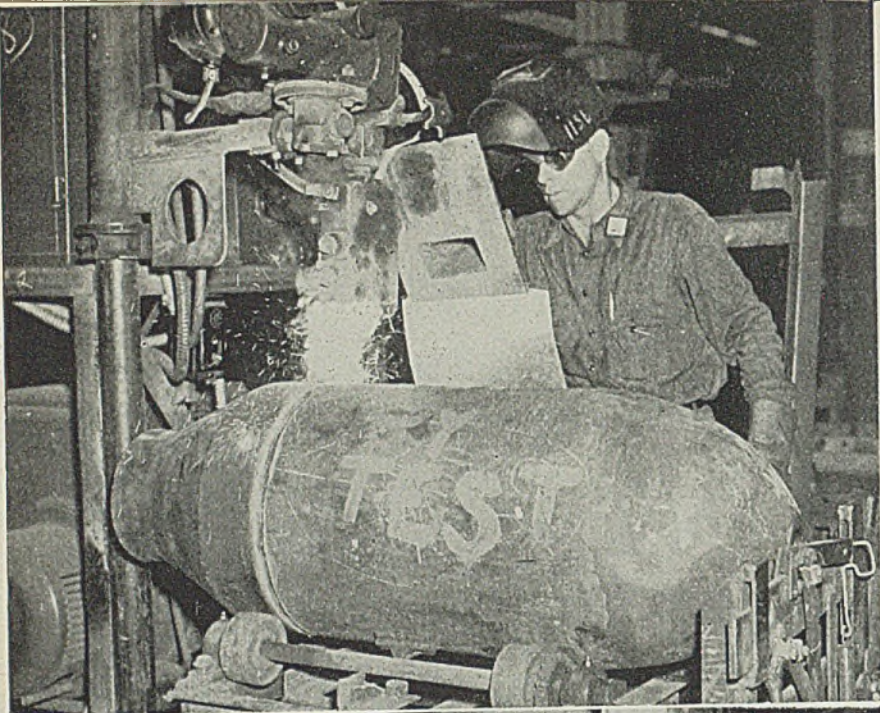


Fig. 6 (Top)—Nose and tail sections are joined by girth seam weld after tacking in position. Bomb is located on cradle by power while continuous seam is made by automatic arc welding machine

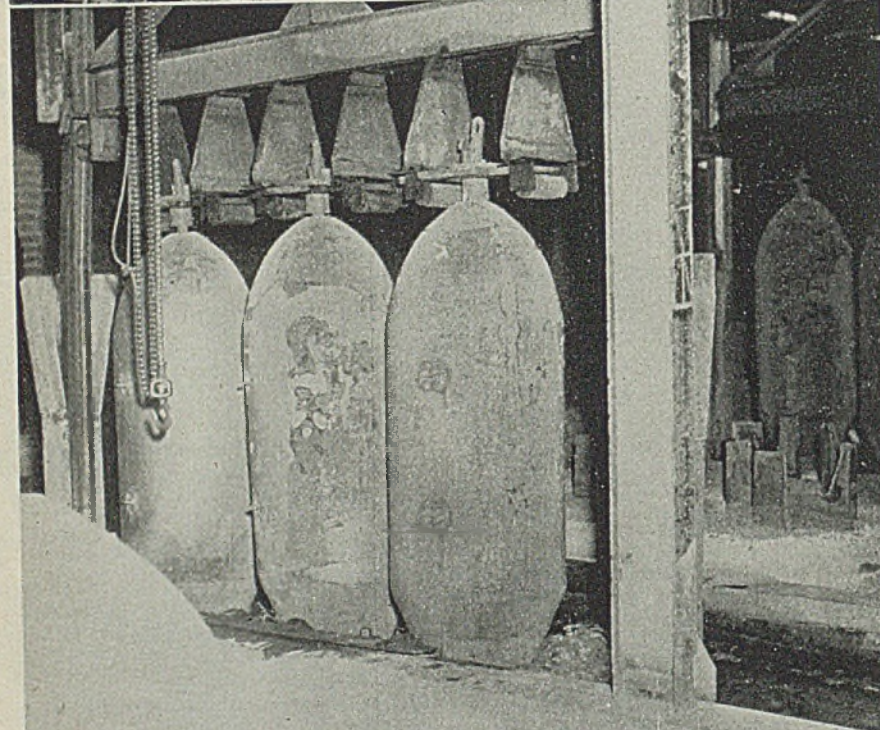
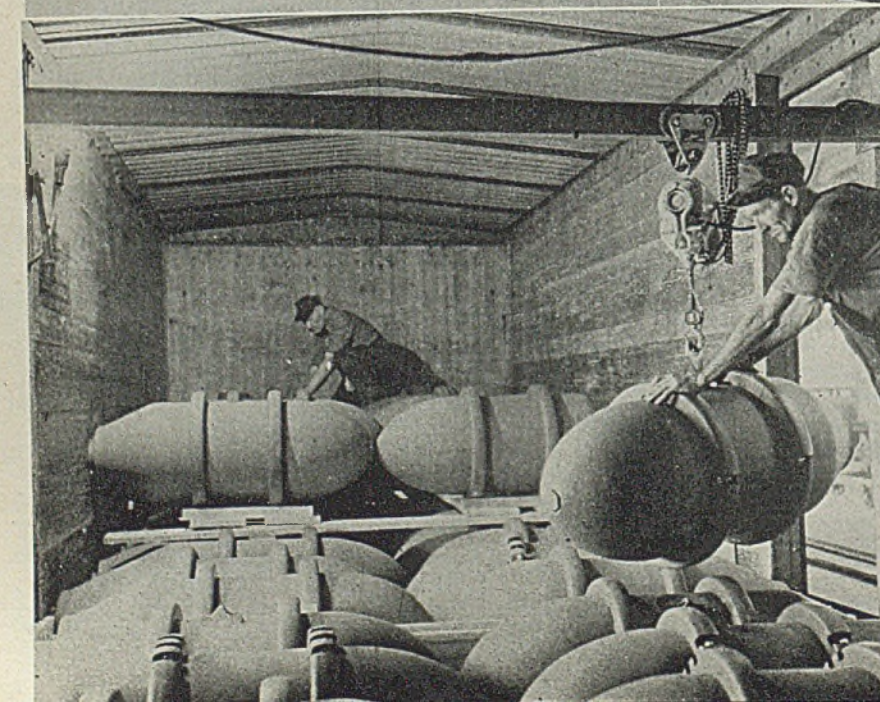


Fig. 7 (Center)—Bomb casings from the continuous furnace are lowered three at a time into the quench bath (step 10) shown here, using a special fixture for suspending them by the nose

Fig. 8 (Bottom)—Interior of box car showing how bombs are staggered and packed to get maximum number in the car. Note the dunnage (packing) used to prevent any movement in the car during shipment to loading plant



lengths (60 inches for a single-piece bomb, 44 inches for a separate nose and 17½ inches for a separate tail) by use of cut-off torches burning natural gas. Original experiments using acetylene gas and oxygen later gave way to natural gas and oxygen torches with resulting economy. A reduction in the size of the blow-hole, used to start the cut, was also possible by using this means of cutting the steel.

To guard against uneven cuts, a unit was designed consisting of a long, level table holding a series of rollers to permit the pipe to be pushed along it. A motor-driven chuck is at end end to turn the pipe. At intervals along the table are offset pairs of small wheels, mounted on air lifts. The cutting torch is stationary. When the pipe is in position, the wheels are raised and the entire piece of pipe given a complete turn. A small wheel attached to the tip of the torch rides on the tubing to insure an even cut regardless of variations in evenness of the pipe, for the torch tip remains at the same distance from the metal at all times.

Step 3—The pipe, once cut, must pass the first of a long series of inspections. The cut must have been square, at right angles to the pipe's axis, without flare or corrugation.

Step 4—The bomb proceeds to the first forging operation by means of metal roller conveyors.

Pushed manually in a vertical position on this conveyor to a point near a vertical brick furnace, the bomb is lifted into the furnace by a mechanism designed in the plant from converted hydraulic cylinders.

The bomb noses are heated for about 10 minutes to a temperature of 1850 degrees Fahr., then lowered by the mechanism just mentioned to a conveyor and pushed manually to the first press for forging.

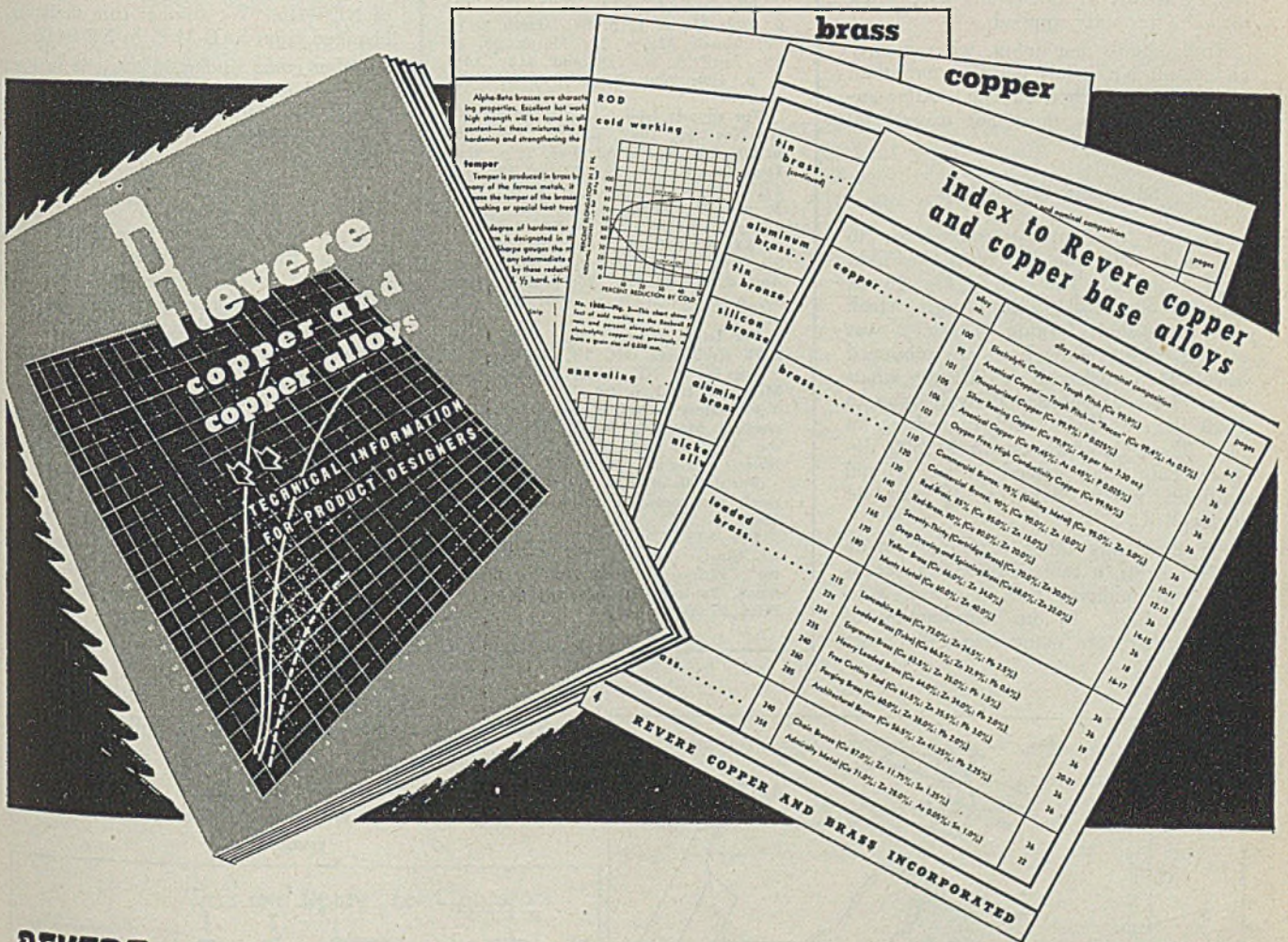
As mentioned previously, the casings are placed on a platen and held by a set of spring clamps while the heavy female die is pressed over the heated end of the pipe, forcing the metal into the desired shape. The bomb is removed and

(Please turn to Page 142)

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NE (National Emergency) ALLOY STEELS

By FRANK BORN

Chief Engineer

Warner Electric Brake Mfg. Co.
Beloit, Wis.

WHILE our experience with the NE steels has been somewhat limited, our use has shown the NE steels to be easier to heat treat, instead of harder as has been the experience of some users. We have found that while the hardness tester may show the same rockwell values as standard steels, the NE steels are usually tougher.

The result is that we are changing over to the NE steels as fast as we can get the forgings and other stock needed. We feel the NE steels will give satisfactory results to almost any user when they are properly applied.

To facilitate machining, we regularly anneal all NE steels having more than 0.40 per cent carbon content. After annealing, hardness must not exceed 90 rockwell B.

Successful Conversions

Two of the earliest conversions to NE steels were the two parts shown in Figs. 1 and 2. The cam in Fig. 1 was formerly of SAE-3135 drop-forging steel. The brake-shaft forging in Fig. 2 was of SAE-2340. Now both are produced of NE-9445 steel with no difficulty whatever. Both are hardened by heating to 1600 degrees Fahr. and quenching in oil. Then they are drawn at 800 degrees Fahr. and cooled in air. Final hardness ranges between 38 and 44 rockwell C.

Of the many other parts now made of NE steels, a few additional substitutions will indicate the range of work involved here. In our manufacture of brakes, there are many size and design

variations of brake and cam shafts. However, all of them are somewhat similar to the one shown in Fig. 1.

A typical cam shaft for a parking brake is approximately 3 inches long and 3/4-inch in diameter with an offset cam 1/2-inch in diameter carried on a head about 1 inch in diameter at one end of the shaft; opposite end carrying serrations for a press fit into another part of the brake. Formerly of SAE-3135, this part now is produced of NE-9440. Another similar cam shaft formerly of SAE-3135 is now manufactured of NE-9445. Yet another cam shaft was changed from SAE-3135 to NE-9442.

Other cams similar to the one in Fig. 2 have been changed over to NE-8744 from SAE-2340. Still other cams formerly employing SAE-3135 now use NE-9445.

NE Steels Reliable

Most of these steels are hardened by heating to 1500 degrees Fahr. and quenching in oil, if over 0.40 per cent carbon. If carbon content is under that value, the quenching temperature is changed to 1600 degrees Fahr.

Both types are subsequently drawn by holding for 2 hours at a temperature of 800 degrees Fahr. in an electric furnace. Then they are dumped out on the floor to cool.

All parts are highly stressed and are subjected to hard usage. While brake service demands the utmost in dependability, we have found that the NE steels can be relied upon just as well as the more standard steels, provided they are used properly.

For information on development of NE steels and data on their properties, see STEEL, Feb. 9, 1942, p. 70; March 16, p. 72; June 8, p. 66; June 15, p. 66; July 13, p. 80; July 20, p. 86; Aug. 3, p. 70; Aug. 17, p. 40; Aug. 31, p. 41 and 76; Sept. 7, p. 78; Oct. 19, p. 66; Nov. 9, p. 96; Dec. 28, p. 27; Jan. 25, 1943, p. 84; Feb. 22, p. 102; March 1, p. 94; March 8, p. 90; March 22, p. 78; March 29, p. 76; April 5, p. 116 and 118; Aug. 2, p. 100; Sept. 6, p. 112; Oct. 18, p. 97.

For reports from users of NE steels, see Nov. 16, 1942, p. 106; Nov. 23, p. 90; Nov. 30, p. 62; Dec. 7, p. 112; Dec. 14, p. 99; Dec. 21, p. 70; Jan. 11, 1943, p. 60; Jan. 18, p. 66; Feb. 1, p. 100; March 8, p. 109; March 15, p. 96; March 29, p. 72; April 26, p. 84; June 7, p. 106; June 14, p. 98; June 21, p. 92; July 26, p. 88; Aug. 2, p. 94; Aug. 23, p. 107; Aug. 30, p. 66; Sept. 6, p. 106; Sept. 20, p. 120.

For latest revised listing of NE ALLOY steels, see Oct. 18, 1943, p. 97. For list of NE CARBON steels, see March 8, 1943, p. 90.

For latest revised list of AMS (Aeronautical Materials Specification) steels, see Aug. 9, 1943, p. 92. AMS non-ferrous alloys are also listed there.

For details of WD (War Department) steels and complete listing, see Feb. 8, 1943, p. 80.

For STEEL's latest "Handbook on NE Steels" and the "NE Steel Selector", address Readers' Service department, Penton building, Cleveland 13. Price \$1.00 per set.

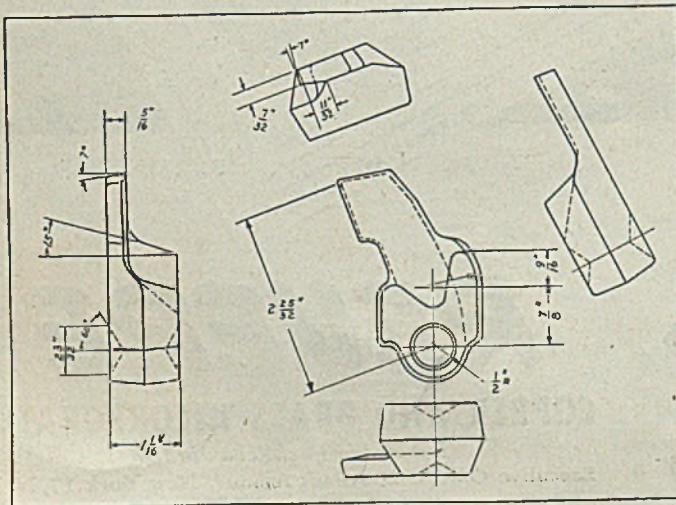
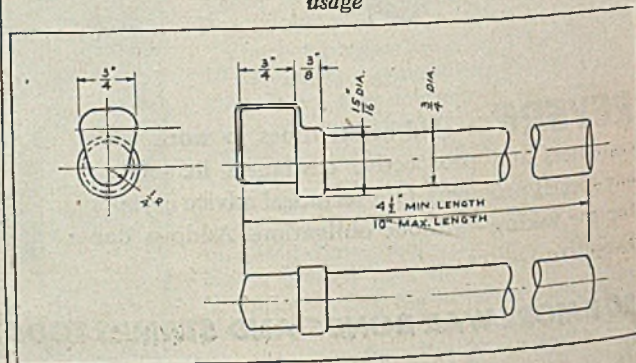


Fig. 1 (Left, below)—Typical cam, formerly of SAE-3135 drop-forging steel, now made of NE-9445 steel

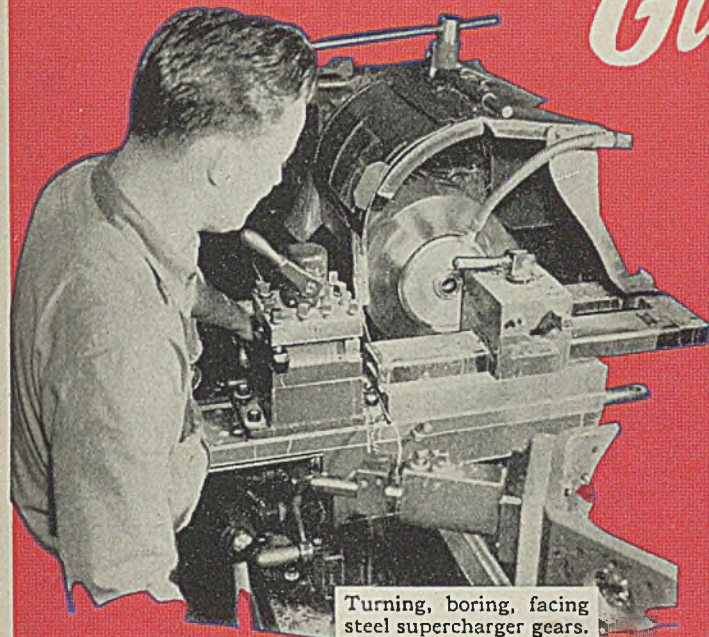
Fig. 2 (Below)—A typical brake-shaft forging, now made of NE-9445 instead of SAE-2340. All these parts are highly stressed in service and are subjected to hard usage



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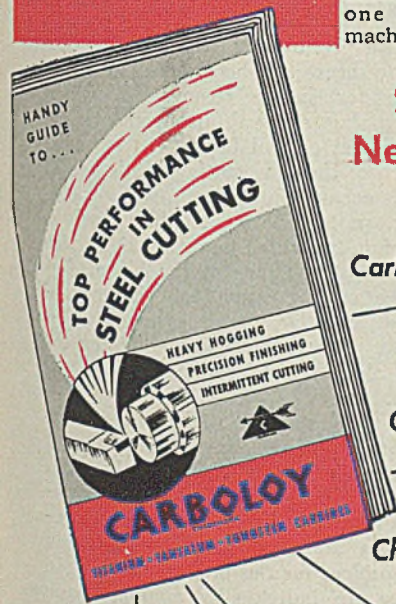
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Machine Requirements

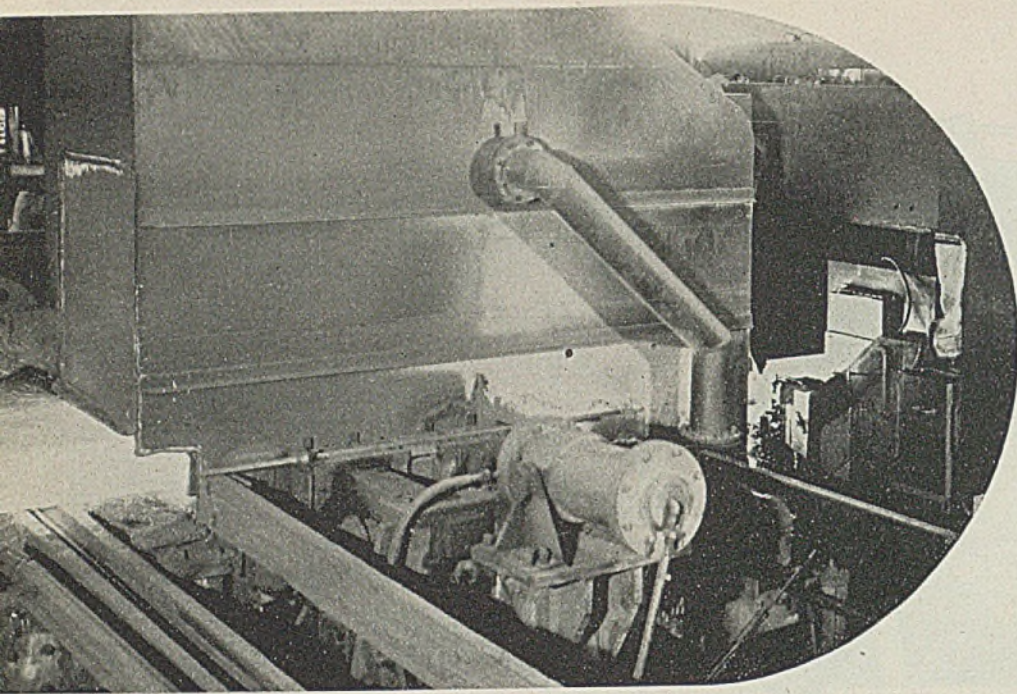
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Flame Conditioning Steel Mechanically

By IRWIN H. SUCH
Eastern Editor
STEEL

Bloom leaving flame conditioner. Fume exhaust hood is shown in foreground

MECHANICAL flame conditioning or scarfing of semifinished steel not only has been further improved but the process has met with broad acceptance in largely eliminating one of the most serious bottlenecks faced by the steel industry in its efforts to meet the unprecedented demand for steel occasioned by mechanized war.

