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STEEL

ESTABLISHED 1882

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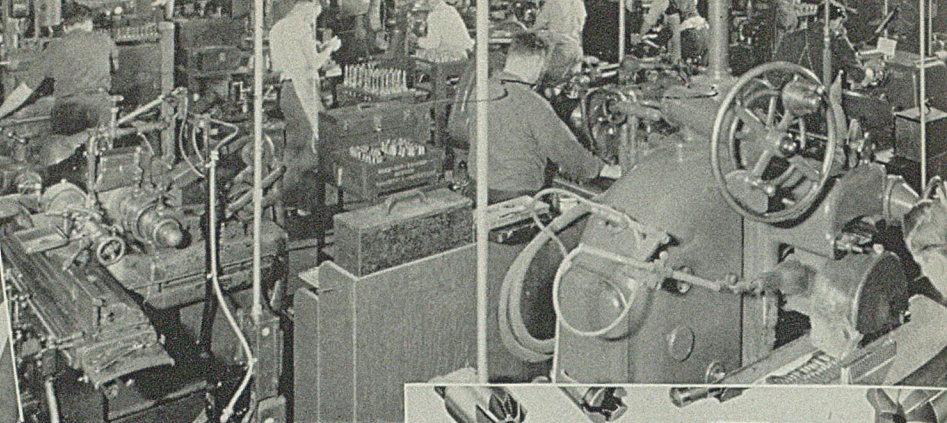
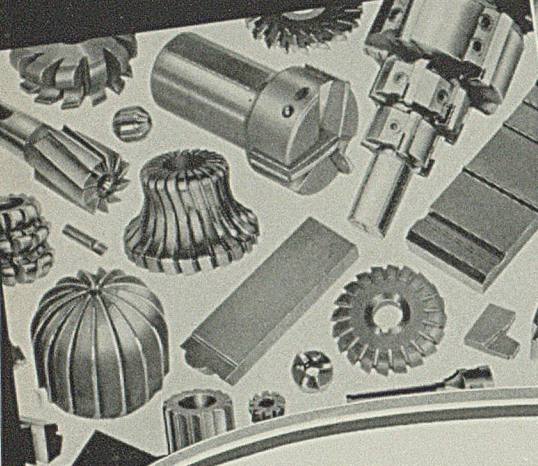
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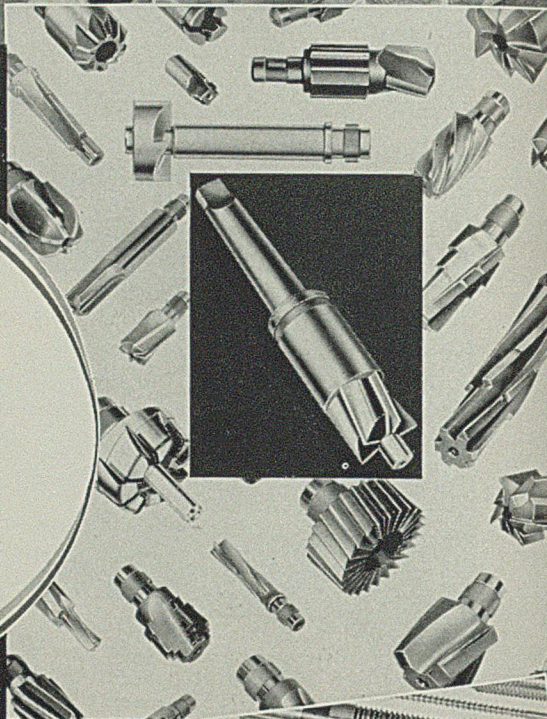
PRODUCTION • PROCESSING • DISTRIBUTION • USE

tion . . . grinding brooches and other precision-made Continental cutting tools.

Below: A few of the many precision cutting tools made by Continental Tool Division of Ex-Cell-O.



To Right: The Continental Countersure with the indestructible drive . . . and various precision cutting tools made by Ex-Cell-O with this well known drive.