More insistent demand on the part of consumers for steel with better finish began to make itself felt along about the time of the last war and there followed a succession of methods for removing checks, scabs, seams and the like from billets, blooms and slabs by mechanical peeling, grinding, chipping and hand-torch deseaming.

Most of these methods are still in use for both primary and secondary conditioning and for some steels, including certain austenitic and stainless types, which as yet are not being flame conditioned on a commercial basis. Mechanical flame conditioning is a development of only the past several years; it is being used in more than 30 plants. Development of a new process is expected to extend flame conditioning to stainless types within the next few months.

The process, which is simply the removal of surface defects and scale from one or more sides of semifinished steel simultaneously through the use of multiple oxyacetylene blowpipes in equipment designed for the purpose, is no cure-all but it constitutes one of the most advanced steps in the solution of a problem which has perplexed mill men for many years. A mechanical flame conditioner can remove 1/64 to 1/8-inch from the surface economically, thus eliminating on the average of 90 to 95 per cent of the defects. Of course, it may be necessary to remove 1/4-inch or more in some spots and this may be done through sec-

ondary scarfing with hand torches, grinding or chipping.

The process is based on the principle that a controlled amount of steel can be melted and made to flow away if the portion to be removed is heated to the fusion temperature and supplied with sufficient oxygen to support this action. Heating the surface of the steel to the fusion temperature is accomplished almost instantaneously through the use of closely arranged blowpipes or nozzles usually about 1 3/16 inches apart. The number of blow pipes depends upon the size of the material to be conditioned.

A Modern Installation at Work

Inasmuch as the mechanical flame conditioning process is uniform in principle but the equipment varies somewhat to meet specific requirements, it undoubtedly would be more helpful from the reader's standpoint to describe one of the more recent and modern installations, that of Youngstown Sheet & Tube Co. at its Brier Hill Works, Youngstown, O.

This machine, built by The Linde Air Products Co., unit of the Union Carbide & Carbon Corp., New York, is placed in a roller table immediately adjacent to the blooming mill runoff table, a transfer connecting the two tables. This arrangement works out exceedingly well inasmuch as the bloomer also rolls wide slabs which in this case are not mechanically conditioned and which, of course, pass directly to the slab shears.

Shears leaving the flame conditioner are conveyed on a roller table toward the end of the mill to a shear and cut to specified lengths. Slabs coming from the blooming mill may be transferred direct to the shear approach table, thus bypassing the conditioner.

The flame conditioner comprises a

unit for controlling the oxyacetylene scarfing heads; a hood, duct and fan system for smoke removal; a water-gravity slag removal arrangement; and an elevated control booth.

Each of the four cutting heads has 12 nozzles encased in a copper, water-cooled jacket protected by Stellite (cobalt-chromium-tungsten) insets or skids which ride against the face of the bloom during the cutting operation. Each head is positioned by an air cylinder which also serves as a cushion in guiding the heads along the uneven contours of the bloom.

The nozzles are set slightly over 1 inch apart so that each cuts a strip about 1 3/16 inches wide. Each nozzle has a rectangular orifice for the cutting oxygen which is designed for the condition to be met. In addition, there are the eight small orifices for the preheat gases. The nozzles are individually equipped with supply lines for preheat oxygen, preheat acetylene, oxygen for desurfacing and cooling water.

The machine will condition squares from 3 x 3 inches to 14 x 14 inches, as well as rectangulars up to 14 inches wide. For smaller than maximum size, the operator may cut off part of the nozzles from each head by adjusting a selector valve. A remote control makes it possible to cut off the necessary number of nozzles. There is, of course, a selector valve for each cutting head. Four dials above the control table show the operator the setting for each head. Vertical adjustment valves, also motor operated, adjust the heads for various sizes.

After the heads are properly adjusted, the operator transfers the first bloom from the blooming mill runoff table to the approach table of the conditioner. The bloom then is spotted so that the end is just within the jaws of the cutting

(Please turn to Page 150)

More Axis-Smashers Out There... Calls for More Cutting Tools Back Here

America's Cutting Tool Industry Comes Through Its Most Severe Test

Behind every swift American victory on the battlefield is a story of swift American victory on the production front.

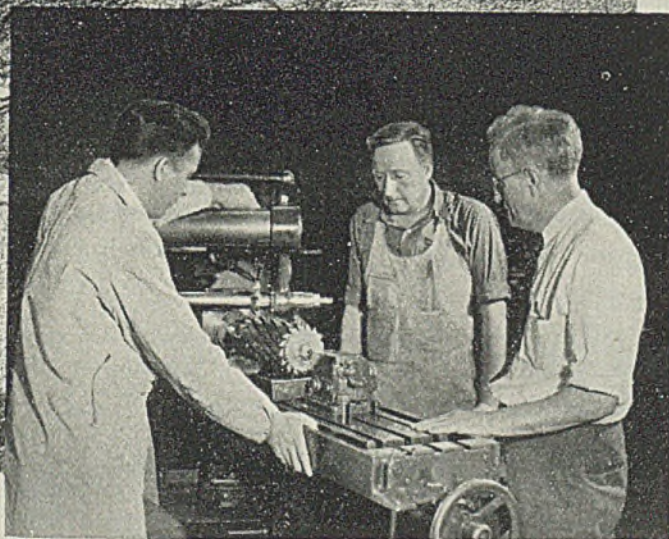
Take the case of one vital segment of our production front, the cutting tool industry. When war struck America, a tremendous expansion in the output of cutting tools had to be achieved . . . cutting tools to help build planes, tanks, ships, guns and ammunition.

And this job had to be done in the face of almost staggering difficulties: manpower shortages, material scarcities, engineering puzzles. To make a long story short, trained minds and trained hands got the job done—and on time!

Yes, and in addition to turning out new types of cutting tools, the cutting tool industry had to see that *existing* cutting tool equipment was used with optimum efficiency, and conserved through skillful care.

Recognizing this responsibility, Barber-Colman service experts were dispatched to war plants where their help was urgently needed. Service like this solved problems quickly, got wheels moving faster.

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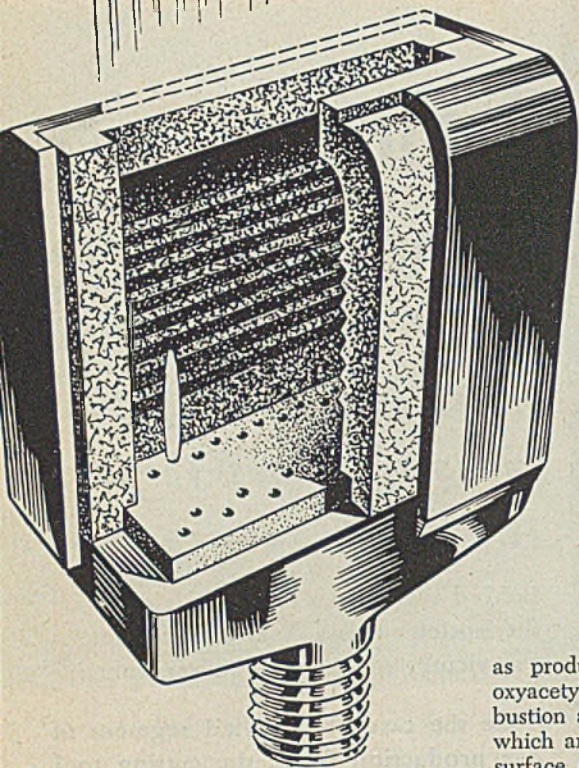
High-Speed

HEAT TREATMENTS

... now possible with newly modified burner designs. Heat penetration speeds being obtained indicate existing text-book limits may have to be revised substantially

By FREDERIC O. HESS

President
The Selas Co.
Philadelphia



THE FIELD of selective, localized heat treatment of steel is being greatly broadened by the development of improved gas-air equipment for the extremely rapid application of heat.

As a striking example of the heat-penetrating ability of this new equipment, it may be pointed out that 6-inch square billets have been heated to 2100 degrees Fahr. in 16 minutes or at the rate of 1 inch in approximately 5 minutes in contrast to the normal rule-of-thumb of 1 inch per hour. On the basis of that transfer, it should be possible to heat a 25-inch square billet to 2100 degrees Fahr. in 70 minutes.

Before describing the improved equipment itself, it might be in order to outline the scope and meaning of selective, localized heat treatment. In the first place, there are heat treatments such

as produced by induction heating, or oxyacetylene application, or gas-air combustion applying primarily to steel parts which are to be locally hardened on the surface only. This is the most widely publicized, and possibly applied, selective localized heat treatment.

A second large family of local heating applications includes local annealing and local tempering. Here brass, copper, bronze, nickel and special alloy parts are embraced in addition to steel.

Another fast-growing class of localized applications of heat is to brazing and silver soldering. Recently, production brazing installations have combined localized annealing with the assembly of several parts by silver-alloy bonds in one operation and possibilities in this direction should not be underestimated.

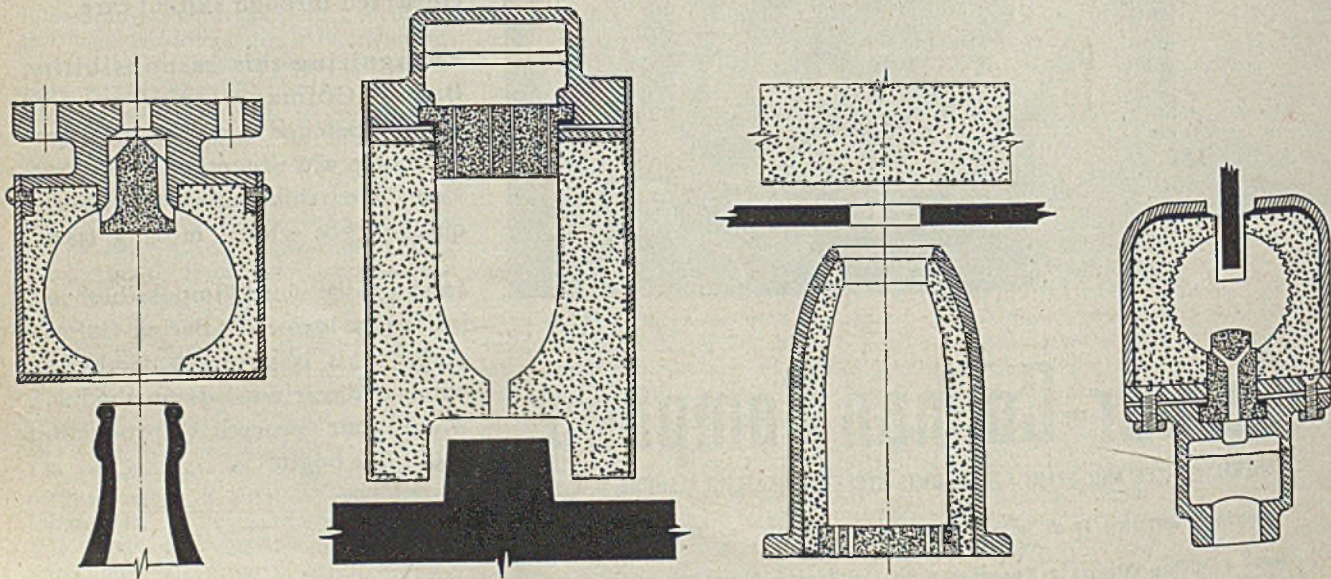
In a broader sense, selective localized heat treatment should also include some paint drying and finish curing applications, where the coating is only locally applied, and is dried or cured by local or selective heat application without heating the balance of the part.

In all cases the job is to impart heat of a certain intensity and at a predetermined rate to specific sections or areas of the material to be heated, to produce pre-specified effects.

From another standpoint, the basis of localized heat treatment is a rate of heat transfer to the area being treated which: (1) is sufficiently rapid to be in excess of the rate at which heat is removed by conduction through the material, yet (2) is consistent with the heat absorption capacity of the material. Otherwise, the

Fig. 1 (Above)—This burner for city gas—smaller than a packet of cigarettes—provides outlet temperature of over 3100 degrees Fahr. and liberates more than 68,000 B.t.u. per hour in a space of less than 2 cubic inches

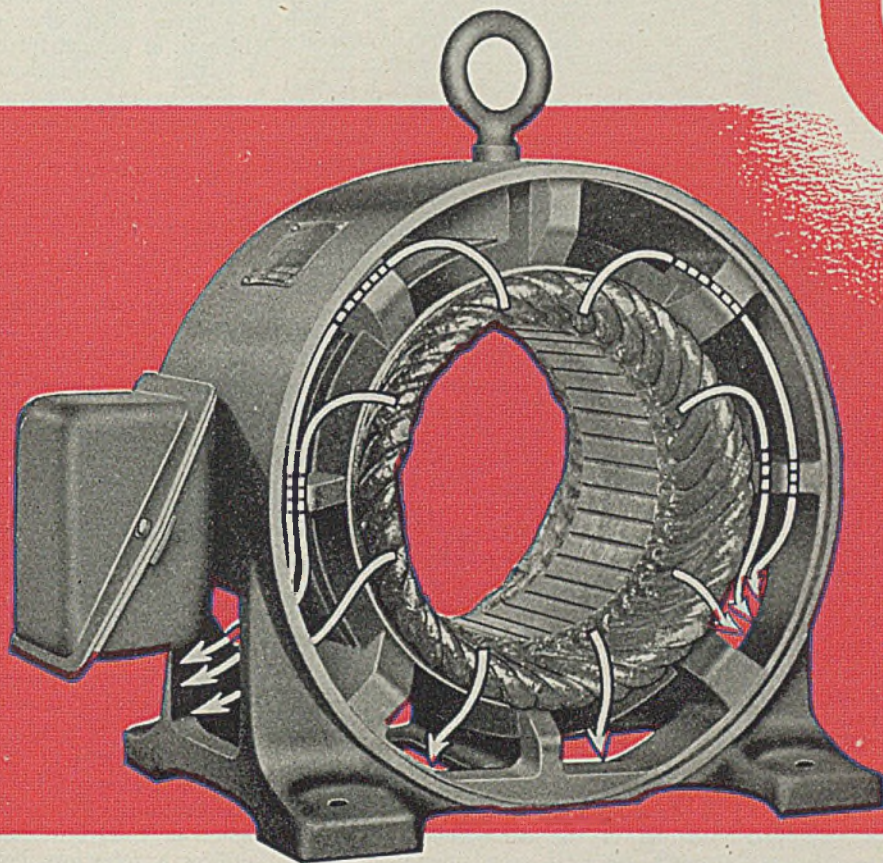
Fig. 2 (Below)—Special shape of burner, extreme left, is used for heat treating armor-piercing shot caps; left center, for tank track shoes; right center, punched holes in water tank heads; lower right for skate blades



STEEL

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- 4 Blown around the stator coil ends.
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- 6 Forced out from the lower half of the frame at the side and bottom of the motor.

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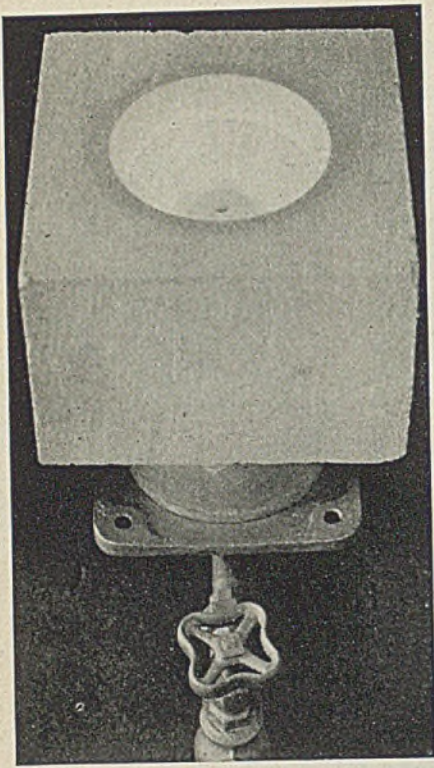
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Fig. 3—No flame extends beyond the face of this cup-shaped burner which employs incandescent refractory surfaces to increase heat radiation



candescence, for transmitting heat to the object by radiation from significant areas at black-body temperatures considerably higher than heretofore practicable.

These two fundamental steps have had some remarkable effects upon heat treating practice during recent years. However, their ultimate effect cannot yet be fully defined—only imagined.

One of the most important methods developed for accelerating the gas-air combustion reaction is to enclose it wholly within a small insulating refractory cell with a restricted outlet opening, so distributing the combustion ports that the individual flames are projected along the ceramic walls of the enclosure, bringing them to brilliant incandescence.

A typical unit employing this principle is shown in cutaway perspective in Fig. 1, the entire element being as small as a packet of cigarettes. Because of the pressure developed within the unit, the violent cross-radiation from white-hot wall to white-hot wall, and the narrow 3/16-inch slot which is the only outlet for an undiluted stream of superheated combustion products, it is possible to combust in the illustrated burner over 130 cubic feet per hour of city gas with an inlet mixture of 2 pounds per square inch. This amounts to a heat liberation of 68,000 B.t.u. per hour within less than 2 cubic inches or 40 to 50 million B.t.u. per hour per cubic foot of combustion space.

As a result of such tremendous acceleration of the combustion reaction, a small spherical metal target in a recent test achieved an ultimate tempera-

ture 300 degrees higher than attainable by the most favorable conventional methods of gas-air combustion. The test also demonstrates that useful outlet gas temperatures from the burners will exceed 3100 degrees Fahr.

In Fig. 3 another variant of combustion along incandescent refractory surfaces is illustrated, in this case the radiant wall being opened out, so to speak, to cup formation, thereby projecting their radiant energy output directly at the work. No flame whatsoever extends beyond the face of the radiant cup burner, Fig. 3. When closely faced to the work being treated, the radiant-cup type ceramic burner develops pressure within the incandescent concavity, redoubles its output of radiant heat, and is capable of amazing rates of heat liberation for selective localized heating purposes.

Four Special Applications

A number of other specially designed burners of this type, all ceramic lined and specially modified to fit the work-piece, are shown in Fig. 2. The burner at extreme left, designed to heat locally in a few seconds and without rotation the top lips of glass bottles for polishing purposes, has lately been adapted to the localized heat treatment of armor-piercing shop caps. Burners of the type shown in the left center fit over the heavy cleats on steel tank track shoes to bring only their surfaces to hardening temperatures. In this case, the ceramic nose of the superheating chamber is molded to the work so that maximum radiant transfer at close range is attained.

The circular unit at right center is used in the speed heating to extrusion temperatures of the edges of punched holes in heavy water-tank heads and utilizes a refractory heat-deflection element.

(Please turn to Page 152)

heat treatment will either: (1) not be selectively localized, or, on the other hand, (2) exceed the desired effect with wasteful energy application.

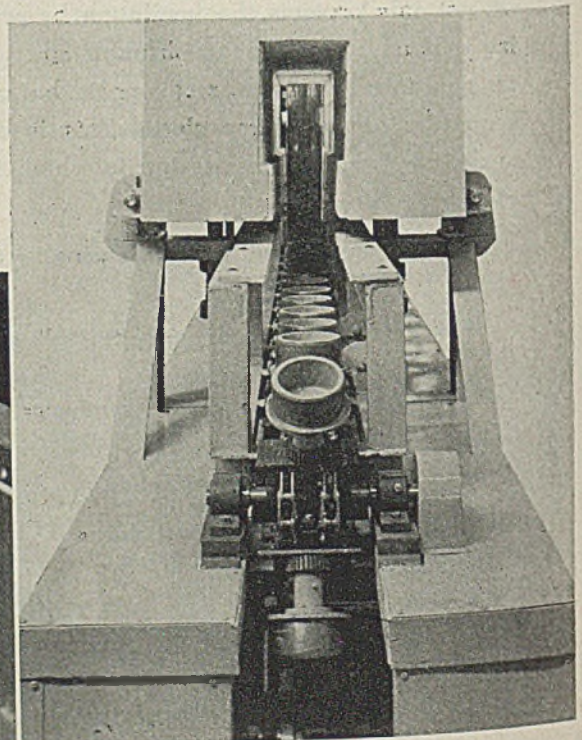
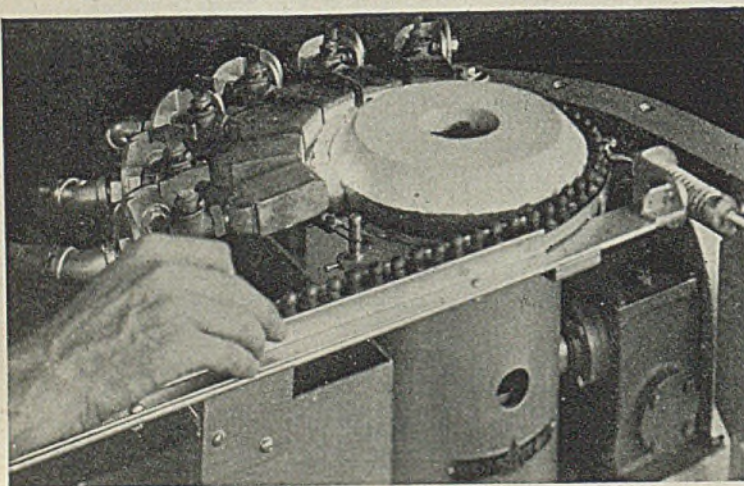
The successful application of air and gas for localized heat treatment, therefore, requires not only exacting control of combustion, but also, in the majority of cases, a higher useful flame temperature. To accomplish this, radiation developed through the use of special ceramics in burner construction has been put to work in two ways:

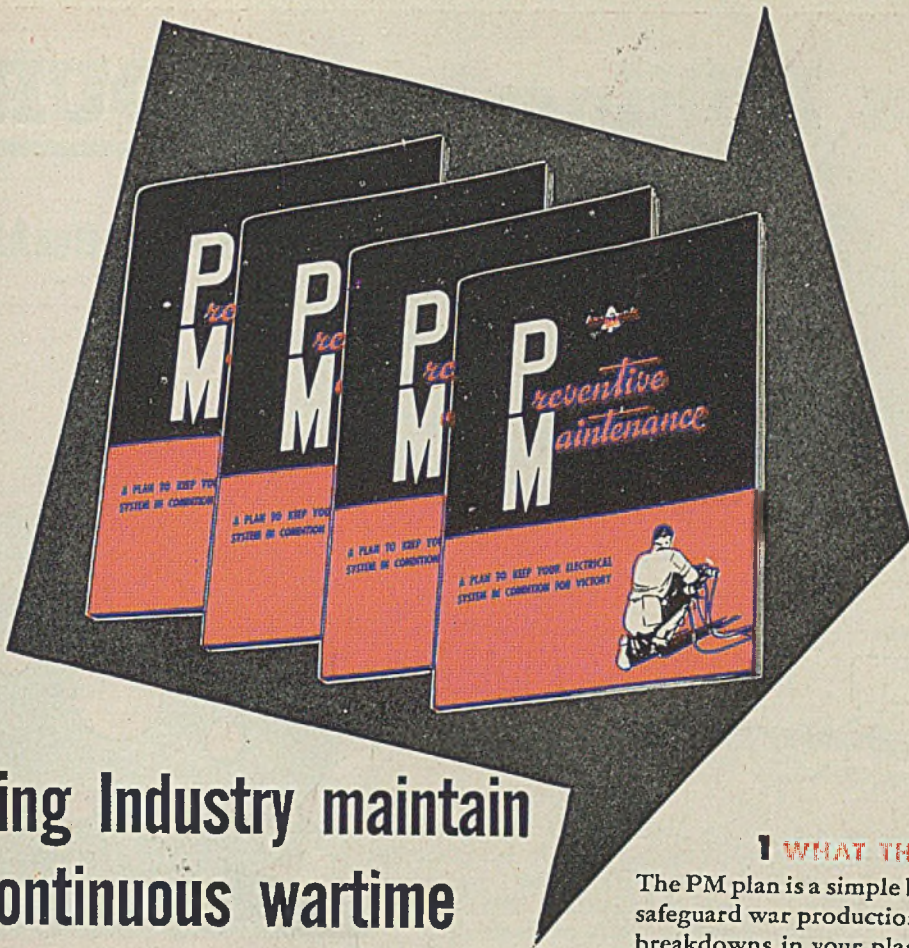
—To accelerate the combustion rate, permitting a greater liberation of heat in the same space, thereby raising the useful flame temperature, and

—To create radiant surfaces of high in-

Fig. 4 (Below)—Completely automatic unit hardens 600 airplane push-rod balls per hour during timed cycle of heating to 1250 degrees Fahr.

Fig. 5 (Right)—A local selective anneal is given bomb casings in this machine which rotates the casings as they travel forward





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November 8, 1941

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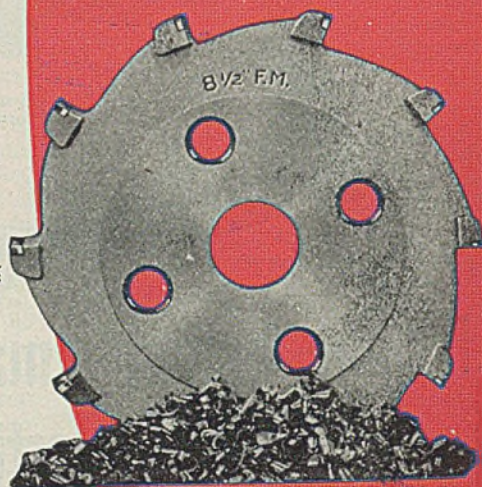
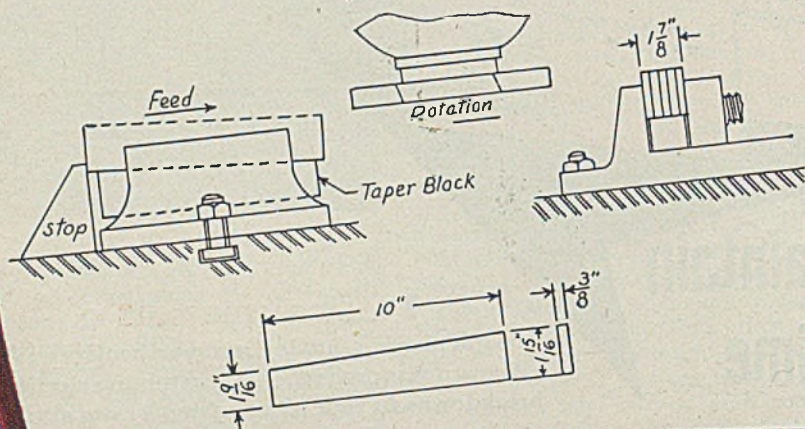
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	High Speed Steel	GRAYSON-KENNAMETAL Mill
No. teeth in cutter	14	10
Speed	61 RPM	136 RPM
Feed	5/8" /min.	7 1/4" /min.
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Pieces per hour	14.4	86

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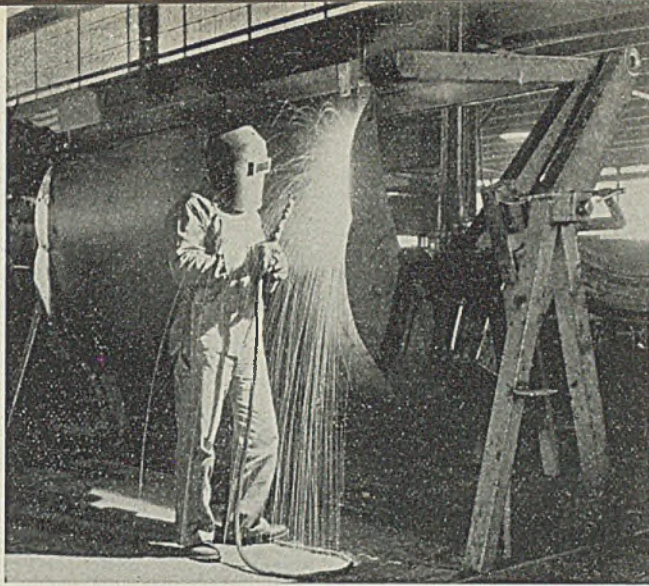


Fig. 13—The two hinge-wing structures of this large scraper apron were built on separate fixtures and then placed in the main apron setup and weld fixture. Pan parts are then built up progressively to complete entire unit in this main fixture

By WALTER J. BROOKING
 Director of Testing and Research
 R. G. LeTourneau Inc.
 Peoria, Ill.

Jigs and Fixtures

... for arc welded mass production

(Concluded from Last Week)

BECAUSE almost every positioning or setup fixture must be specific to the particular job, there is a great advantage in planning to make those fixtures in the shop at the time the first few experimental units of the machine are being made. There are many reasons why they should be made at that time and by the shop crew. Some of these are:

In the first place, probably the best way to make either a setup fixture or a weld positioning fixture is to make one of the weld structures without the use of fixtures; and then, by using this as a pattern, build a jig around it, placing stops for locating certain points on certain parts in the proper place and locating the clamping devices around the original part as the jig is being made. The scheme assures locating the stops and clamping units in the proper places and in the proper relationship, one to another. This can be accomplished by

workmen in the development department as well, or better, than it can be done by anyone else. Too, this system eliminates considerable drawing and engineering work otherwise spent in laying out the fixture.

Another good reason for making these jigs and fixtures in the department where they are to be used is that if the jig is to be the simple spinner type, it can generally be made from material at hand, even scrap, rather than purchasing new and specialized material.

For a large number of fixtures, such as the ones shown in Figs. 8, 9 and 10 (in part two, last week), there are sev-

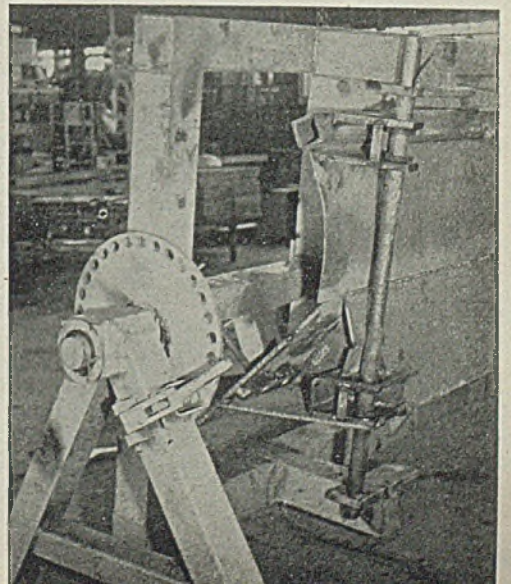
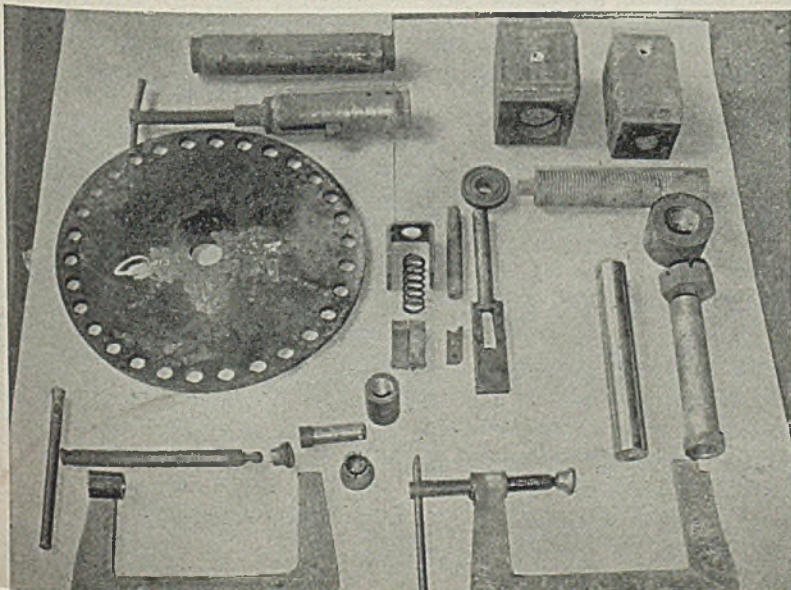
eral generalized parts which may be made up and used on almost any fixture. The group of such parts in Fig. 14 includes axle blocks (made of a short piece of box section, with two bearing end plates welded on), a turning and stop plate, parts for a latch assembly, a holding-plug assembly and tubular part, an axle, and a generalized type of C-clamp together with its parts.

Many of the parts commonly used on the simple spinner type positioning fixture may be used (with very little or no extra work) on other jigs when redesign or discontinuation of products make the original fixture obsolete. The

119

Fig. 14 (Left, below)—Stock or standard items for making jigs and fixtures. Usually these parts can be salvaged from a fixture when it is needed no longer and so are used again and again

Fig. 15 (Right, below)—Tapered bar here not only positions parts accurately for this assembly using premachined holes but protects inside of bored holes from weld spatter as well



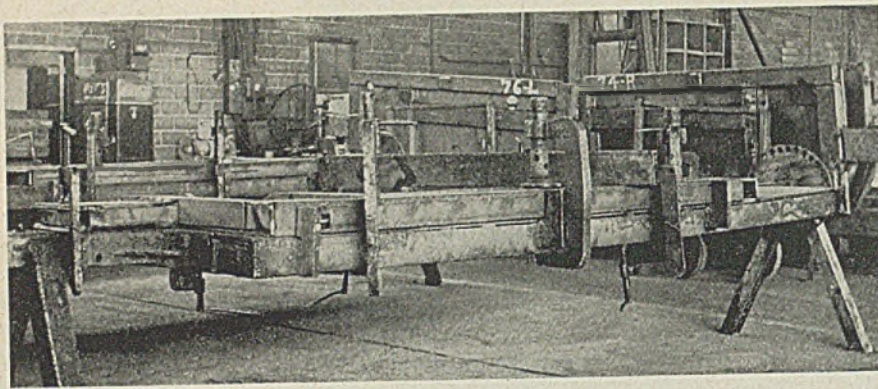


Fig. 16—After experimentally determining amount of prebending to counteract distortion from welding, fixture is designed to give bending required. Thus parts come from welding fixture almost straight for the weld distortion is counteracted in the fixture

alert and resourceful jig-and-fixture department with the proper disregard for "fanciness" as compared to effectiveness will not hesitate to re-use such parts of production jigs and fixtures as long as they function properly. The resulting fixtures may not be pretty or fancy. But since effectiveness is the main objective of such units, the salvage of used parts for fixtures often pays very desirable dividends.

Axles for such fixtures need not be complex because they are slow turning, rather rugged pieces of equipment. They need only to be turned to the proper sizes to fit hubs or axle blocks, and mounted in line so there is no tendency to bind as they are rotated. Seldom are ball or roller bearings of sufficient advantage to justify their cost.

Almost any structural form or shape could be used for the supporting members for the axle block to raise the jig or fixture up off the floor to the proper level. Angles, I-beams, pipes, T-irons, box sections, or almost any other material which happens to be at hand may be used.

The same general statement may be made about the type of material to be

used for the framework of such structures. Whatever material happens to be available to the fixture makers may be used so long as it has enough strength and does not involve a considerable waste of material from the standpoint of weight or availability.

Careful calculation of the center of gravity of both the structure and the fixture should be made by the jig and fixture department, or experimental department when designing and fabricating jigs for parts which must be rotated, because the ease of turning depends mostly upon obtaining a well-balanced assembly of fixture and structure. If fixtures are hard to turn, labor expense rises and sometimes costly accidents may occur.

Counterweights Should Not Be Used

The department which makes the jigs and fixtures should plan not to use counter-weights to make the fixtures turn easily. Counter-weights in fixtures of this kind simply increase the amount of material which has been put into them, increases the mass of material which must be turned, and therefore reduces the speed at which a workman may turn them.

One of the biggest sources of economy in arc welded construction is that of being able to use parts previously machined. The department which makes jigs and fixtures should be careful to utilize pre-machined parts wherever possible so that finish welded structures will require little or no machining.

This creates a need for special stops or shields to properly position and also to protect machined surfaces from injury during the welding process. This may be accomplished by proper design of the fixture.

Fig. 15 shows the positioning of two pre-machined substructures by being threaded on tapered pins which protect the inside of the bore of the substructures and also position the parts positively and accurately in the proper relationship to the rest of the unit.

Some study on the part of the jig-

Fig. 17—Since these units are produced in lots of 50 or 100, each with 29 long welds, a special positioning fixture was justified. About 2½ hours is saved per unit by this positioner. See closeup in Fig. 18

and-fixture producers in any given plant will bring out certain things about the effects of distortion on the structures they build. Study will also show how they may compensate for distortion by the proper location of their stops; by the total strength of the framework of their fixtures; and, in some cases, by prestressing the parts so that when they come out of the jigs they are nearly accurate and need little or no further processing to correct the effects of distortion.

An example of such prestressing may be seen in Fig. 16 which shows a large earthmoving scraper side sheet fixture. The side sheet is welded largely on one side and therefore the jig itself has been bent to compensate for the distortion which results from such concentrated welding on one side of the structure.

Combination Setup and Welding Fixtures: Often it is good economy to combine the two fundamental functions which welding jigs and fixtures offer—that of setting up the structure, and that of positioning the structures for welding.

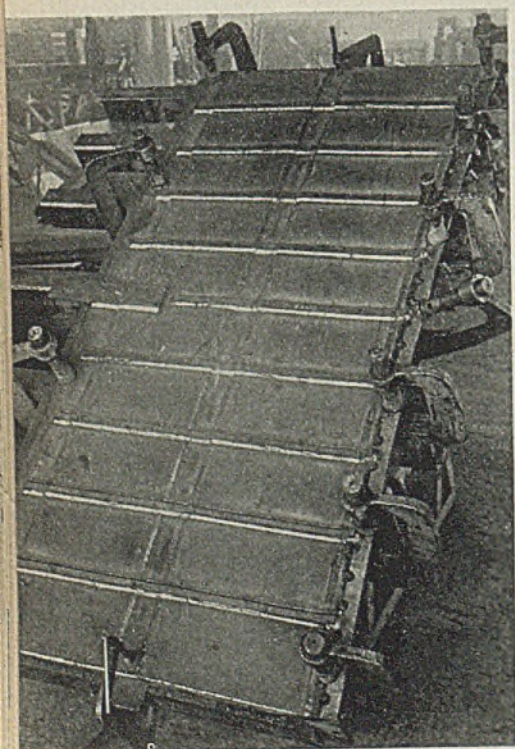
Many structures lend themselves to being setup in a relatively simple fixture which can be built so that it is suspended on axles and forms a spinner with setting-up stops and clamping devices giving sufficient clearance for welding. One of the advantages of such a combination is elimination of the extra handling which would otherwise come from taking the tacked-together structure from the setup jigs or fixtures and positioning it in the welding fixture.

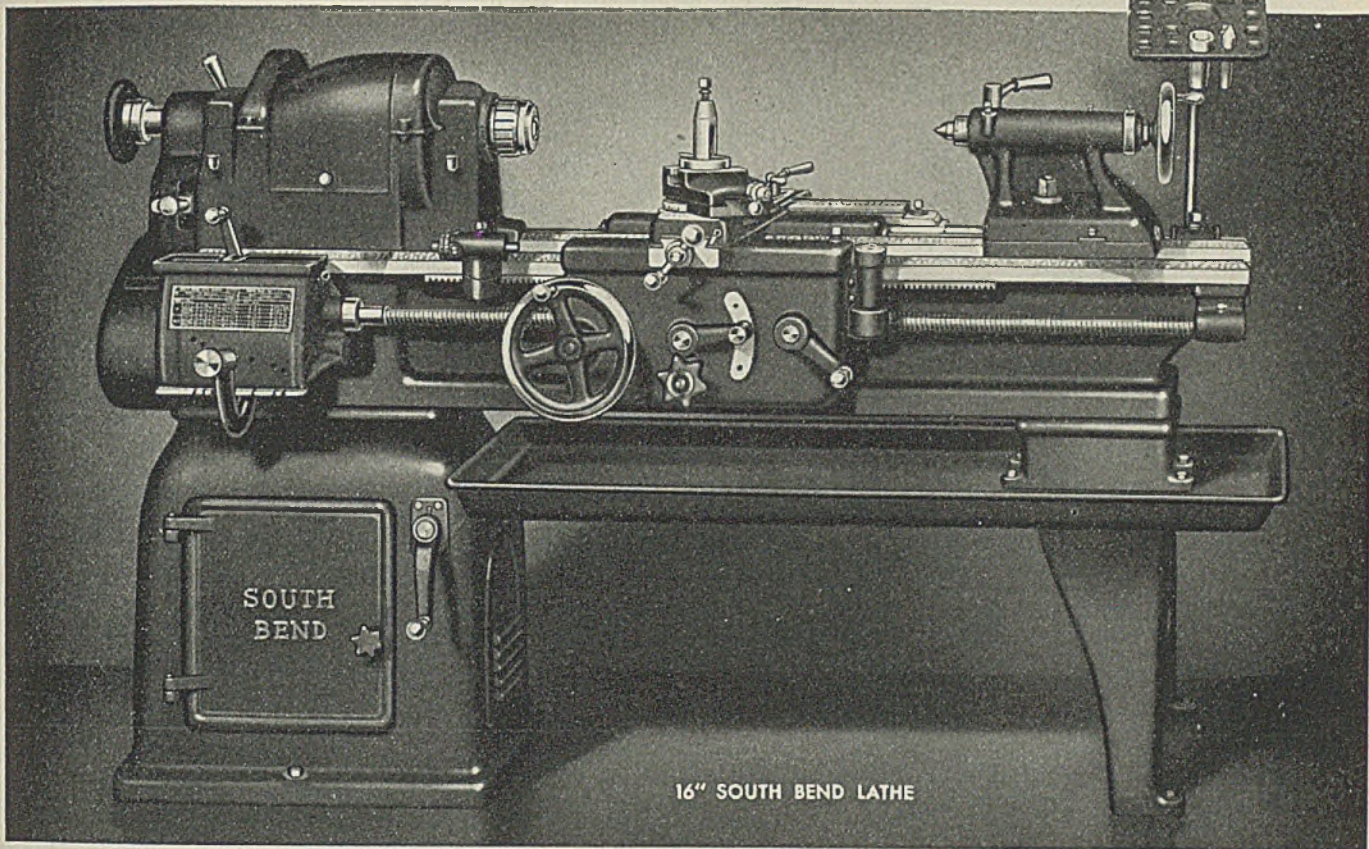
Another advantage is that there is no separation of the setting up and the welding functions; which, because they are difficult to correlate, frequently cause valuable floor space to be utilized by structures which are tacked and awaiting welding, or cause expensive time to be lost by waiting on the part of either the setup or welding operator.