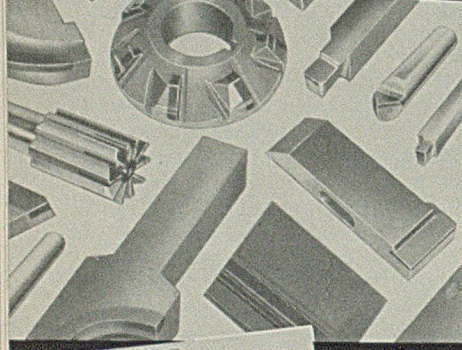


Where **QUALITY** and **WORKMANSHIP** count!

Cutting tools . . . made right . . . are becoming more and more vital in the rush for war production. There's no time now to experiment with inexperienced cutting tool sources. Continental engineers at Ex-Cell-O Corporation have been making high-grade cutting tools of many types and sizes for more than 25 years.

EX-CELL-O CORPORATION • DETROIT, MICHIGAN

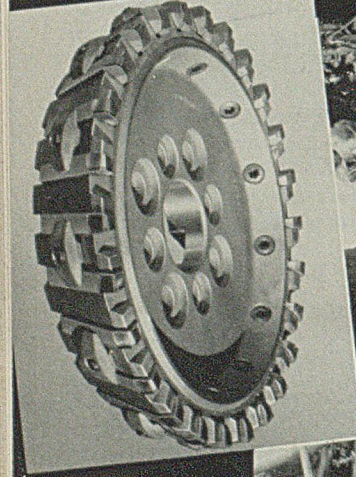
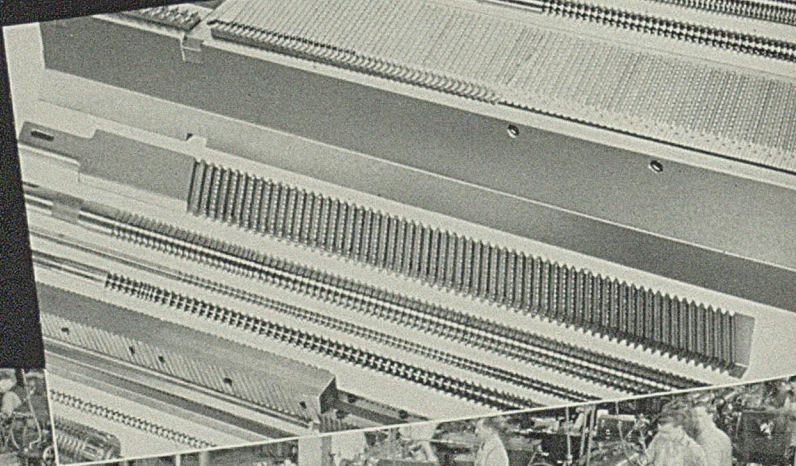
EX-CELL-O MACHINES AND TOOLS
XLD Precision



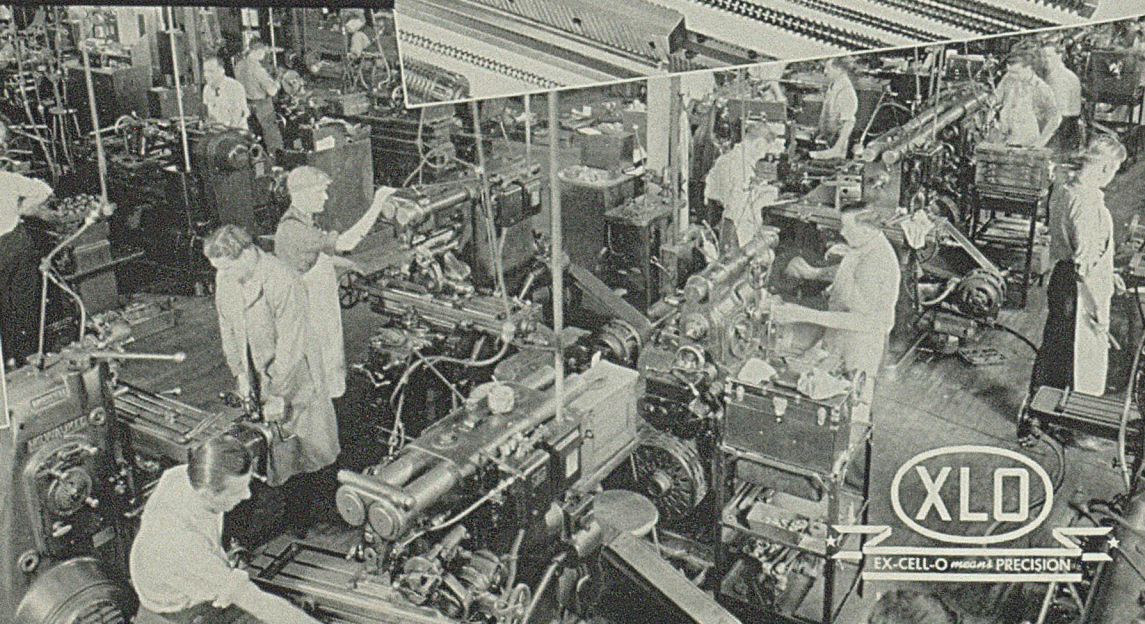
To Left: A few of the many carbide-tipped cutting tools made by Continental Tool Division of Ex-Cell-O.

To Right: Where sizable production with close accuracy and good finish are required, broaching has many advantages. Shown are some of the different kinds of broaches produced by Continental.

Below: Another sectional view of Ex-Cell-O's Continental Division, where standard and special cutting tools of various types and sizes are made for war production jobs.



Above: Another widely-used cutting tool bearing the Continental name...inserted blade face milling cutter.



EX-CELL-O *MAKES* PRECISION

HIGHLIGHTING THIS ISSUE OF STEEL

THIS WEEK'S pictorial feature on conversion from peacetime to wartime production tells how a number of smaller manufacturers made the switch (pp. 38-41). A vast additional amount of such conversion still lies ahead and is to be pushed just as rapidly as it is possible to do so. While government representatives are trying to render all possible help in enlisting additional facilities for war production, past experience proves that the chief factor in making the necessary conversions is the amount of initiative and determination with which the manufacturers involved go after the necessary contracts or subcontracts. Only by getting such business can a great many of them count on remaining in business.

The machine tool industry reviews its problems, one of which arises from the fact that it no longer may have nickel (p. 54) It now

Women on Machines

is clear that training of women to perform machine operations will be on a vast scale (p. 55) The problem of providing transportation for war plant workers already is becoming acute (p. 57) Industry resents unwarranted government accusations which are featuring the patent law hearings (p. 42) Re-examination of government contracts is to involve many additional companies (p. 58) New organization is the Associated White Metals Smelters of America (p. 63) First heat will be poured this week at the new Texas steel plant (p. 45); new blast furnaces are to be built in that state (p. 67).

President Roosevelt at last has indicated he is about to establish a national labor policy (p. 44); in the meantime slowdowns have affected production on a number of Navy contracts

National Labor Policy

"Floating" cars eliminate side-sway and lurching (p. 62) The labor-management committee method for promoting produc-

tion is making rapid progress (p. 68); more war plants are on 24-hour schedules The recent Steel Conservation Order is held up temporarily to work out details (p. 48); it will result in discontinuance of production of more than 400 items made of steel. Anti-inflation policy is beginning to take shape; Cuba will become important source of nickel; steelmakers have higher priority on repair materials Various new government orders and activities affect industry (pp. 49, 52, 53).