If one man handles setup, tacking and finish welding in a combination fixture (or in separate units for that matter), there is no time lost while he is waiting for someone else to finish a process or free a machine.

When the structure is set up by the same man who welds it, he is likely to be more mindful of the adjusting of the separate parts so they fit up more closely. Therefore finish welding may be more quickly and better done than if someone else did the finish welding.

Still another advantage in having one man both setup and weld the structures





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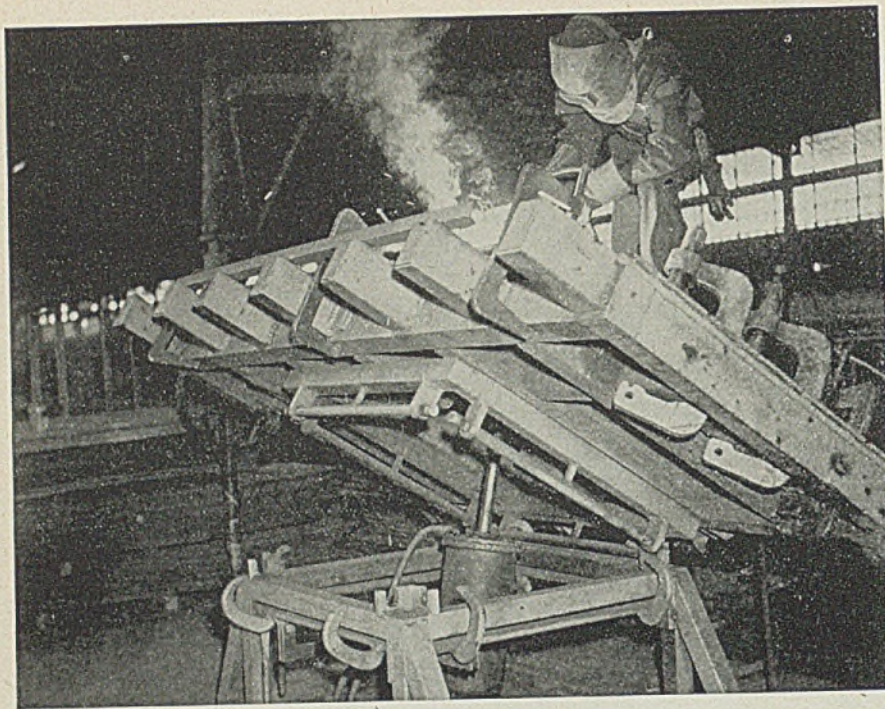


Fig. 18—Closeup of positioner in Fig. 17 but taken from underneath to show tilting arrangement. Air cylinder lifts table to 45-degree angle in each of four directions by hooking down the side in direction desired as shown here

is that the man who sets up the parts must have a welding machine available for tack welding the parts together. When one man welds and sets them up, there is only one machine involved and therefore less idle machine time.

Complex parts or welded substructures may often be placed in a combination setting-up and weld positioning fixture such as shown in Fig. 13 and additional parts may then be added and welded into the larger, complete, main structure.

In the front gate (apron) structure being set up and welded in Fig. 13, the side arm substructures are welded in a separate fixture and then placed in the main setting-up and welding fixture for the apron. The separate parts which go to make up the main apron pan or front gate structure are then placed in the fixture, tacked together, and welded—the entire operation being done by one operator or two operators working together.

Specialized Welding Fixtures: In a large production shop which manufactures machinery by the arc welded process, there are frequently certain units which justify the manufacture of a specialized and somewhat more complex fixture than a simple spinner type.

Such a structure forms the bottom of a large earthmoving scraper and is shown in position on its combination setting-up and weld positioning fixture in Fig. 17. Fig. 18 shows the fixture's mechanism for positioning in each of four directions. The 29 long welds which may be deposited from one side of the structure during its fabrication may then be deposited in the strictly down-hand position instead of the horizontal fillet at a saving of about 2½ hours per unit.

Obviously, the considerable advantage in the deposition of these welds, plus the quantity of the welding per structure (these units are made in lots

of 100) justified the expenditure of some time and money in manufacturing this specialized fixture. It is powered by an air cylinder underneath it, and has a series of hooks which hold one side down and releases all other sides, thereby causing the structure to be positioned for welding so that all welds in one plane may be welded.

General Advantages of Welding Jigs and Fixtures: There are many definite advantages which accrue to the organization which builds efficiently operating welding jigs and fixtures and which takes the economic advantages which come as a result of using such equipment.

Although more is said about the advantages accruing through the use of weld positioning fixtures than is said about those coming from the use of efficient setting-up jigs and fixtures, it is likely that greater benefits are derived from the latter type.

A properly constructed setting-up fixture may often reduce the amount of labor in handling and in measuring parts in the setting-up process as much as 80 or 90 per cent on an ordinary routine manufacturing job as compared with setting up of the same structure without a fixture. This saving in labor alone is considerable, but it is one of several and not the only advantage which comes from the use of such equipment.

Another great advantage of using a good setting-up fixture is that a workman who has had less training and who therefore may, in some respects, be less skilled may successfully handle the job, simply because the fixture makes it possible to set the parts together in their proper relationship without measuring and without error, and is, therefore, practically mistake-proof.

Good setting-up fixtures result in structures whose parts are placed together in proper relationship, and therefore fit properly, leaving fewer gaps

for the welding operator to fill up. Oftentimes a really good weld setting up fixture will cut the amount of poor fit-up because of misplaced parts sufficiently to reduce the welding of certain joints 50 to 75 per cent.

Structures which are set up in properly designed fixtures will be found to be uniform and interchangeable—a prerequisite of mass production and yet a thing which is seldom found when parts are positioned by hand without the use of jigs and fixtures.

The advantages which accrue from the use of weld positioning units are well recognized as amounting to as much as 25 to 35 per cent of the welding cost on the average structure, using the common materials and making ordinary machinery or equipment that is being welded today.

In addition to the reduction of time required for depositing the welds, there is almost always an improvement in the appearance of the welds since welds deposited in the strictly downhand position often have a better appearance than those welded in the horizontal fillet, vertical, overhead, or horizontal butt-weld positions.

A further saving is encountered due to the fact that in almost all cases where all welds on a structure may be deposited in a strictly downhand position, an operator with less experience may be used on the job and still produce as satisfactory a job as an older, more experienced, or more highly skilled workman. Good welding positioners, therefore, tend to decrease the training problem by shortening the training period for the new operator.

Welding setting-up and weld positioning fixtures are not expensive equipment as long as they are kept simple and are made from the materials at hand. They are one of the most profitable investments which a mass production arc welding organization may acquire. The acquisition of such fixtures depends most upon the mode of thinking of the organization and the training of the experimental department to the economies of the production of such fixtures so as to best serve the requirements of each individual job for which a fixture is being made.

Ends Training Course

The Eutectic Welding Alloys Co., 40 Worth street, New York, recently concluded training course for its midwestern and western field engineers, to acquaint them with the latest applications of company's low temperature process in various fields of war production, salvage and reclamation and the part played by the Eutectic method in each.



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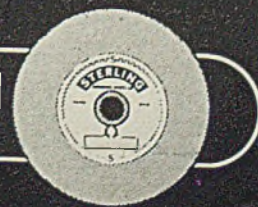
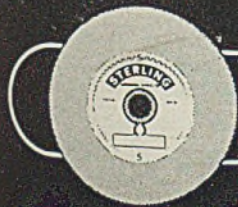
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... and efficient production control system take care of movement of 7000 different parts in production of wings for the Republic P-47 Thunderbolt fighter plane

By G. ELDRIDGE STEDMAN

PRODUCTION CONTROL is the art of having the right amount of material at the right place at the right time . . . no more and no less. The production control department is the chief planning and co-ordinating agency of any plant. Its organization and function is determined by many variables such as type of product, plant layout, fabricating processes and personnel. Consequently, production control methods differ.

Irrespective of variants, however, the necessity of having the right amount of raw material in the plant consistent with cost, procurement time, storage space and processing time, together with

proper amounts of material in float throughout the plant is the prime consideration of all production control systems.

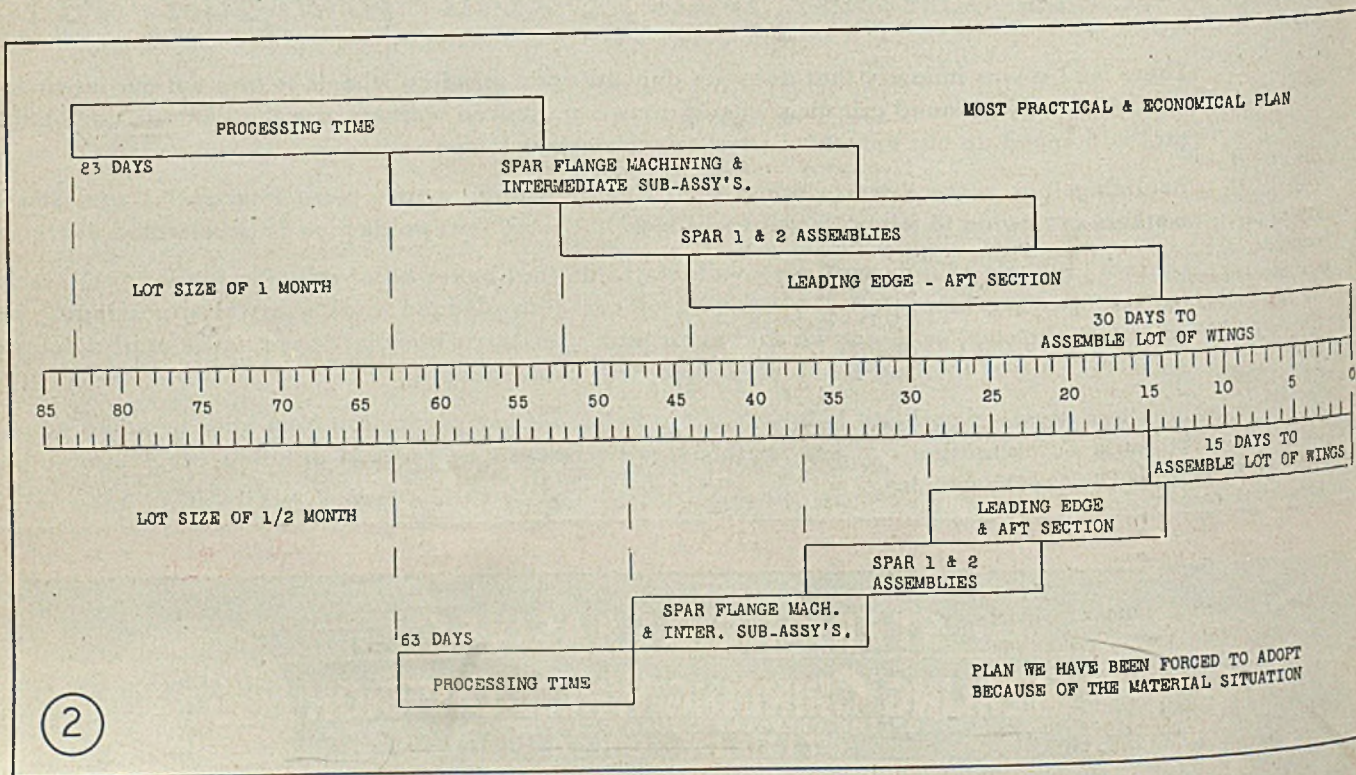
Servel Inc. of Evansville, Ind., has a particularly effective production control division under the management of Fred Creech; Larry Cutsinger, his assistant; and a division staff of seven associates. The company is a subcontractor of breech blocks for the A.O.G. gun, steel

cartridge cases, aluminum cylinder-head castings for Pratt & Whitney and Jacobs aircraft engines, wings for the Republic P-47 Thunderbolt combat-interceptor warplane, and other miscellaneous items. It is with the P-47 wing production control that this article concerns itself.

Production control at Servel centralizes planning and handling from inception of a given schedule to delivery of the product. This division is the main con-

Fig. 1—Special delivery by motor scooter, speeds movement of small parts over long distances

Fig. 2—Material float schematic for the P-47 wing



tact with prime contractors. When production programs are agreed upon by management, they are worked into specific "master schedules" by the production control office, extended into further detail by the departmental groups, planning and performing under their control. These groups include:

- 1—Control Management: Planning, staff, records and follow-through; prime contractor, customer contacts.
- 2—Materials Control: Controlled materials plan.
- 3—Dispatching.
- 4—Stores and interdepartmental trucking.
- 5—Motor Transport.
- 6—Shipping.
- 7—Traffic.

Especially developed war industries have escaped certain production control problems, in that plant layout was initially designed and new employes trained in operations that assured best flow of material. But such old-time plants as Servel, with facilities developed to handle peace production and with employes well trained on old methods, have encountered some problems.

The Servel plant covers over 62 acres under roof and is disposed in four related plants. A new DPC wing plant of huge proportions now functions upon the company property, but much wing production occurs elsewhere. There are more than 7000 parts involved in P-47 wing construction, four times more than in refrigeration processing. Further, the standard processing usage of wing parts is entirely different than involved in Servel peacetime production, subject to numerous engineering changes, shortages, interruptions in the rhythm of

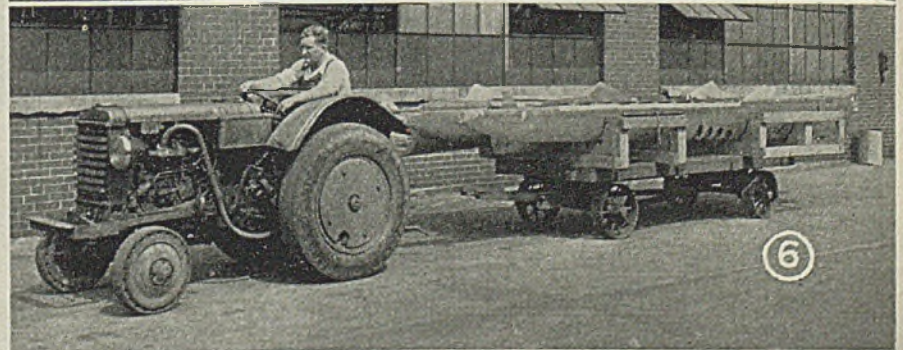
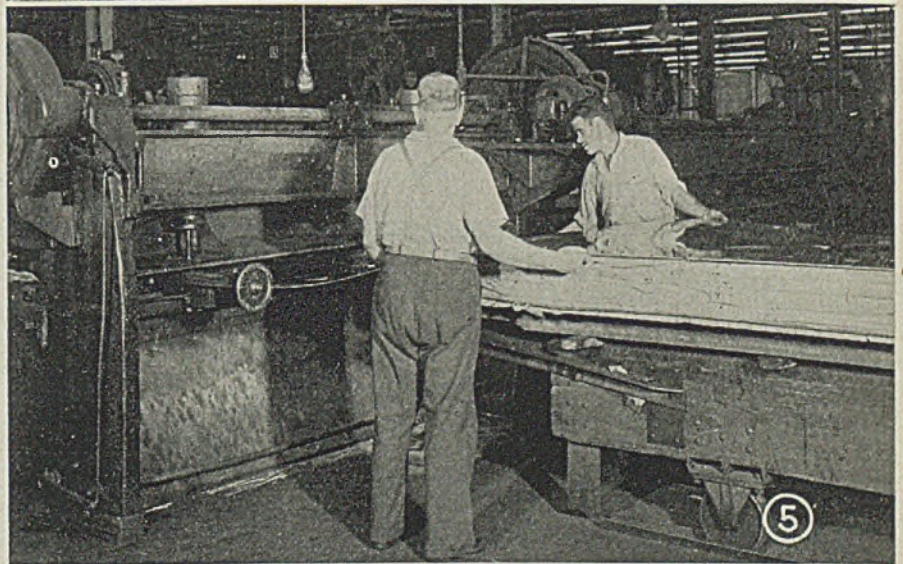
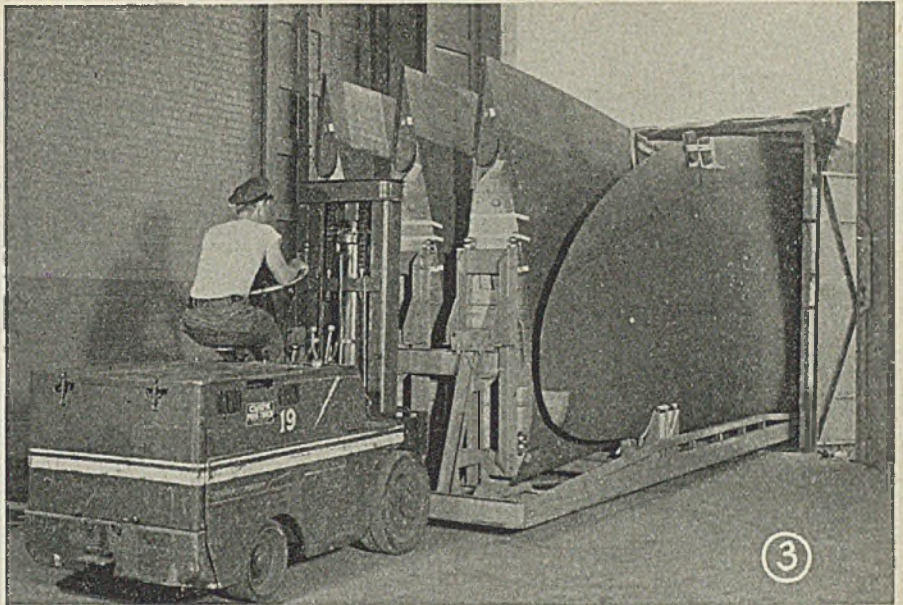


Fig. 3—Completed wing sections held in special skid mount of welded structural steel is being moved into open end of freight car

Fig. 4—Handling and production control officials at Servel: Seated, left to right: Irvin Moutoux, materials control supervisor; Harry Carrico, stores supervisor; Fred Creech, production control manager; Larry Cutsinger, his assistant; Harry Aufterhall, motor transport foreman; Chester Brinkmeyer, shipping foreman. Standing: Ray Woerter, chief rate clerk; Russell Coffman, chief dispatcher; Marvin Johnson, production control; A. McGinness, traffic manager; Wilbert Sturn, CMP supervisor

Fig. 5—Shearing aluminum sheet to size. Note special dolly and track on floor for wheels

Fig. 6—Special dolly for moving leading edge assemblies

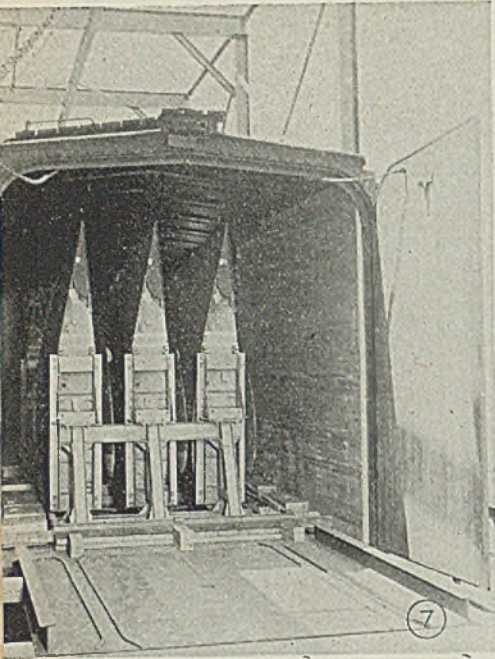


Fig. 7—View of special skid mounted wing sections as placed and blocked in either freight car or truck trailer. Note in foreground the special guide plate with tracks to facilitate correct placing of skid

days during peacetime, while wartime materials schedules are often based upon 6 to 8 months' delivery.

"The movement and follow-up of wing material is complicated," Mr. Creech states. "The problem is one of multiplicity of parts and swift processing. We have tried to make as few changes in our established methods of peacetime production control as possible, even though war production is radically different. Slight changes in technique that seem desirable have been found more troublesome to install than to use the old system.

"It takes too long to get supervision and workers to understand how to handle the variable paper work involved in new control systems. To retrain them to any new system would present a retraining task that would result in intolerable confusion. We have found that our centralized production control is tailored so neatly to our plant layout, personnel and supervision that we would use it were we building wings, watches, refrigerators, or automobiles."

Servel production control departments are organized in sequence and the system is completely integrated. Everyone knows what is being done. All detailed schedules are based upon "master schedule". Perpetual inventory is maintained; responsibility to check and warn being placed in each department dispatcher's

hands. Critical materials are flagged promptly.

The materials control department with 38 employees, is under the supervision of Irvin Moutoux and his associate, Wilbert Sturm, the latter being controlled material plan supervisor and responsible for meeting government requirements, regulations, priorities and allotments, reports, etc. Principal functions of the materials control department break down into something like this: Project master schedules into detail; requisition materials required to meet purchase authorizations; specify deliveries to meet assembly schedules; follow-up deliveries for compliance; place shop parts orders; compile and issue material schedules; follow up engineering change notices; arrange disposition of obsolete material; requisition material and frame shop schedules to meet spare parts and rework schedules; prepare fabrication schedules; compile and issue statistics covering all phases of finished product activity such as orders received, shipments, orders on hand, perpetual inventory and lot production.

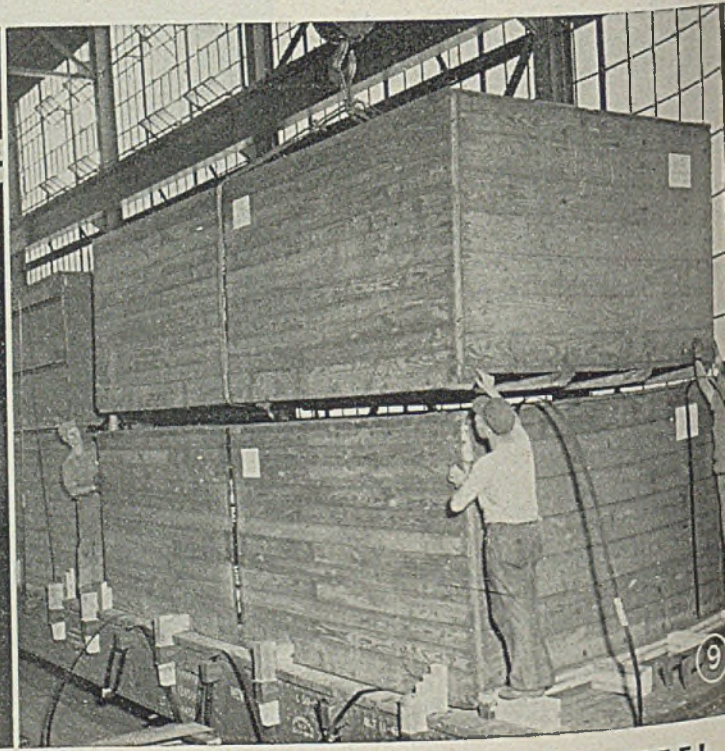
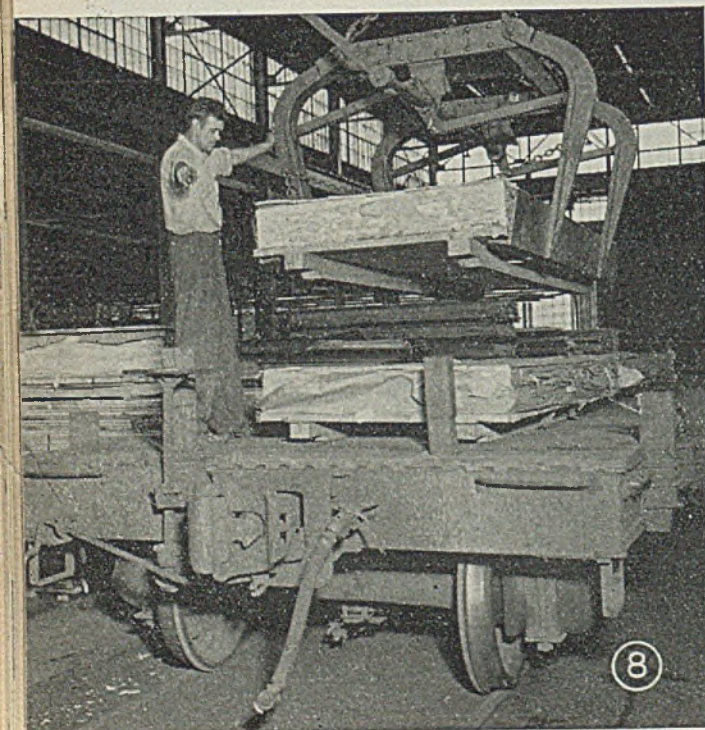
Servel makes great use of cycle systems throughout its operations. Thus it uses a "cycle material float" plan in the fabrication and assembly of aircraft wing sections. The chart, Fig. 2, indicates how this lot-based material control system functions. Until recently, it was based upon an 83-day cycle between raw material receipt to shipment of last item in the monthly production lot. However, because of difficulties in procurement of materials beyond Servel's control and because of shortages in critical metals recently, this cycle has been cut down
(Please turn to Page 154)

material flow not before encountered.

Usable Servel floor space aggregates 1,912,000 square feet. Servel produces many wing parts for itself and for Republic. So forgings, extrusions, formings, stampings, castings, machining, sheet aluminum and steel, strip and bar steel, carbon and alloy tubing, rivets, bolts, screws, wire insulation, electrical connections, certain finished parts from outside vendors and its own machine work—7000 parts of all types, shapes, forms and pieces are received from everywhere and processed under pressure schedules that require adequate material float with problems of critical material shortage. All these must be handled in an assured production schedule, and the final parts must pass rigid inspection. Material procurement could be depended upon in 70

Fig. 8—Load grab facilitates handling of sheet packs in stock areas

Fig. 9—Crated wings being loaded on flat car. Note blocking to prevent movement and steel straps overall



Efficient materials-handling with Exide-equipped industrial trucks helps ease manpower shortage!



Forked truck loading bagged materials into a railroad freight car. One man handles the work of many.



Forked truck stacking palletized unit load. This method doubles storage capacity of warehouses.

Production costs cut through increased efficiency

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HANDLING OF PALLETIZED UNIT LOADS

Although many kinds of modern materials-handling equipment are used in efficient operations of loading and unloading, there are definite advantages to the palletized unit load. Here are some of them, using forked truck pallet and tractor-trailer systems of handling.

- 1 Handling-time cut 25-75%; particularly in unloading railroad cars and trucks.
- 2 Volume of damage reduced by elimination of many manual bucket-brigade handling operations.
- 3 Capacity of warehouses increased through higher tiering of palletized materials.
- 4 Enables use of less skilled help, including older men and women.
- 5 Simplifies inventory-taking, sorting, and inspection operations.
- 6 Reduces accidents, and often prevents them.
- 7 Makes rodent and vermin control simpler through better housekeeping methods.

The success of the war depends upon speedy movement of men and materials. Standardization of packing methods and materials-handling equipment accelerates the movement of materials at home and on the fighting fronts.

EXIDE-IRONCLAD BATTERIES OFFER THREE VITAL POINTS OF SUPERIORITY

- **MORE POWER, MORE PRODUCTION:** An Exide-Ironclad delivers its power at uniform voltage to assure constant hauling speeds. There is always a giant surge in reserve when an Exide powers your battery propelled vehicles.
- **LONG LIFE SAVES MATERIALS:** Every Exide is built to last, and saves vital materials by squeezing the last ounce of use out of the materials in it. When you buy an Exide, you definitely... Buy to Last and Save to Win.
- **EASY MAINTENANCE, SAVES LABOR:** Exides are kept charged by the simplest method ever devised. With the Exide Charge Control Unit all you do is connect battery to the charging source and turn a knob.



DELIVERIES—Despite war-time conditions, we are quite sure that we can make deliveries to meet your requirements.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia
Exide Batteries of Canada, Limited, Toronto

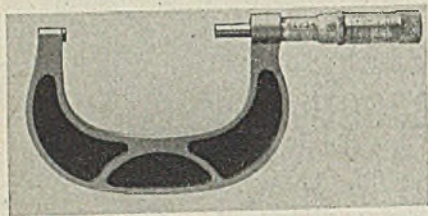


Tractor-trailers speed-up loading operations. Palletized loads can be placed on trailers by forked trucks, hauled to storage or shipping points and unloaded by forked trucks for additional speed and prevention of materials-damage.

INDUSTRIAL EQUIPMENT

Vernier Scale

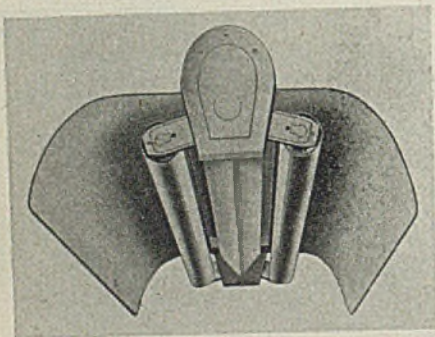
Dimensions can be checked to 1/10,000-inch with the vernier scale supplied with 1, 2 and 3-inch Reed



micrometers sold by George Scherr Co., 128 Lafayette street, New York 13. Purchasers of 1, 2 and 3-inch "mikes" will in the future automatically receive a tool with "tenths" vernier at the same price heretofore prevailing for the micrometers. Illustration shows a new 2-3-inch micrometer showing the 0.0001-inch vernier.

Fluorescent Unit

Starting switches and "blinking" are eliminated in using the new two-lamp 40-watt fluorescent unit, model MF-24-N, introduced by the Fostoria Pressed Steel Corp., Fostoria, O. The lumen output of the lamp is approximately the same as any other two-lamp 40 watt unit powered by conventional ballast. The unit will continue to operate even though the voltage drops momentarily below 50. Lamp life with this unit is considered satisfactory, even though lamp manufacturers say that a reduction of as much as 50 per cent is common. It operates on a power factor of 98 per cent at 118 volts and is connected for stroboscopic effects. It accommodates two fluorescent lamps on 5-inch centers. It also is constructed with a V-channel for wiring, which separates the two lamps. The nonmetallic reflectors of the unit



are removable from the top without interrupting lamp operation. When the reflectors are removed, all wiring in the V-channel is exposed to full view.

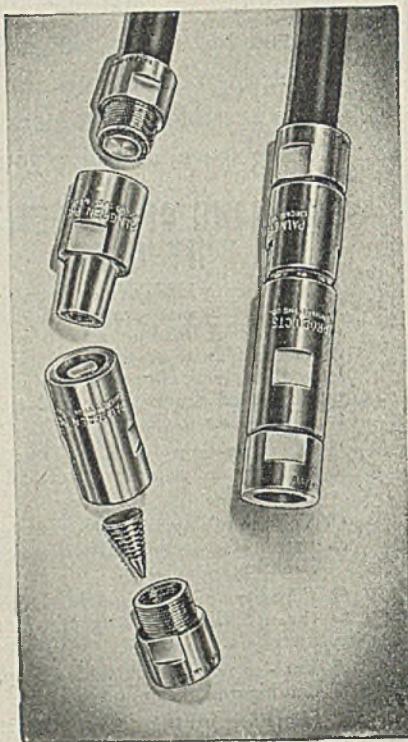
Solderless Connectors

Solderless connectors which make it possible to assemble various lengths of welding cable or other cables to their respective connectors in the field and on

the job in a few minutes have been developed by Chicago Tool & Engineering Co., 8392 South Chicago avenue, Chicago 17. The only tools necessary are a knife to remove the wire insulation and a pair of pliers to tighten the nut.

Known as the Palmgren solderless rapid cable connector, it is possible to adapt the body to welding cable in size ranging from No. 1 to No. 3/0, inclusive, by using the proper size adaptor nuts. The connectors are interchangeable with standard solder type Palmgren cable connectors, thus one cable having a standard solder connector at one end can be plugged into another cable having the solderless type connector.

They are advantageous where electrode



holders are equipped with ship lengths, which usually are installed in electrical or maintenance shops, for the whip end can be adapted to this solder type connector, and the length of cable can be fitted with solderless cable connector when in the field.

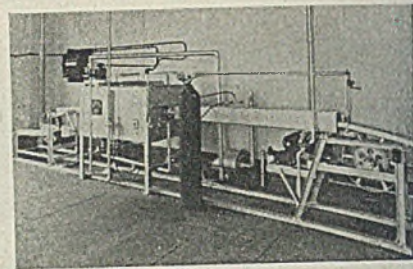
Illustrated is a taper plug which is forced into center of cable after insulation is removed. By screwing nut and body together, forcing taper plug flush with threaded end of nut, a tight connection with high conductivity is made.

Annealing Furnace

A small furnace for continuous, automatic copper brazing, silver soldering, sintering or bright annealing of metal strips, bands and miscellaneous formed objects that require a uniformly bright, high finish surface is announced by W. S. Rockwell, New York 7. Gas heat with a gas burner firing from each end of the furnace is used in the development.

The furnace consists of a steel shell

with a heavy insulating firebrick lining. Work to be brazed moves on a continuous mesh belt conveyor into a small enclosed charging muffle, emerging into a



long fully enclosed water-cooled cooling zone. The length of the charging neck; the length, width and height of the muffle, and the length of the cooling chamber depend on the size and quantity of the pieces to be treated and on the speed of their travel through the furnace.

Special driving mechanisms protect the conveyor belt against strain.

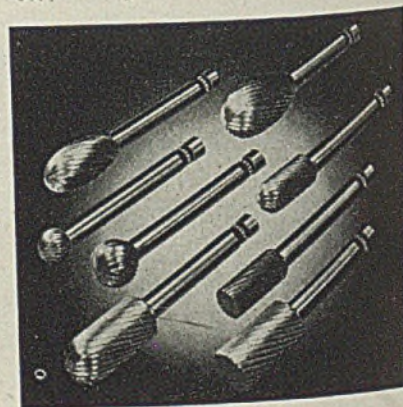
Hose Clamp

Two new small size Aero-Seal hose clamps for use on hose sizes from 1/4 to 3/4-inch inclusive are being offered by Aircraft Standard Parts Co., 1711 Nineteenth avenue, Rockford, Ill. The clamps are known as style M-6 and M-10. The M-6 is designed for 1/4, 3/8 and 1/2-inch hose and the M-10 for 3/8 and 1/2-inch hose. Extra take-up in the band of the M-10 enables it, if necessary, to be used on all five sizes of hose from 1/4 to 3/4-inches inside diameter.

Band of the clamps is a spring steel strip perforated to correspond with the teeth of a worm gear. It is drawn through the clamp housing by a worm thumbscrew which tightens the clamp rapidly. Since perforations in the band extend for nearly 3 1/2 inches, the clamp may be taken up a full inch (in the larger sizes) on diameter.

Carbide Rotary Files

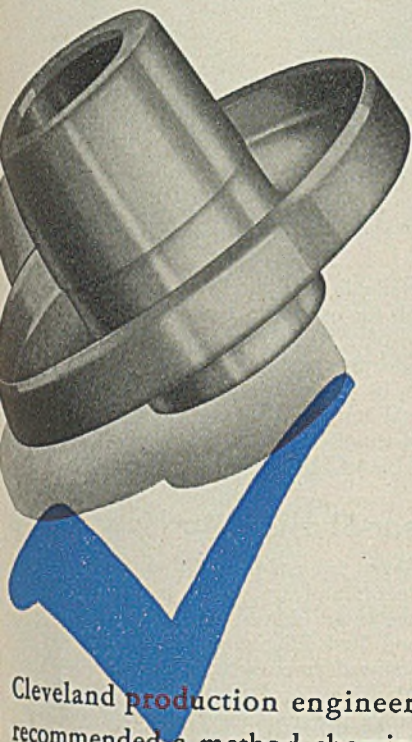
Six new tools were recently added to its standard line of cemented-carbide rotary files, Carbur Inc., Lincoln Park 25, Mich. reports. These are available in three shapes each of which is furnished in two sizes. The new shapes



(All claims are those of the manufacturer of the equipment being described.)

Ever Hear of CLEVELAND'S "PRODUCTION COST PATROL?"

**11.8 Minutes
Per Piece...
SAVED!**



Cleveland production engineers recommended a method showing savings of 11.8 minutes per piece on this part on the equipment already in use—released two machines for other work.

A BROAD STUDY of plants in all kinds of manufacture shows that unless your organization is outstandingly unusual there is an even chance that *you can be shown how to make substantial savings* in your turning and forming departments.

The Cleveland Automatic Machine Company has developed a service, manned by engineers with special training, through which, without cost to you, a survey can be made, in cooperation with your production staff, that will tell you whether and how such savings can be made. We call it a "Production Cost Patrol" because its purpose is to police wasteful methods. The steps are simple . . .

1. Upon request you will be given details of the engineer's method of surveying your plant. Credentials will be submitted if required by the nature of your work.
2. The engineer will spend as much time as necessary in your plant, making detailed studies without interrupting production or making demands upon your organization.
3. A written report will be made for you, with proposals for changes in method wherever savings can be made.

This service is not limited to users of Cleveland Automatics, nor are the proposals limited to cases where the savings can be made on Cleveland's. In many studies made by Cleveland engineers, new methods involving substantial savings have been found for the equipment already in use. In any event there is no charge.

May we explain Cleveland's Production Cost Patrol to you more fully?

Cleveland's new product information bulletin is off the press. Describes the complete line of automatics, and Cleveland-made diecasting machines.

THE CLEVELAND AUTOMATIC MACHINE COMPANY

CLEVELAND, OHIO

SALES OFFICES



CHICAGO: 1408 Civic Opera Building
DETROIT: 540 New Center Building



NEWARK: 902 American Insurance Building
CINCINNATI: 1315 American Building



MORE FOOD...MORE TRACTORS and MORE of these Special STUDS

This special Erie Acme Threaded Steering Gear Stud for a well known tractor may soon be ordered again into service in answer to the tremendous need for more equipment for food production.

A review of orders for Erie's Special Bolts, Nuts and Studs reflects the importance that Uncle Sam is placing on all war materiel, for, specialized bolting is a vital part of fighting machines and of machines to produce fighting machines.

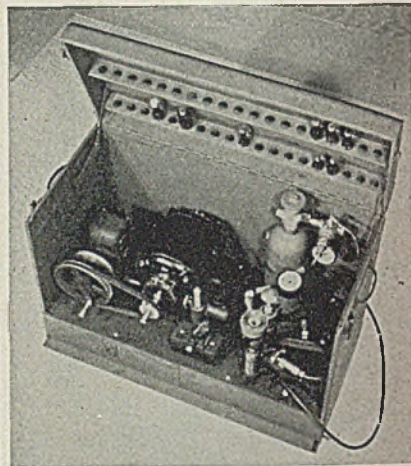
ERIE BOLT & NUT CO
ERIE, PA., U. S. A.

are illustrated with the two ball end types introduced a short while ago.

All of the tools have cutting teeth ground from the solid. They offer at least 50 times the life of similar steel tools. Outstanding feature of the tools is they can be run at much higher speeds than ordinary steel rotary files.

Spark-Plug Tester

A portable aircraft spark-plug tester for use in both shop and field is reported by Airplane Mfg. & Supply Corp., 409 North Brand boulevard, Glendale 3, Calif. The unit, operated by a 1/2-horsepower electric motor, has a hand crank for use when 110-volt power is



unavailable and a hand pressure test bomb for use when carbon dioxide fails. Its cabinet, including all necessary tools, weighs 84 pounds and measures 26 x 12 x 19 inches. It features a newly designed top, held in vertical position by steel supports, and two built-in racks capable of holding 38 spark plugs.

Gear-Shaving Machine

Gears from 24 to 96 inches pitch diameter and up to 97 inches outside diameter are shaved on the new 75,000-pound Red Ring gear shaving machine announced recently by National Broach & Machine Co., Detroit. It is especially suitable for producing accurate steam turbine reduction units and large diesel timing gears. Its maximum shaving range from headstock spindle is 110 1/2 inches. The machine is designed for rotary crossed axes shaving. Its cutter head is equipped with vernier scale and sine bar so that settings to any desired angle within its range can be made readily and any setting can be accurately duplicated thereafter. The cutting tool, which is free to rotate, is driven by the work gear. An important feature is that characteristics of the work gear may be accurately checked without removing it from the machine.