Electrographic analysis, explains E. A. Arnold (p. 74), is a comparatively new method of analyzing metals that does not destroy the sample,

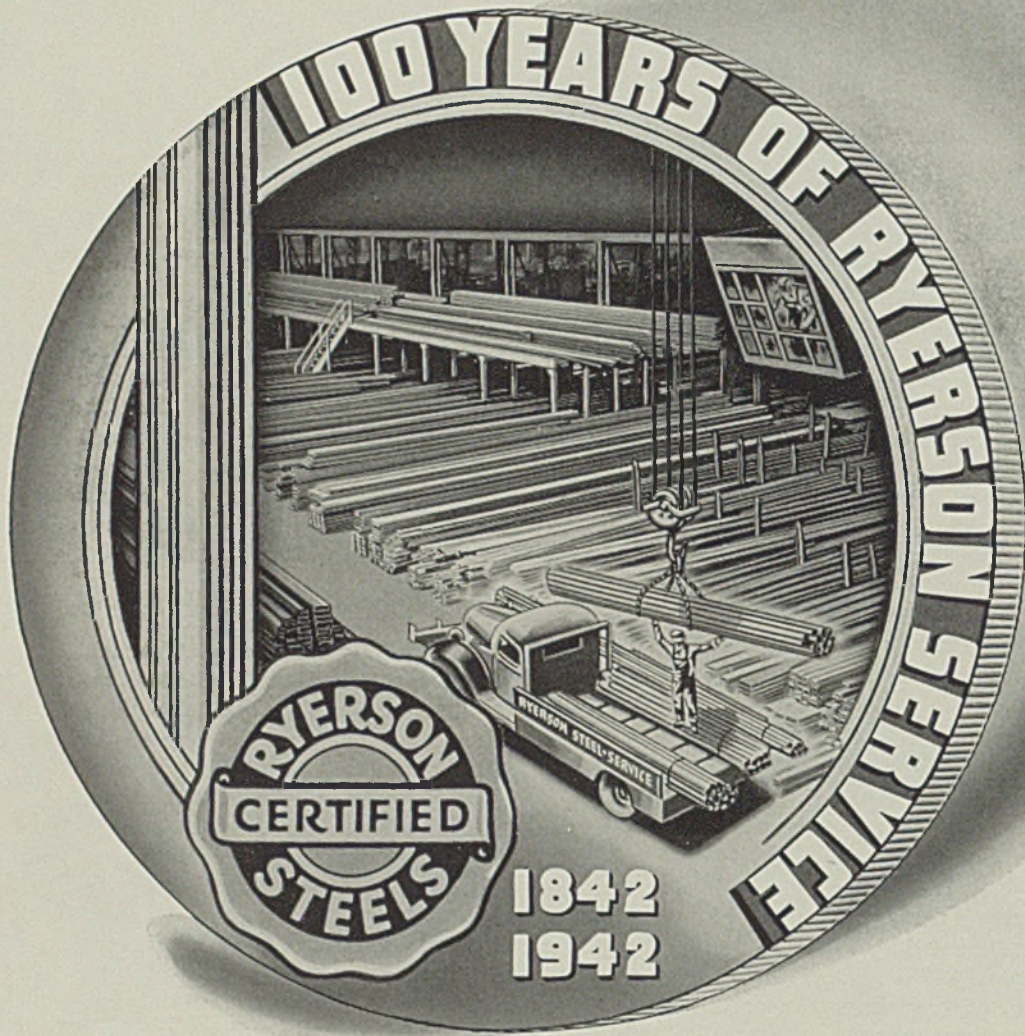
New Method Of Analysis

takes only a few seconds or minutes, gives positive color reactions, shows distribution of element sought. . . . A discussion of how to avoid cracks in welds, (p. 78) is approached by studying the forces encountered. . . . To speed training of men for war production, General Electric Co. plans (p. 80) to distribute a series of color films on arc welding. . . . A rotary indexing feed table (p. 93) is employed by an aircraft company to speed blanking and forming operations by positioning work under the ram automatically.

Dr. C. B. F. Young tells (p. 94) why silver plated coatings are being so widely considered as an important substitute for coatings of nickel,

Silver for Coatings

chromium and other scarce elements. . . . Another method of conserving strategic metals is a new process (p. 82) developed to produce steel sheets protected with a cladding of copper or copper alloy. It is now being extended to produce sheets clad with brass, gilding metal and stainless steel. . . . What one manufacturer has done to conserve materials is told (p. 72) by David R. Kellogg. . . . The scrap shortage is permanent, says Lewis B. Lindemuth, so the handling of high-iron charges must be licked. He explains (p.88) some of the major problems.