The checking head which is an integral part of the machine is used to determine the size of the work gear, the amount of shaving stock on it, its linear pitch, wobble, eccentricity, and

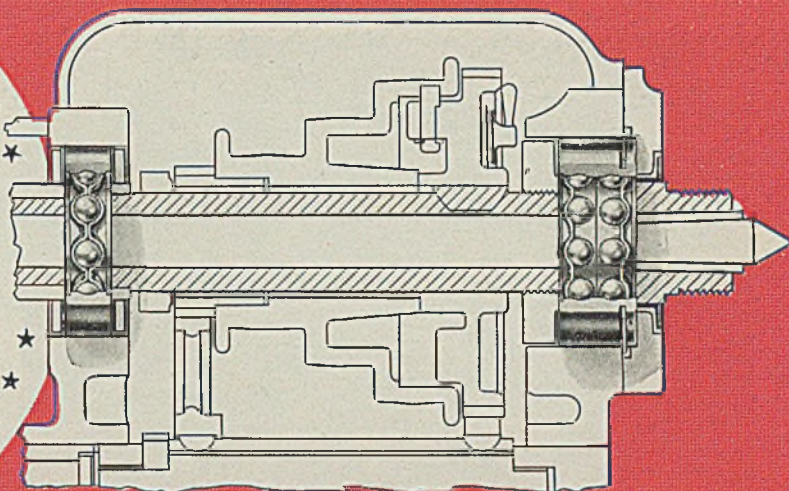
STEEL

SUSTAINED *Spindle Accuracy!*

A FINER FEATURE OF LOGAN LATHES*

Brief SPECIFICATIONS

- Swing over bed 10½"
- Bed length 43½"
- Spindle hole 25/32"
- Precision ground ways: 2 prismatic "V" ways; 2 flat ways
- 12 spindle speeds—30 to 1450 per minute



Precision, Pre-Loaded Ball Bearing Headstock is Standard Equipment on All Models

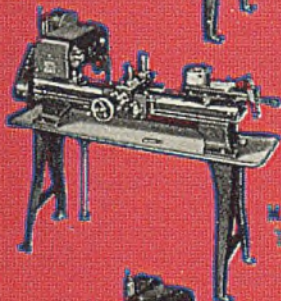
Your purchase of a lathe is an investment. To be profitable, it should be a *long term* investment in speedy, accurate production. It will be if the lathe is a Logan, because Logan engineering designed it that way . . . throughout! For example, to assure sustained accuracy of the spindle, the headstock is equipped with special New Departure Ball Bearings. These bearings, of extreme precision, are pre-loaded so that the pressure of the cutting tool . . . either radial or thrust . . . causes a minimum deflection of the spindle. In addition to "pre-loading" . . . these ball bearings are grease sealed . . . requiring no lubrication and no adjustment for their entire life. Moreover, the higher operating speed of the Logan Lathe, due to its ball bearing spindle mounting, enables a shop to take every advantage of modern, high speed cutting methods. Production is increased and unit costs reduced.

Write for catalog sheets so that you can compare before you buy.

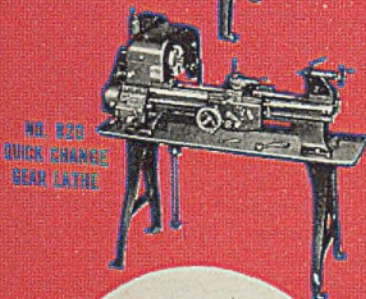
LOGAN ENGINEERING COMPANY
CHICAGO 30, ILLINOIS



NO. 200
BACK GEARED
SCREW CUTTING
LATHE



NO. 850
MANUFACTURING
TURRET LATHE



NO. 820
QUICK CHANGE
GEAR LATHE

Logan

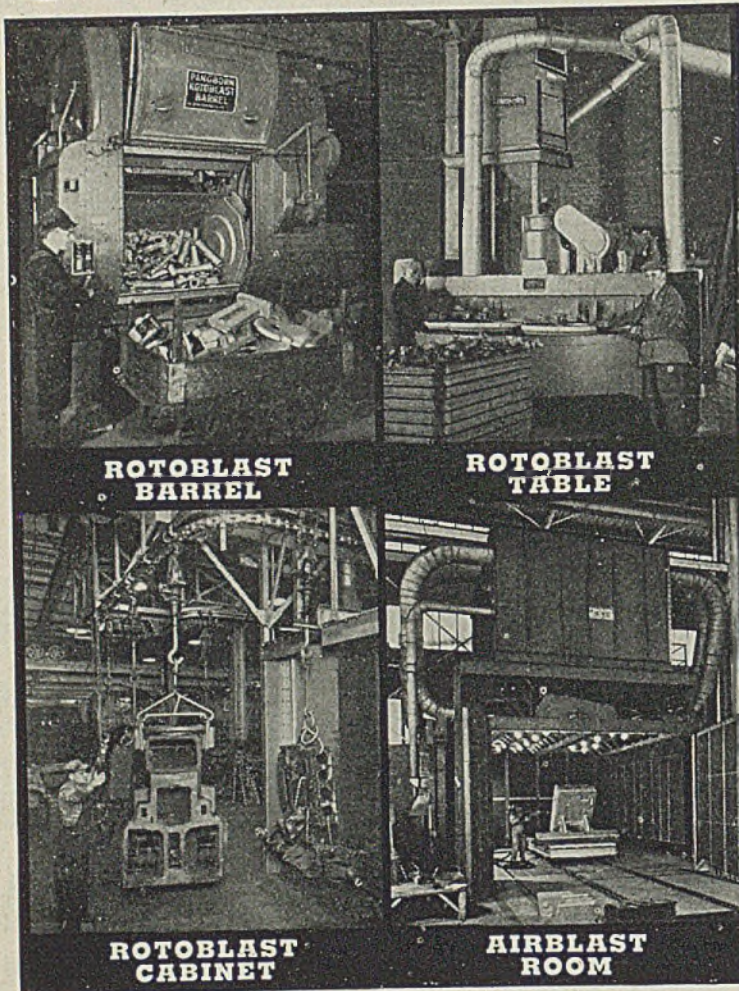
A NAME TO REMEMBER WHEN YOU THINK OF LATHES

*This advertisement is one of a series describing the finer features of Logan Lathes . . . Look for the next of the series

\$1,036,830.50

equals

CONFIDENCE



**ROTOBLAST
BARREL**

**ROTOBLAST
TABLE**

**ROTOBLAST
CABINET**

**AIRBLAST
ROOM**

4 concerns—since January 1942—have invested a total of \$1,036,830.50 in Pangborn blast cleaning and dust control equipment. As the engineering staffs in these organizations are second to none in thoroughness of investigation—and all items were purchased in competitive markets—the 7,673 square feet of Airblast ROOM area and the 31 ROTOBLAST units involved emphasize the CONFIDENCE these buyers have in Pangborn leadership.

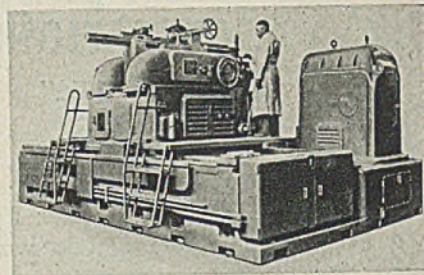
"COME TO PANGBORN"



PANGBORN

WORLD'S LARGEST MANUFACTURER OF DUST COLLECTING AND BLAST CLEANING EQUIPMENT
PANGBORN CORPORATION • HAGERSTOWN, MD.

pitch diameter. The operator can check work gear alignment from either side of the machine. The headstock is a self-contained unit with its own motor drive, special journaled sleeve-type bearings and change gears to regulate the speed of rotation of the work gear. The latter is driven through a flexible coupling. The cutter head and checking head are mounted on a saddle. The saddle assembly also is a self-contained unit with its own motor drive, pressure lubrication and controls which govern the length of stroke. The cutter head slide is reciprocated across the face of the



work gear during the cutting cycle. It is equipped with automatic feed and a preselector for varying the amount of feed. The cycle can be either manually or automatically controlled.

Pressure lubrication is used throughout and all lubricant reservoirs are provided with sight gages. The saddle ways are lubricated by automatic gravity feed. Coolant supply lines and electrical control conduits come through the rear of the machine base. Base of the machine measures 20 x 12 feet, 11 inches. The machine stands 11 feet high.

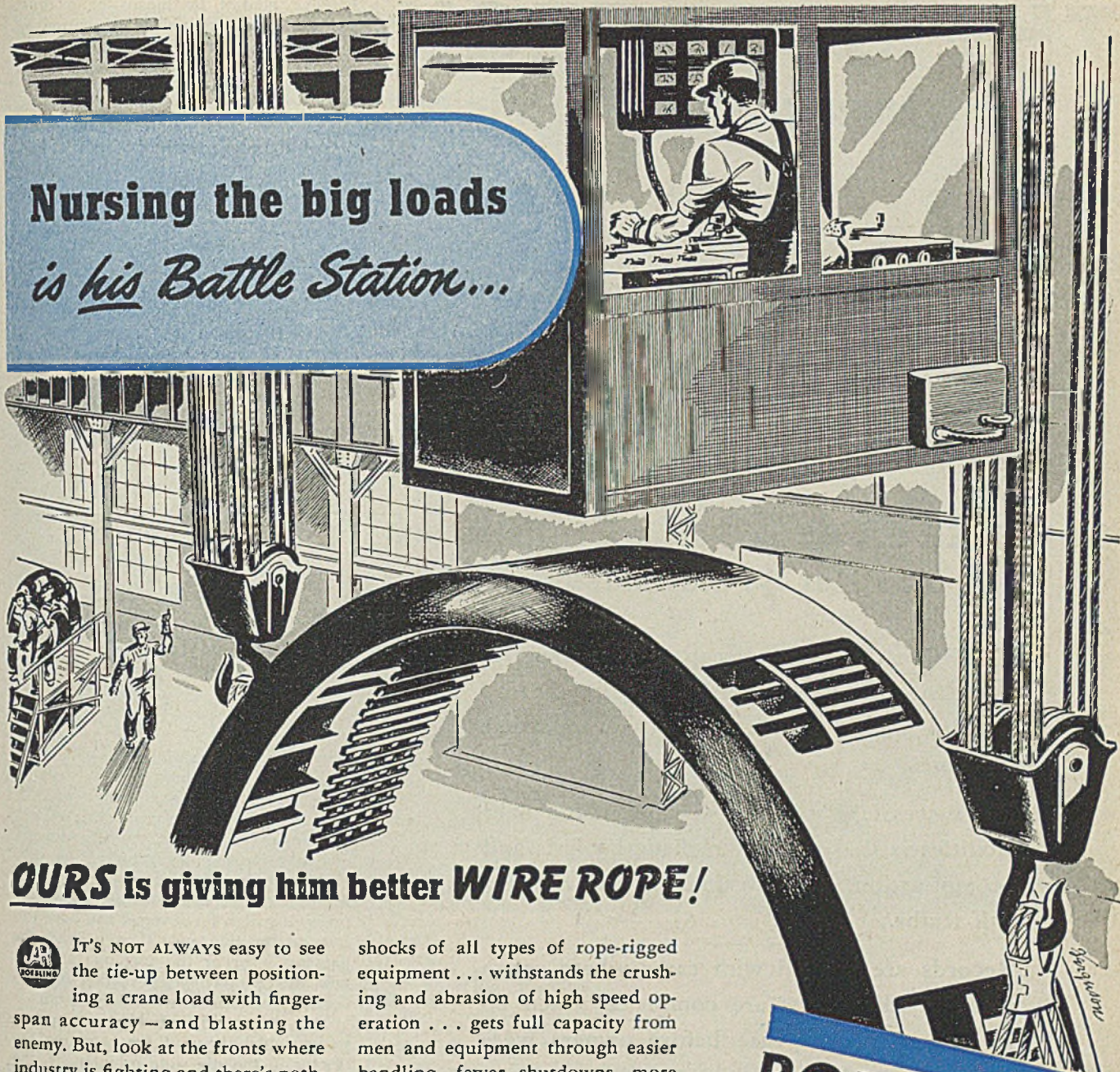
In the illustration the operator is in position to start the cycle and is within easy reach of pushbuttons which control the complete operation of the machine. A bank of lights tells the operator whether or not the saddle is in feed and the direction of movement. A similar control station is on the other side of the machine, opposite from that occupied by the operator in the illustration.

Forging Press


A quick advance speed of 750 inches per minute, a pressing and return speed of 37 and 725 inches per minute respectively are features of the new 1100-ton self-contained hydraulic forging press equipped with 35-ton ejector and sliding die table recently announced by E. W. Bliss Co., Fifty-third street and Second avenue, Brooklyn 32, New York. The press is electrically controlled and interlocked by means of this control so that the press, die slide and ejector operations can occur only when in proper position.

Four methods of operation are provided for the main slide: Semi-automatic cyclic operation—completing one press cycle and then stopping; full automatic operation—press slide operating continuously until a stop button is depressed;

Nursing the big loads
is his Battle Station...



OURS is giving him better WIRE ROPE!

 IT'S NOT ALWAYS easy to see the tie-up between positioning a crane load with finger-span accuracy — and blasting the enemy. But, look at the fronts where industry is fighting and there's nothing remote about it. Yours is a front line job . . . as necessary to winning the war as it is for securing the peace.

And our job of keeping you supplied with a tough, easy-to-handle wire rope like "Blue Center" is no less vital. First choice with outstanding plants throughout the country, you'll find it resists the loads and

shocks of all types of rope-rigged equipment . . . withstands the crushing and abrasion of high speed operation . . . gets full capacity from men and equipment through easier handling, fewer shutdowns, more sustained production.

☆☆☆

Yes, Roebbling "Blue Center" Steel Wire Rope is conserving steel for all America . . . by staying on the job longer . . . by meeting emergency service conditions unfailingly, wherever wire rope has a job to do, for Victory.

ROEBLING
"Blue Center"
STEEL WIRE ROPE
 PREFORMED OR
 NON-PREFORMED



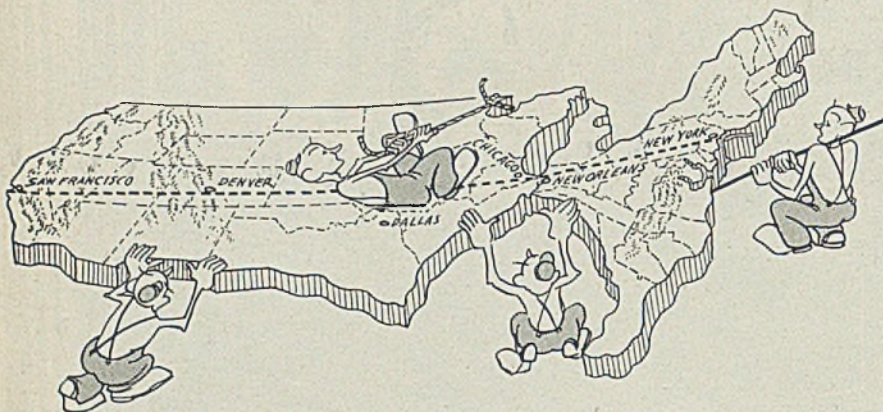
GIVE YOUR WIRE ROPES A FIGHTING CHANCE!

and they will deliver the full length of service that has been built into them. To help you, Roebbling has assembled a wealth of conservation data and boiled it down on a 4x5 inch tag that can be fastened right to the equipment. Printed in two colors and varnished to stay clean, it's a convenient way to remind and instruct operating men about such vital precautions as: Proper Installation,

Correct Spooling, Proper Use of Clips, Regular Lubrication, Frequent Inspection and Careful Operation. Copies are yours for the asking. Write our nearest office and specify Tag "A".

JOHN A. ROEBLING'S SONS COMPANY
 TRENTON 2, NEW JERSEY
 Branches and Warehouses in Principal Cities

THE STRATEGY of the Transportation Map Maker



HOWEVER . . . Other Forms of Distortion Are Not So Harmless

THE early railroad map makers found it easier to move the cities to a straight line than to weave a series of curves to actual locations.

The successful liquidation of unprofitable plant facilities is the result of realistic analysis and prompt action. It is no time for distortion by half truths.

Records are choked with cases where entire value of idle plants are completely eaten up by idle works expense before owners were reconciled to liquidation.

A realistic survey of your idle plant problem in the light of present conditions will enable you to improve your financial structure and post-war competitive position.

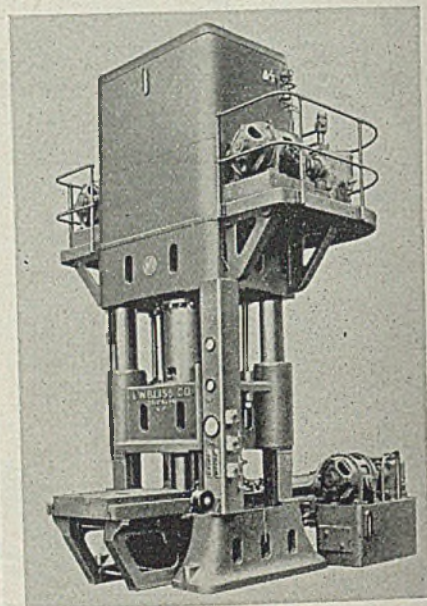
*Confidential Inspections and Appraisals
Made Without Obligation*

HETZ CONSTRUCTION COMPANY WARREN, OHIO

ENGINEERED LIQUIDATION SINCE 1929

BUILDINGS — EQUIPMENT — LAND — INVENTORIES — INTANGIBLES

joggling control by means of a drum switch permitting small reciprocations of the press in answer to positions of the drum switch and also retaining the quick advance and quick return features; inching control, permitting small increments of approach of the press by push-button, the press descending only so long as the down button is held depressed and only at pressing speed and opening



only so long as the up button is held depressed. The inching control features the same safeguards against over-pressure and over travel as the production control. Sequence on the first and second methods may include operation of die slide and ejector. A feature of the third and fourth methods is the ability to set the pressure switch for reversal and have this reversal function even though either the joggling lever or the inching button is held in the down position, the press reversing at the predetermined pressure.

Die slide is operated by a separate pump which is used for actuating the ejector in the die slide or interlock, the two not functioning at the same time.

Counterbore Drive

Shearproof counterbore drive introduced recently by Moreland Tool Co., 16935 West McNichols road, Detroit, uses the eccentric principle in its design to completely equalize the torque load on the holder and the mating driving member of the cutter. Driving member of the cutter fits into a spherical off-center hole in the holder . . . both shank of cutter and corresponding hole in holder being round in shape and eccentric in location only.


The method of coupling cutter and holder is practically as strong as a piece of solid bar stock of the same diameter and analysis. Concentricity of the assembled unit is held to the closest tolerances by means of a "stick taper". Angular notch is positioned to assure a full contact of the driving members from the start—it also provides a mechanical check against careless assembly of the

STEEL



ANOTHER DOWMETAL PRODUCT—ALLOY INGOTS

Answering the call for **Magnesium Alloys**

 Twenty-seven years of research and experience go into every Dowmetal magnesium alloy ingot so that you who are entrusted to make vital sand, permanent mold and die castings can forget your alloy problems when you buy ingot from Dow.

All alloy ingots are made under close metallurgical

control and furnished in a wide variety of compositions with certified analyses to meet strictest government and industry specifications. Dow also has available a complete line of fluxes and protective agents to meet your every melting problem.

THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN
 New York • Cleveland • St. Louis • Chicago • Houston • San Francisco
 Canton • Los Angeles

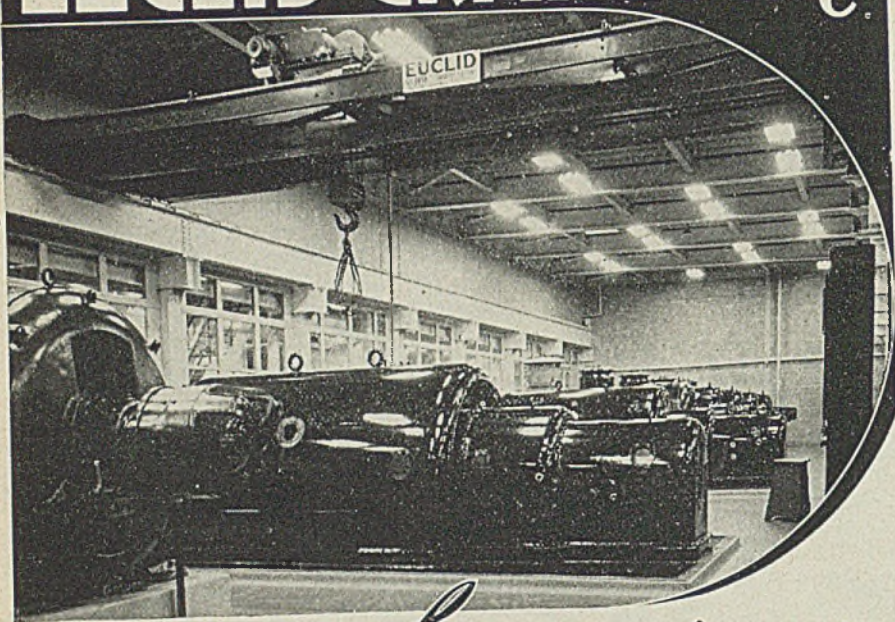
MAGNESIUM

PRODUCER SINCE 1916



INGOTS • CASTINGS • FORGINGS • SHEET • STRIP • PLATE • EXTRUSIONS

EUCLID CRANES *are*



STANDBY *Troubleshooters* IN MANY POWERHOUSES!

Interruption of power cannot always be avoided but must not be tolerated a minute longer than necessary when an emergency does occur. Utmost dependability in the standby cranes is therefore requisite.