**Through Peace and War —
A Century of Service —**

THROUGH 100 YEARS of peace and war—good times and bad—Ryerson has served industrial America. As in every other crisis, we continue to provide steel to meet the emergency requirements of our nation at war.

STEEL

April 20, 1942

RECKLESS SNIPING IS DANGEROUS IN WARTIME

It is too bad that so many Americans choose this particular time to find fault with each other. If one were to take seriously the accusations which have been widely publicized recently, he would be forced to conclude that most of our citizens are prompted by the basest of motives.

Consider the furore over the acts of companies which have dealt with German enterprises. A congressman gets a bit of information which looks bad. Without checking thoroughly, he issues a series of wild charges and hales representatives of the accused company before an investigating committee. The entire proceeding is attended by scare-head publicity. Regardless of whether the company later proves its innocence, the public gets the idea that it and perhaps many other American corporations have been working hand-in-glove with the enemy against the interests of their own country.

A more sensible method of dealing with cases of this kind should be employed. The government has ample facilities for investigating suspicious practices. Why not get the facts first and then if they justify action, let the proper authorities discharge their duties in the ordinary way? Then adverse publicity would be meted out to companies only after it was clearly evident that they deserved it.

Recently one of the investigating committees issued a statement charging that numerous companies holding war contracts had increased salaries of executives by outrageous percentages. It is true, of course, that some companies have increased salaries more than circumstances warrant. But, unfortunately, one of the executives held up in this statement as a 'horrible example' happens to be a man who held a relatively unimportant job in the late thirties but who stepped into a tremendously important post in the forties. Naturally his increase in salary, expressed in percentage, looks suspicious. But he has become, in a few years, an outstanding figure in his industry. He deserves commendation, not censure.

Even worse than the injustice done to individuals and corporations by this irresponsible sniping is the false impression given to the public. To exaggerate evil in one class is to breed suspicion and hate in others. Now is no time to rekindle the fires of class hatred in America.

E. L. Shaner

Editor-in-Chief

Here are the reasons why you must . . .

CONVERT YOUR TO WAR PRODUCTION

LIVES OF millions of Americans and the outcome of the war itself depend today upon the speed with which our industrial plants shift over to full war production, for war respects no timetable. Thus we dare not wait until we can build sufficient special-purpose plants and machines to make the weapons we need. Right now war production is crying for every production facility we can muster—especially machine tools—for even garages, repair shops, and home workshops are being enrolled in this life-and-death battle for production.

Given an equal start, we could outproduce the entire Axis—single-handed. But the start was not even. America IS BEHIND for the enemy has mobilized his entire industrial forces for nearly a decade with the single purpose of building an invincible military machine. Even after the quick and tragic fall of Poland, Belgium, France and the rest, and our own serious losses, many of our manufacturers are still loath to leave the ways of peace and get into this fight.

But you say, "How about our vast new arms plants built or begun?" While some of these are in production and many existing plants have shifted over to war work, the bald truth is that this country, the greatest industrial nation on earth, is *still handicapping its armed forces with a lack of sufficient fighting equipment*. Too little and too late are still defeating the United Nations.

To get an idea of the job facing

us, consider what Germany has done.

With a national income of only 40 billion dollars against ours of nearly 100 billion, Germany last year produced 27 billion dollars worth of war goods while the "Arsenal of Democracy" brought forth a total of 15 billions for ourselves and the other United Nations. With Italy and Japan, total Axis production was around 45 billions, equal to that of Britain, Russia and the United States together. Yet to overtake the Axis and to go on to decisive victory, we must out-produce it 2½ to 1, military authorities agree.

Axis successes so far are largely due to the completeness with which they have geared their industrial potentialities to war needs. In Germany, Italy and Japan, there has been no thought of business as usual for some time, for conversion of civilian production to war production was considered a prime requisite as a prelude to conquest.

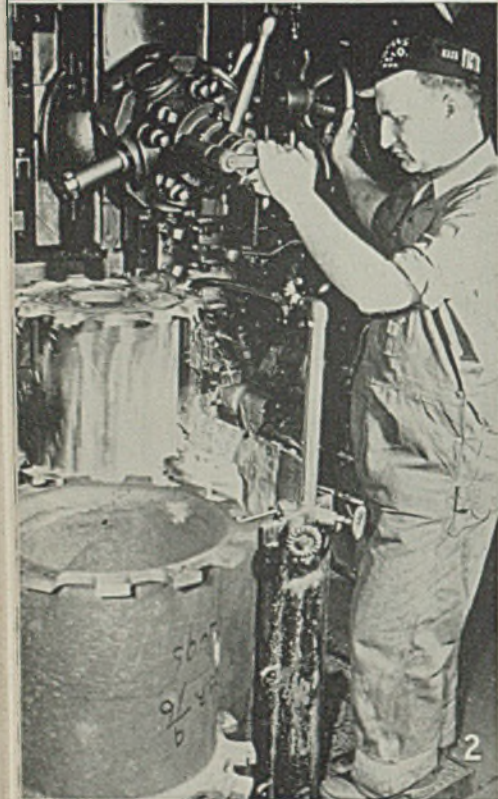
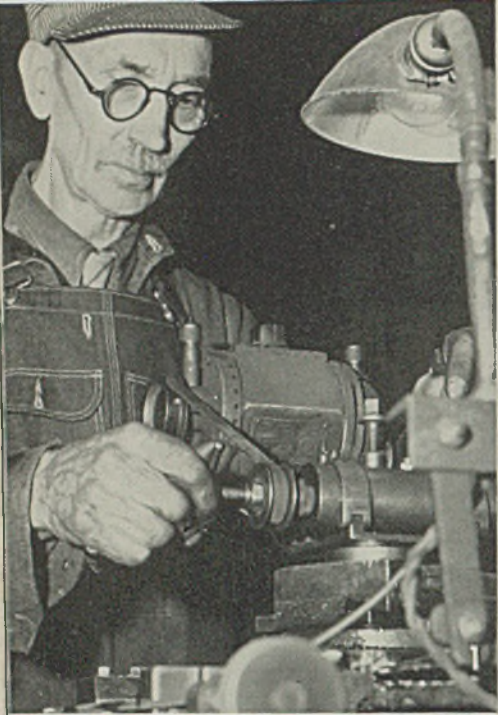
As far back as 1936, Hitler began converting large plants to war work. His original idea was to concentrate war work in mass production plants, leaving some 2,000,000 small shops to meet civilian needs. But in 1938 he changed his industrial strategy because the little shops proved less able to produce complete civilian items than to make bits and pieces of war machines. So a few efficient large firms in each industry were assigned the job of filling minimum civilian requirements.

Then through a vast system of subcontracting, Hitler put his skilled

Fig. 1—In peacetime, this worker's job was to machine shafts for rock crushers. Now the small shop which employs him is doing machining work for a large company filling a Navy contract. Same man, same machine, but now they make gun mounts. Here he sets up a tool post grinder in a lathe

Fig. 2—Instead of making power-driven lawnmowers, this manufacturer has retooled his plant to produce track sprocket hubs for tanks. Both man and machine have been converted to make their efforts count in war production work in vital 1942

Fig. 3—Fingers long skilled in assembling small parts for phonographs and recording devices now aid the war effort by speeding the assembly of small parts for intricate communications equipment so vital in war. All photos from Office of Emergency Management



PLANT

Part I
The Axis Converted, Years Ago

workers — blacksmiths, tinmiths, electricians, die workers, watch-makers—to work on war production in their small shops and even in their homes. Work and materials reached them through prime contractors and through jobbers—men who lined up production capacity for prime contractors and military authorities. Small shops formed cooperative pools and got contracts, each doing what it could with what it had, together turning out assemblies or subassemblies.

The entire conversion program was greased financially by the German Industrial Bank which advanced long-term low-cost loans to firms that wanted to expand, build or convert facilities for war production.