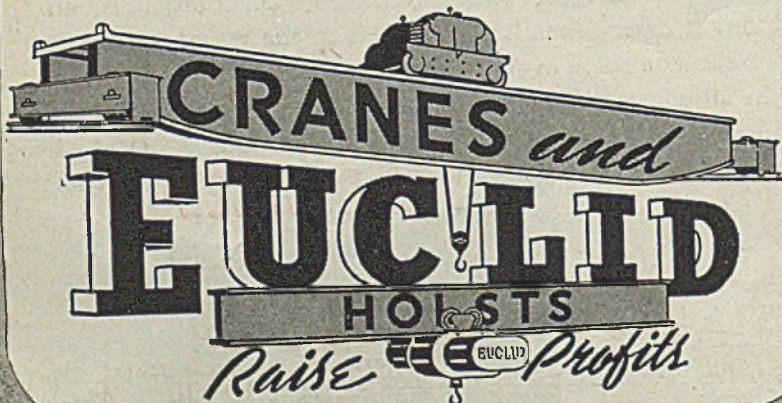
EUCLID CRANES are popular in this service and are to be found in many leading industrial and public utility power houses. They embody *speed* necessary to expedite emergency repairs and *ease of control* essential to the proper handling of intricate turbine and generator parts.

**WE
CAN DELIVER**
*a limited
number of*
**5 to 10 Ton
Cranes**
in
60 to 90 Days

This Euclid standby crane in the power plant of the Ford Willow Run Bomber Plant is a typical example of recent installations.

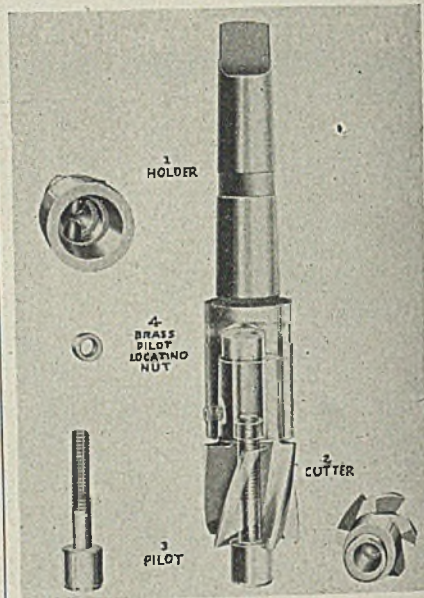
Satisfactory performance is evidenced by the roll call of both Euclid Crane and Euclid Hoist users, all discriminating buyers. Many have placed repeat orders and an impressive number have standardized on Euclid equipment.

THE EUCLID CRANE & HOIST CO.
1365 CHARDON RD., EUCLID, O.



holder and cutter. A taper shank on the cutter is recommended where precision is required. The pilot has no function other than as a guide—cutter can be drifted from the holder without disturbing its location.

Pilot hole is ground to close limits and extends back, the same size, the full



length of the flutes where it is enlarged to provide for inserting a brass nut to hold it in place. The length of pilot permits sharpening away more than two-thirds of the cutter without affecting either the drift-cut features of the cutter or the concentricity of the pilot. Four sizes of holders are being made providing cutters up to and including 3 inches in diameter.

Burring Tool

Bur-Sha is the name applied to a new tool developed recently by Industrial Aircraft Mfg. Co., 12205 Euclid avenue, Cleveland, especially useful in smoothing sharp edges on metals. It can be used to make a smooth radius on all gages of steel, brass, aluminum and other alloys, and eliminates incipient cracks in the forming of sheets of metal, if used for burring the edges before the drawing operations.

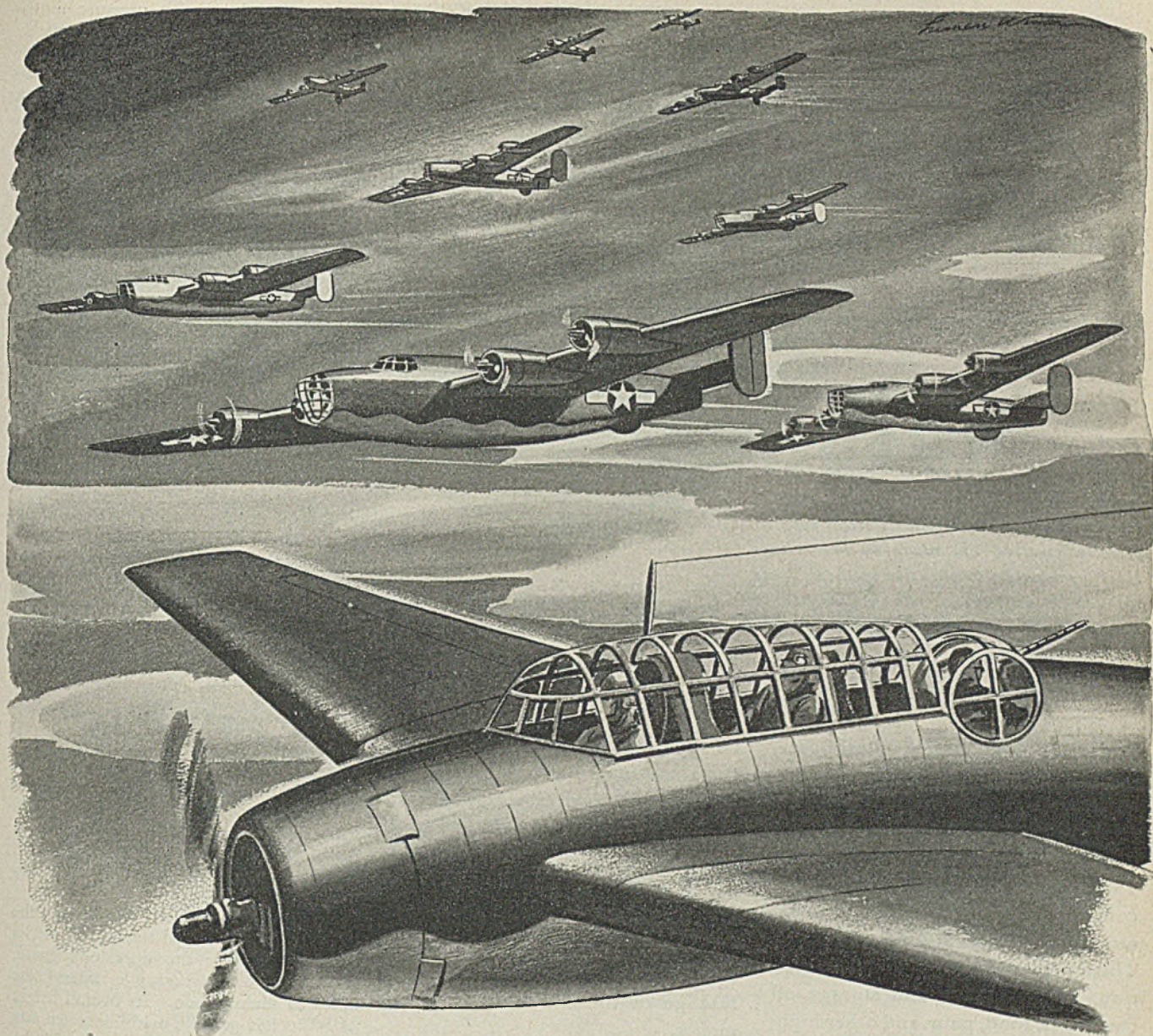
Shaft of the unit is bent sufficiently to allow freedom of position for the hand, and minimum pressure. The groove in the shaft fits closely the metal being burred, and the burring slot is shaped so the complete radius is made with one stroke.

The tool is being offered in two materials to meet hardness requirements of the metal to be burred—a carbon drill rod for alloys, and a high-speed drill rod for steel. It also is offered in a variety of sizes.

Hydraulic Pump

Anker-Holth Mfg. Co., 332 South Michigan avenue, Chicago, is offering a new Hi-Po supercharged hydraulic pump to meet the needs of a high-power hy-

STEEL



In America's Air Armadas . . .

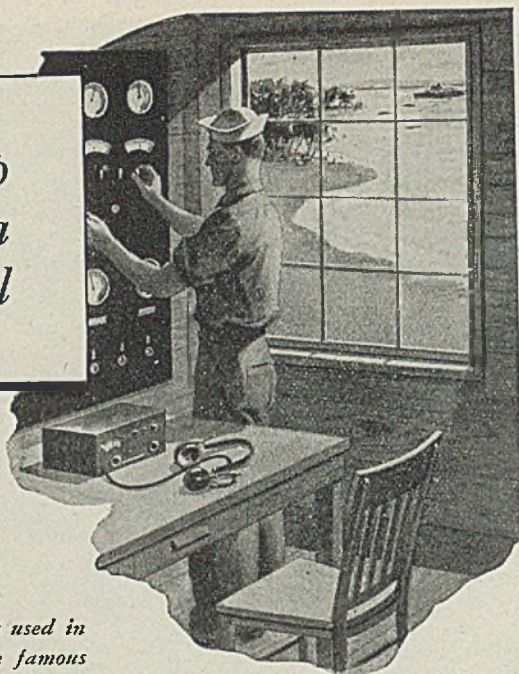
ANDREWS QUALITY STEEL

"None of our aircraft is missing." There's a lot back of these welcome messages! The unexcelled skill and daring of Allied airmen, and above all, the inherent ability of Americans to create and build the finest, most dependable products in the world. We know that our aircraft quality steel has made some of those happy messages possible, and we are proud to have a part in the all-out war effort. Produced in sheets in a wide range of sizes and thicknesses, aircraft alloy and carbon steel meets specifications AN-QQ-S-685 (X-4130). AN-QQ-S-686 (X-4135). AN-QQ-S-756 (X-4340). AN-S-11 (SAE 1020-1025). AN-S-12 (NE-8630). AN-S-22 (NE-8635). Complete information will be sent on request.



The Andrews Steel Company produces a limited range of aircraft quality alloy plates

*They keep
their ears in a
seamless barrel*



Housings for sound detection devices used in protected waters, are made by the famous Hackney seamless construction method. These seamless housings are but one of many types of Pressed Steel Tank Company products now serving in the war effort.

Today, these Hackney seamless housings are part of the equipment used in detecting the presence of lurking submarines and other enemy marauders. In peacetime, the Pressed Steel Tank Company applies its seamless construction process in the manufacture of Hackney Seamless Barrels. Their principal uses are the protection, transportation and storage of chemicals, food, paint and other high value products.

Pressed Steel Tank construction not only meets the wartime requirement of ruggedness, but also assures a sturdy, durable container which will stand up under the toughest kind of peacetime handling and transportation, trip after trip.

The Hackney Seamless Barrel can

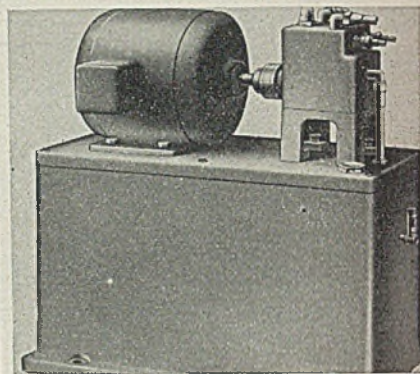
be cleaned easily and quickly. The curvature of the chime is smooth. There are no crevices, seams or welded joints in the interior of the barrel.

The bilged shape of this Hackney barrel facilitates handling and gives added strength. And a Toggle-tite, or single bolt closure, holds the head air-tight to the top edge, preventing leakage or the entrance of foreign matter.

The Pressed Steel Tank Company is now fully engaged in the manufacture of products for war-important uses. If you are building products important to the war effort, it may be that you, too, can use Hackney products or design and manufacturing facilities. Write for complete information.

draulic unit developing pressure in the 3000-pound range. Pressure is quickly delivered by unit's ½-horsepower motor using a supercharger to preload the piston chamber reducing pulsation to a minimum.

Pump and motor are mounted directly



on the oil reservoir using SAE-20 motor oil as the pressure medium. Low-pressure by-pass control having a range up to 300 pounds is built into the pump body of the unit.

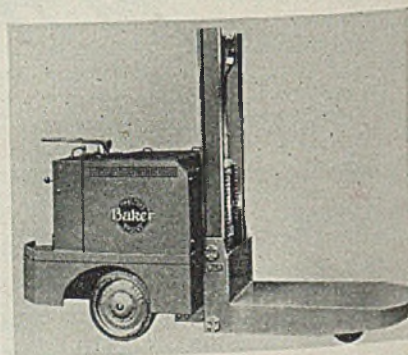
Both high and low pressure can be controlled individually on the power lines or through automatic control.

Lift Truck

A new 6000-pound capacity Hy-Lift truck, type H-3, is announced by the Baker Industrial Truck Division, Baker-Raulang Co., 2168 West Twenty-fifth street, Cleveland 13. It combines a "self-loading" feature with tiering and is useful for both transporting and tiering skidded material.

Built on a 66-inch wheelbase, the truck has an overall length of 123¾ inches, including the operator's guard. It is capable of working in intersecting aisles 67 inches wide. Its overall height of 83 inches permits ready entrance into box cars for loading and provides a maximum lift of 67 inches.

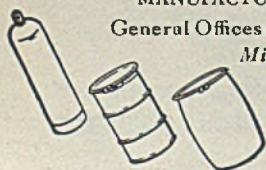
Battery box of the truck has been



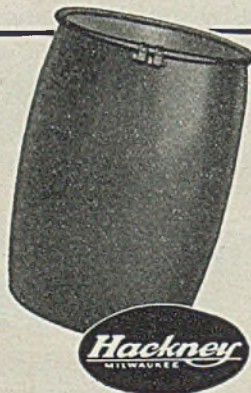
increased in size from 27 x 36½ to 32 x 39½ inches, providing space for enough additional battery capacity so that the truck may be operated continuously. An improved hydraulic-lift system provides positive control of hoisting and lowering. The control lever starts the pump motor and closes the valve forcing oil into the jack cylinder. Lowering is by gravity controlled by the same lever. The platform travels vertically on ball-bearing

Pressed Steel Tank Company

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The Original Phosphoric Acid Metal Cleaner

Mechanized dip treatment of helmets in preparation for paint finish

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GUNS
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Body Surfaces
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All Sizes

BOMBS
All Sizes and Types
and Many Other
Ordnance Parts

Deoxidine, a phosphoric acid type metal cleaner, removes rust and rust producers, light oil, oxides and annealing scale, from pits as well as from the surface of metal, *creating a chemically clean, slightly etched surface*—the ideal anchorage for enduring paint or lacquer finish. Deoxidine meets Army and Navy specifications for cleaning metal prior to painting.

There are various grades of Deoxidine adapted to the several methods of application and to cleaning surfaces with varying amounts of rust and oil. The Deoxidine Cleaning process has been standard for more than a quarter of a century and is adapted to the cleaning of steel, aluminum, aluminum alloys, in fact all metals (except zinc and cadmium).

If you have specific cleaning problems and will send us detailed information, our Technical Department will gladly send you prompt advice and recommendations. Please fill in attached coupon.

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American Chemical Paint Company, Ambler, Pa.

Please send me general Technical Service Data Sheets on

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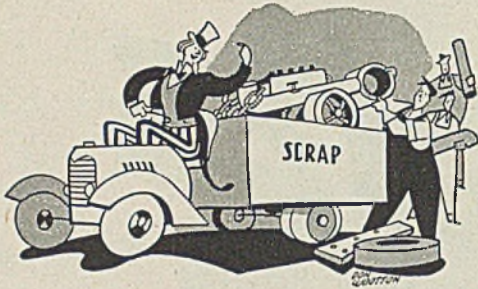
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Title _____

Company _____

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F-11



57,400,000 TONS OF SCRAP!

That's what Uncle Sam must collect!

That's what the steel industry of the United States will need to meet its war production program.

Do you realize how much scrap this is? It would take 771,000 freight cars to haul this tonnage. They would make a train 6,717 miles long!

Why is so much scrap needed? In making steel, the normal mixture that goes into the furnaces is 50% scrap and 50% pig iron. In foundries the proportion of scrap to pig iron is much higher. So we in this country must actually produce more scrap than pig iron if we are to keep the war production program going full-blast.

It is an actual fact that half of every ship, half of every tank, half of every gun, used by our Armed Forces, is made from scrap.

The scrap piles of the nation's steel plants are running low. This time it will take "fine-tooth-combing" to replenish our stock. Every farm, every factory, large and small, every shop, store, office and home must start its own drive for scrap.

You can help! Everybody can help! Start now to get out everything made of iron or steel that you do not absolutely need. Get it out where Uncle Sam's trucks can pick it up.

REMEMBER—our boys out there on many fronts need it—and they are depending upon you to get it. So everybody dig, dig, dig for SCRAP!

Geo. P. Trundle Jr.
President

THE TRUNDLE ENGINEERING COMPANY

Consulting Management Engineering

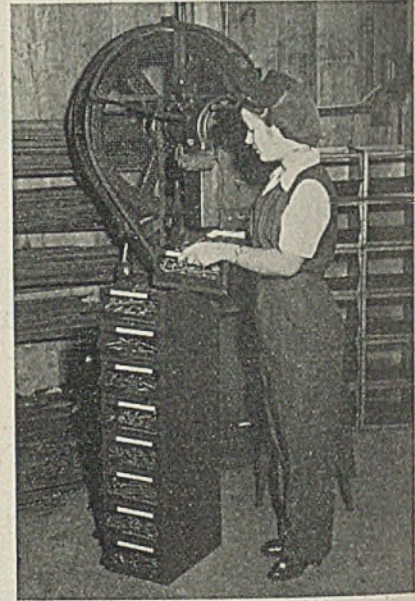
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rollers running in upright channel guides. Power here is supplied by a hydraulic jack and travel is compounded by sprockets and roller chains.

The operator's guard is built integral with the frame, providing additional safety to the operator.

Stacking Box

All contents are readily available in using the new type 700 stacking box recently introduced by American Metal Works, 1517 Germantown avenue, Philadelphia 12. It is ideal for stacking pur-

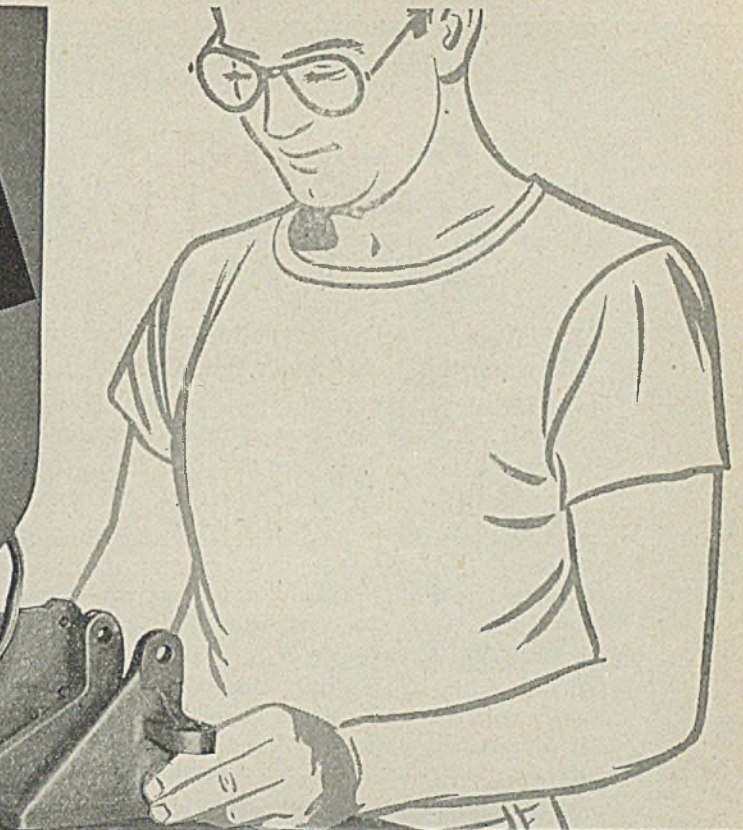
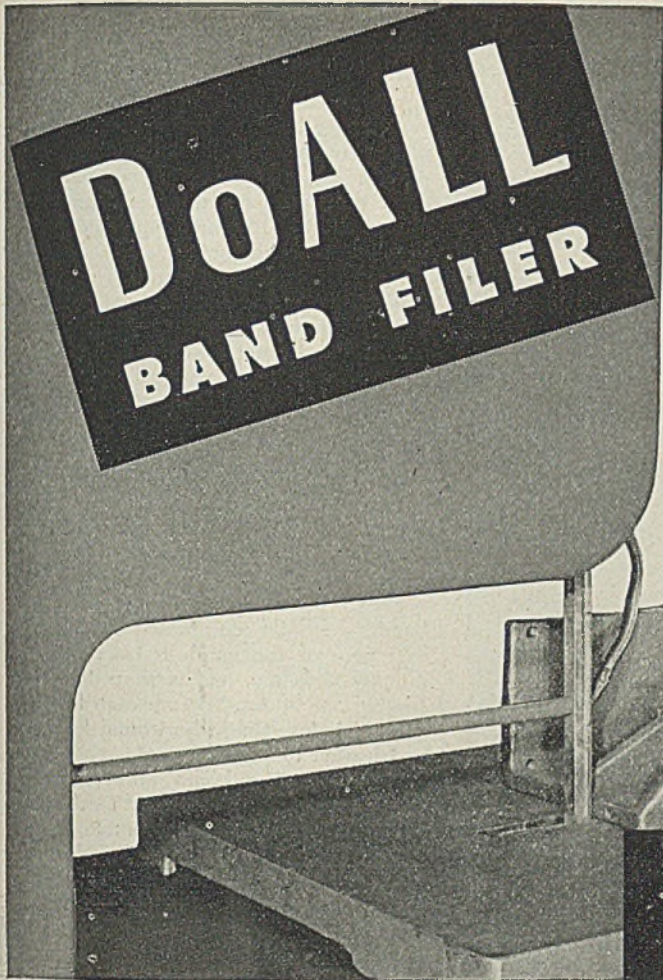


poses, a label above the opening quickly identifying contents. Box shown in the illustration is of 19-gage metal and measures 9 x 13½ x 4½ inches.