Italy also succeeded to an important extent in intensifying its war production. Although there most war production is handled by mass production plants because they can process most of the raw materials Italy can get, smaller firms were brought in through subcontracting as they were needed. Now in an effort to make the most of Italy's manpower, Germany is importing Italian labor for its own industry.

Japan, too, has been intensively developing its key industries—iron and steel, shipbuilding, oil refining, machinery and tools—for 25 years to increase its military power. While this expansion has centered around government owned and operated arsenals, the construction of private plants that can or could produce war items has been stimulated. Importation of 270 items nonessential to the war machine was forbidden as early as 1937 so all foreign exchange could be mobilized to purchase war essentials such as United States scrap iron.

Subcontracting had been practiced extensively in Japan for some time, and this experience facilitated conversion of its industrial machine to war production. Rationing of civilian goods—a sure indication of conver-



Fig. 4—Old hands and young hands—hands that used to guide machines in the manufacture of automatic vending machines—operate the same machines in the same shop, but now they make weapons for our fighting men. Here workmen are running a jig boring machine to produce a bullet die

sion—began in July, 1938.

After the shock of Dunkerque—three years after the Axis began all-out production—England abandoned the idea that war needs could be filled in war plants and got busy converting existing facilities as the realization was driven home that this war would have to be fought and won with the production facilities at hand, not those that would be ready a year or so later. The result of this realistic approach is that intensified war production in England now accounts for 60 per cent of the national income, instead of 20 per cent.

From the standpoint of conversion, we are today five years behind the Axis. But fast action NOW will enable us to catch up, long strides at a time, for facilities in this country that last year produced 20 billion dollars worth of civilian goods *can be converted to war production this year.* This industrial power, when added to our special purpose facilities built and being built, will put

us in sight of our goal of 40 billion dollars worth of war production in 1942.

BUT THIS MEANS CONVERSION—NOW!!!

These manufacturers shown here have already realized the need for conversion to war work and are now in the battle of production. They will not have to close their plants because of the WPB order stopping manufacture of consumer durable goods. Are you in the same favorable position? Better get on the band wagon while there is still time.

Already most of our large and many of our medium sized plants are in war work. It is especially to those medium and small plants not now in war work that this plea is directed. Get into this picture now while your efforts can still count in vital 1942. Survey your production facilities; then see your nearest War Production Board Contract Field Office (list on Page 26, Section Two, this issue of STEEL) for war production opportunities. Please turn over.