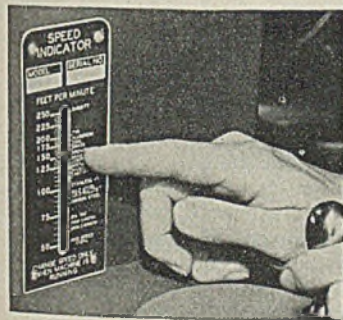
Gage Blocks

Cemented carbide gage blocks, which provide the means to greatly reduce the wear error in gage block use, are being offered by Lincoln Park Tool & Gage Co., Lincoln Park, 25, Mich. The new blocks, called Carblox, retain their accurate size within the allowable wear tolerance at least 50 times longer than ordinary blocks. Greatest wear factor in gage blocks is caused by abrasion on the ends of the build-up. A relatively small amount of wear is caused by the wringing together of the blocks. The Carblox used on each end of a build-up act as protective anvils and prevent wear on the less wear-resistant steel blocks. Blocks are being offered to "A" accuracy (0.000004-inch) and "B" accuracy (0.000008-inch) as a series of gage block build-ups or as individual blocks when a build-up is not required.

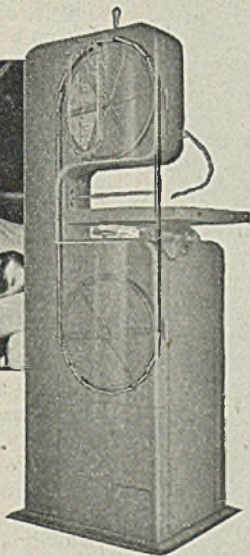
The 14-block set consists of two 0.050, two 0.100 and one each of 0.05005, 0.0501, 0.0502, 0.0503, 0.0504, 0.0505, 0.0506, 0.0507, 0.0508 and 0.0509-inch. The 0.050 and 0.100-inch blocks are also furnished in boxes in pairs as well as in combination—that is two 0.050-inch blocks and two 0.100-inch blocks in a box.



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 variable control fits file speed
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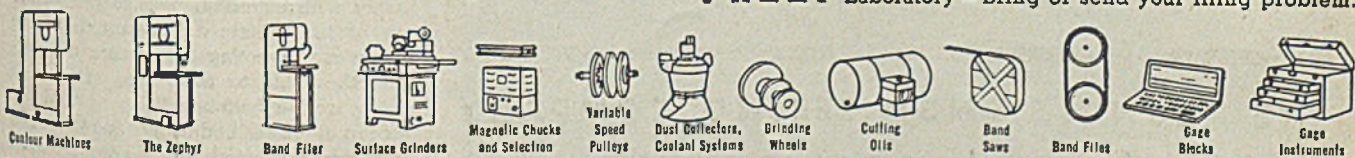
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The resultant speed is amazing! Four times faster than reciprocal machine filing—nine times faster than hand filing! *Plus* smooth cut internal or external finishes, *file-broached* to tolerances beyond .001"—precision without experience, without fatigue.

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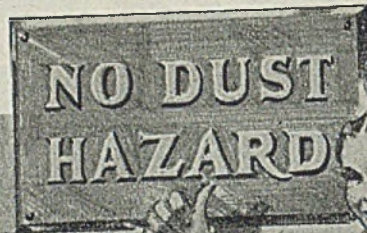
"A *Swell* PLACE TO WORK"

YOU can feel a justifiable sense of pride when the Joes, Louies, Hanks, and others in your plant speak of it as "a swell place to work" . . . because that simple testimony of good will is the "end result" of all the many big and little things you do to make it so.

On the other hand, the best employee-relationship in the world can go for naught if a faulty hygienic condition is permitted to exist. Take dust for instance—a more annoying and fearsome condition is hard to find, yet it is one of the most common of all.

If there is the slightest doubt about the efficiency with which dust is being controlled in your plant, check into it without fail. It may be the cause of low employee morale, poor workmanship, and sluggish production.

If you find that it is, or need help in your investigation, we will be glad to put a trained dust control engineer at work immediately. In the meantime write for information on American dust control equipment.



Two-Piece Case Design

(Continued from Page 108)

then allowed to cool, passed on to another furnace, heated to 1850 degrees and placed under the second press. The process is repeated two more times. After the fourth operation is completed, the nose of the 18.5-inch pipe section has reached its final contour.

Half of the original eight forging operations have been eliminated through learning from experience the ideal temperature and exact die design that allow maximum forging without forming tubular buckles.

The process just described differs only slightly in the case of the two-piece bomb and the one-piece bomb. In the former, the noses are inserted in horizontal instead of vertical furnaces, then restored to an upright position by use of an up-ender.

Step 5—In the case of the one-piece bomb, the tails are formed as follows: The nose of the bomb is inserted in a dummy nose die, and is shaped in two forging operations. Before each forging, the tail is inserted in horizontal furnaces and heated to 1850 degrees.

The two-piece bomb tails originally were fashioned on 300-ton mechanical bulldozers in four or five operations, but considerable difficulty with buckles and thin tails was encountered.

With the present method, in which they are forged on hydraulic presses in two operations in much the same manner as the one-piece bombs, this difficulty is eliminated as the use of female dies on a hydraulic press has a tendency to gather the metal and increase the tail thickness.

Some of the noses fail to obtain the proper contour by use of female dies only, and must be completed in a third operation in which they are sized over a male die while hot.

A female die, mounted on an 8000-pound drop hammer, is used to complete the forging operation on noses which do not pass the final contour gage.

Originally, these bombs were completed by dropping the nose into a female die and then shaping the nose forging by use of a male die mounted on a piston, but the damage done to the forging due to scale collecting in the female die and in the bomb caused this method to be abandoned. Legs of the drop hammer were raised as much as 48 inches with extension pads to permit the use of the female die mounted on the hammer. Inverting the female die permits the scale to drop free after each stroke of the hammer.

Step 6—The bombs are now forged and are inspected by Ralston, Blaw-Knox and army representatives from the Cleveland Ordnance District.

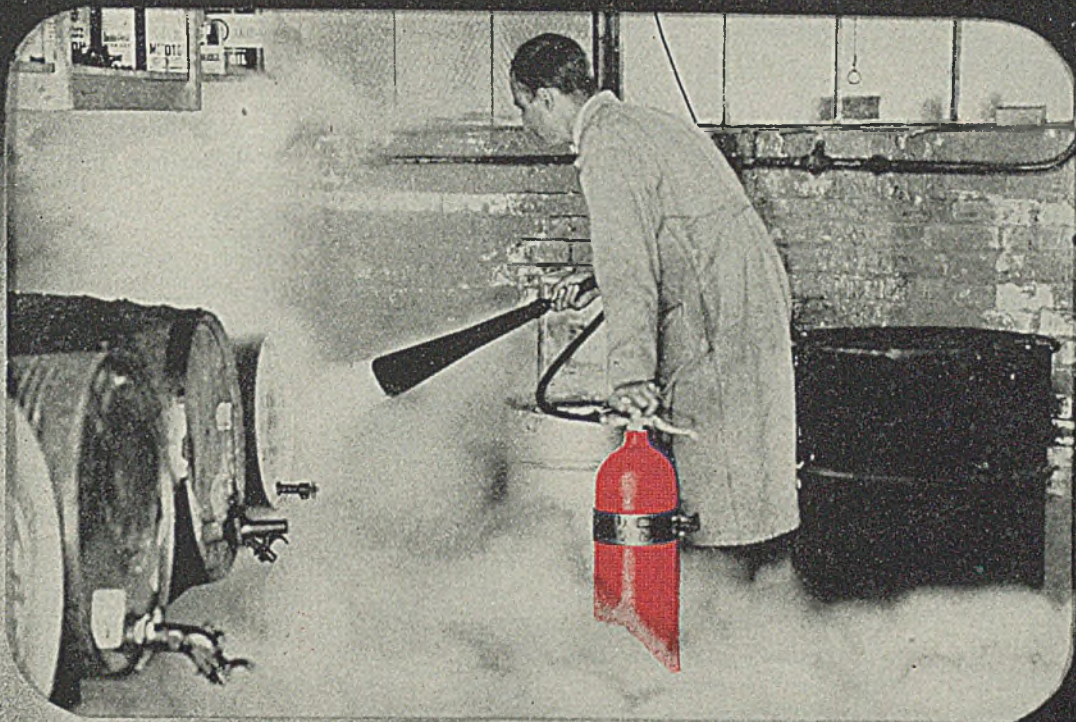
Step 7—The bomb nose is placed on a horizontal boring machine and a hole 1.5 inches in diameter bored in it. This hole is examined to see if there are folds or checks visible in the metal. If not, the nose goes forward to the next operation. If folds or checks are found, however, the nose is rerouted to the re-



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STEEL



The villain of this film threatens your plant, too!

FIRE, the saboteur, can destroy your plant — even though you've installed the most modern fire-fighting equipment! If your men don't know how to operate it, or if they use the "right" equipment against the wrong fire, disaster can easily result.

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pictures the different classes of fire, shows how to fight each of them. It's fast-moving, grips the attention of its audience during the twenty minutes of its run.

We'd be glad to show this film to key men at *your* organization. There is no obligation whatever for this service. Just drop a line today to the address below and we'll arrange a showing at your convenience.



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November 8, 1943

THOMAS

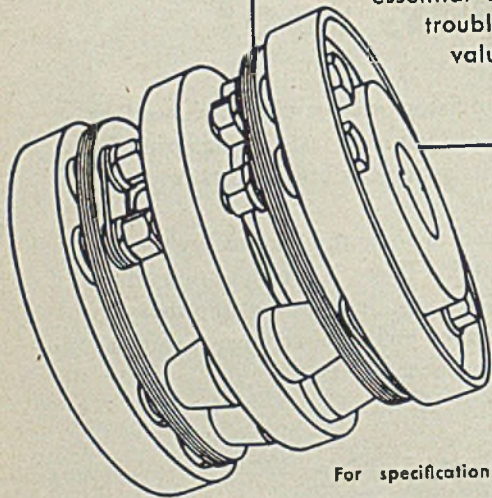
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*are taking a vital part
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... Because of their exclusive features Thomas Flexible Couplings are used on many of our nation's tools of war, as well as in the manufacturing of them. Since there are no wearing parts backlash is eliminated and lubrication is unnecessary.

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work department, where imperfections are scarfed out and welded, using electrodes with the same properties as the bomb material. The nose is then annealed and returned to be rebored and re-examined.

Step 8—The bomb is pushed forward to a horizontal facing machine, where the nose is faced off so that it is 2.25 inches across. This area is then examined for checks and folds as in the previous operation.

The bomb is then transported horizontally on roller conveyors to the magnetic inspection (Magnaflux) station, where cracks and flaws invisible to the naked eye can be discovered. (At this writing, no other bomb manufacturer does this.) If a defect is present, the bomb goes to the rework department to be scarfed out, welded and annealed.

Bore Die for Extrusion

To minimize the number of folds and cracks which occur in compressing the metal nose, Blaw-Knox engineers developed a method whereby a hole is bored in the female dies used in the last two forging operations. This permits excess metal to protrude into the socket, forming an extrusion which is cut off after the final forging and while the bomb is white hot by a burn-off machine developed within the plant.

Burning off this pucker is essential to reduce tool wear which resulted from the original method of using mechanical means to remove it. Under the present method, a natural gas torch burns a 1.25-inch hole into the bomb nose at the same time as it burns off the pucker, thus aiding greatly in subsequent boring operation in which the nose hole is produced.

Step 9—After passing through the magnetic inspection station, the bomb goes to a station where a welder tacks three suspension lugs on its surface.

After it leaves the tacking position, the bomb goes to the final lug welding position, where the lugs are attached according to strict specifications.

Step 10—The bombs are loaded six to a car to be put through a hardening furnace, where they are heated to a temperature of 1650 degrees Fahr. They are then removed from the car by a mechanical lifting device designed and made in the plant and are dipped into quench tanks filled with water which is circulated through a cooling tower. The casings remain in the quench tank for 3 minutes.

Step 11—The bombs are replaced on their car by the same lifting device mentioned above and go through a draw furnace, where they are heated to 1000 degrees. At the end of this process, they are unloaded and racked outside of the plant in a cooling area.

Step 12—After being cooled, the bombs go to a hydraulic lug-testing machine, where the three lugs are subjected to a direct pull of 8000 pounds and a shear pull of 3500 pounds, exerted parallel to the longitudinal axis.

Step 13—The bomb noses are placed vertically in a vertical boring machine,

and the nose is threaded 12 threads to the inch, 2 inches in diameter, to a depth of 1.125 inches.

Step 14—The tails are placed in a horizontal boring and facing machine, where the tail is bored to a diameter of 9.75 inches and threaded, eight threads to the inch. (The bomb was bored in the original machine to a diameter of 9.5 inches.) It is then tapped with a Landis collapsible tap.

In this operation, difficulty was encountered in keeping the nose and tail bores true to the bomb's axis and in keeping an even sidewall thickness in the tail threaded area, as holding devices in use then rested on the forged areas, which were not within the close tolerances required in machining. The machines used had to be reconstructed and a floating holder developed which would permit the bomb case to oscillate slightly to follow a collapsible tap which was attached to a hydraulically operated piston on the machine.

Step 15—After the threads have been inspected, the bomb is conveyed to a mechanical degreasing unit for cleaning with a preheated cleansing solution. The bomb is suspended vertically from a plug screwed into its nose and attached to an endless conveyor chain.

Step 16—From here, the bomb goes to the shotblasting department, where scale and rust are removed by blasting with No. 30 fine steel grit. Originally this department was adapted from the one in shot blasting freight cars. Six stations, each with two nozzles, were constructed and 12 men operated them, clothed in masks and respirators.

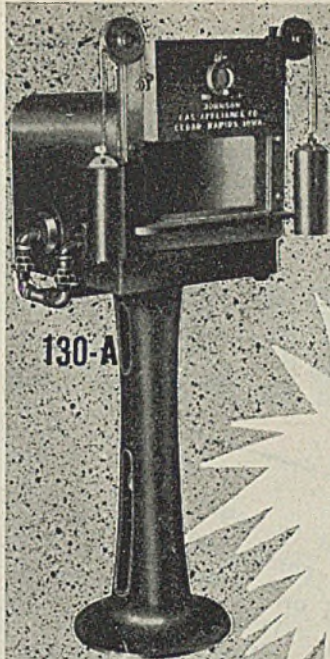
Semiautomatic Shot Blast

In August, semi-automatic shot blasting equipment was installed and hand methods were used only in removing scale missed by the automatic device.

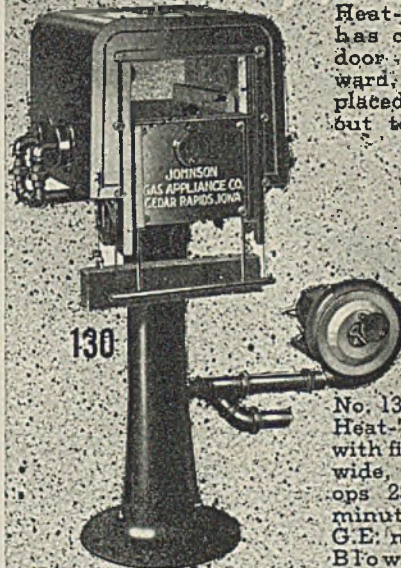
Step 17—The bombs are passed manually over a horizontal conveyor to inspection tables where representatives of the Army and Blaw-Knox look for exterior scale blemishes, welding splattering on lugs, and overbore on nose or tail. Minor retouching necessary is done in this department by grinders capable of as high as 5800 revolutions per minute. The nose and tail threads are hand tapped again to insure removal of particles of grit and the bombs are then passed through a rotary cleaner, where they are wire brushed and cleaned under air pressure to remove all dust before going to the internal paint station.

Step 18—The interior of the bomb is painted by rotating the bomb in a horizontal position at the same time as a tube is injected emitting a regulated amount of acid-proof black paint at a controlled rate of speed.

Step 19—The bombs are ejected from the internal spraying booth by an automatic air ejector which returns them to a vertical position on the roller conveyor. They are then pushed to a point where they can be hung on an endless overhead conveyor which carries them



130-A



130

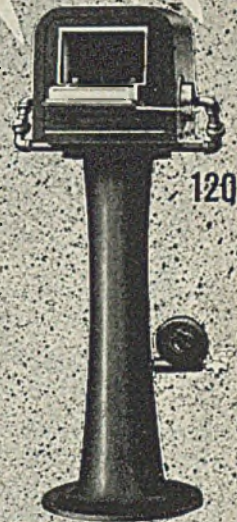
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No. 130-A Hi-Speed Steel Heat-Treating Furnace has counterbalanced door which opens upward, so tools can be placed or removed without temperature drops.

4-burner, illustrated, for 1400 to 2000°F. is \$295. 6-burner, for 1800 to 2400°F., \$325. Prices are F.O.B. Factory. Firebox 7 $\frac{3}{4}$ " high, 18" wide, 16 $\frac{1}{2}$ " long.

No. 130 High-Speed Steel Heat-Treating Furnace, with firebox 5 $\frac{1}{2}$ " high, 13" wide, 13 $\frac{1}{2}$ " long. Develops 2300°F. in just 22 minutes. Complete with G.E. motor and Johnson Blower, \$248 F.O.B.

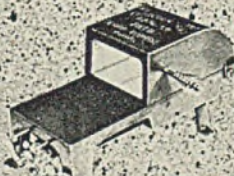


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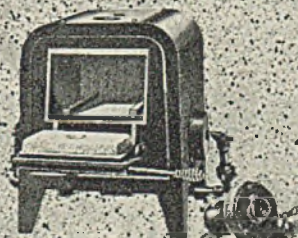
No. 120 Hi-Speed Steel Heat-Treating Furnace, with firebox 5" high, 7 $\frac{3}{4}$ " wide and 13 $\frac{1}{2}$ " long. Ideal for hardening punches, dies and parts. Equipped with G.E. Motor and Johnson Blower. Only \$129.50 F.O.B.

Parts and Patterns Available

If you own any Johnson Gas Appliance, — and you probably do, for they've been tops in the field since 1901, — you can still get any part you need, for we have parts and patterns for every Johnson Gas unit ever built. If you need repair parts, write for price list.



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"It is an obligation for management to begin NOW to look ahead to the post-war years, when ability to produce at low cost will once more determine which plants are to survive. It is then that the plant that has been making full use of mechanical handling equipment will find that same equipment its sharpest-edged tool for cutting costs."

—Factory Management and Maintenance

● Yes, NOW is the time to plan low-cost, efficient output for your post-war product. For planned production can give you the efficient cost-cutting tool you will need. With *both* Lamson Dispatch Tubes and Lamson Conveyors at work in your plant, management, materials, men and machines all move efficiently and economically towards a planned result.

● Lamson Tubes furnish instant, unerring communication to every part of the plant—important papers, time tickets, blueprints, samples, inspection reports, small tools, are made available the minute they are needed. Lamson Conveyors keep materials moving with a minimum of handling and floor-space, setting up a steady pace for production and eliminating traffic in the aisles and pile-up around machines.

Send for NEW Booklet

● How to increase output and cut unit costs with this system of planned production is told in our new booklet called, "Co-ordinated Control." It's full of valuable suggestions for projecting economical post-war production. Whatever your plans, be sure to send for a free copy of "Co-ordinated Control."



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Makers of CONVEYORS and PNEUMATIC DISPATCH TUBES

through the external paint booth. Here they are rotated and painted with a red-dish-color prime coat.

Step 20—The bomb continues from the paint booth on the same conveyor and two metallic shipping bands to protect the lugs and aid in handling are installed while the bomb is in progress.

Step 21—The bomb is removed hydraulically and placed on a small car which is pushed to the final inspection department. The base and nose plugs and fuse seat liner are installed. Ordnance inspectors give the bomb a final once-over.

Step 22—The bomb is moved along the inspection table by rolling manually in two channels, with the shipping bands making this comparatively easy. The bombs are then loaded into railroad cars, four rows high, 180 casings to a car, and soon are on their way to any of several government loading plants to be filled with high explosive.

Welding Two-Piece Casings: The above procedure applies generally to the one and two-piece bombs alike. The two-piece bombs, however, before being placed in the regular machining assembly line must be welded into a single unit. This is done as follows:

The two ends to be placed together are beveled or scarfed to about a 30-degree angle ready to weld. Where there is distortion in the tubing caused by heating or forging, the piece must be sized or rounded by a hydraulic sizing machine, which was designed and made in the plant.

Girth Weld Difficult

The nose and tail are matched and placed in a jig where they are tack welded together. They are next placed in an automatic welding machine and welded. This girth weld is one of the most difficult in the business and must be done by a qualified welder.

The weld must pass a radiographic test as well as periodic tensile, bend and hydrostatic tests. After the two pieces are welded, the bomb goes along the one-piece line until machining operations are completed. At this point it is inserted in a hydrostatic pressure machine and the bomb is filled with water to 1800 pounds pressure. The bomb is hammered and the pressure increased to 2400 pounds. If there is no leakage, the welded bomb goes back on the one-piece line.

Another phase of the Columbus bomb program which should not be overlooked is the development of procedure which has cut the amount of scrap which must be sent back to the mills to be melted down to less than 3 per cent.

One department of the forging plant is given over to the salvaging of bombs which fail to pass inspection for some reason. Grinding, welding and reprocessing methods have been highly developed.

The Columbus bomb program is the only one in the United States where two-piece bombs are made. This is an important factor in reducing scrap, for if

STEEL