CONVERT YOUR PLANT



Continued

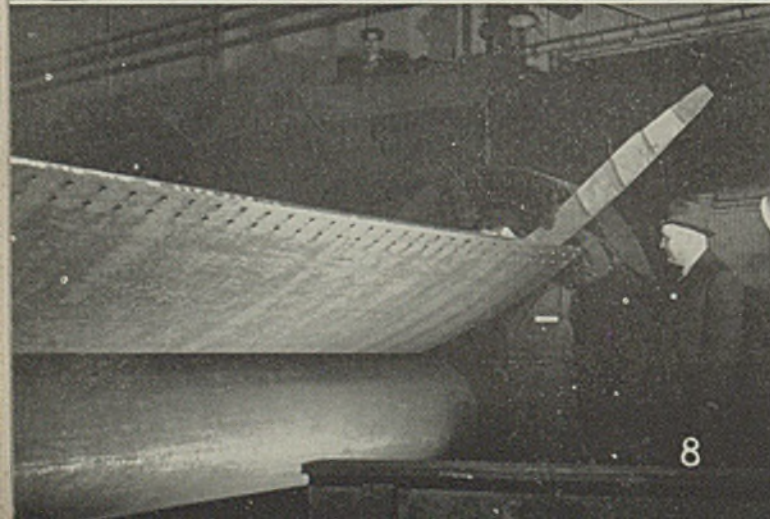
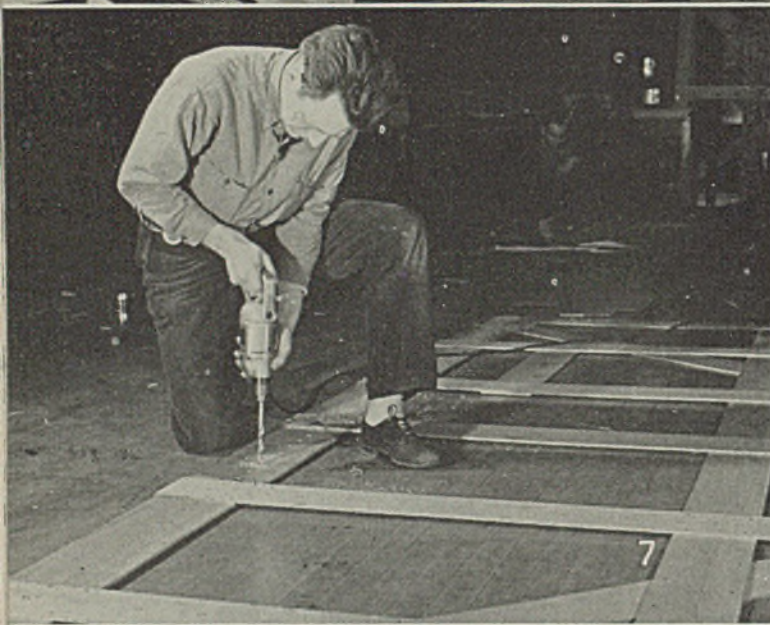
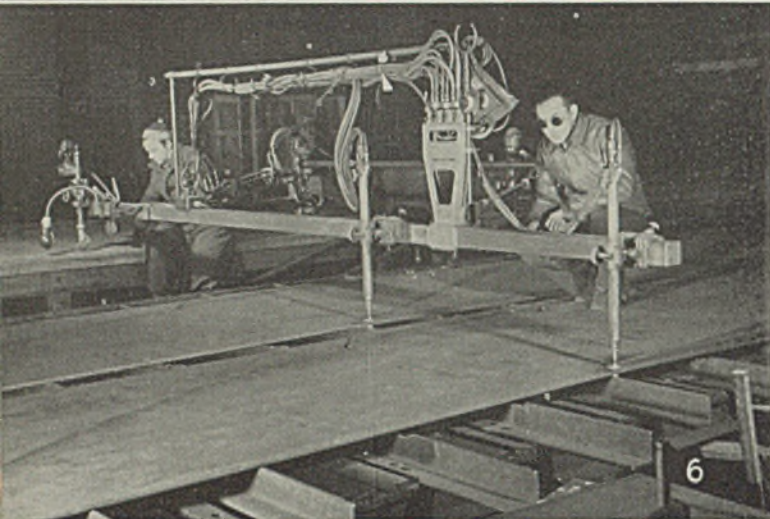
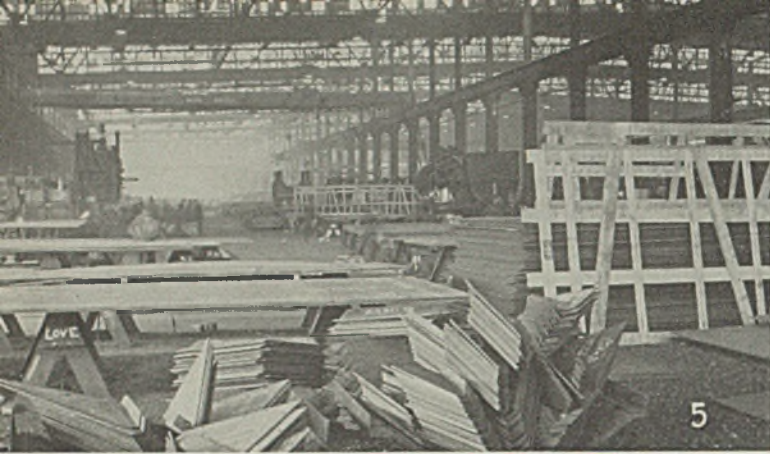


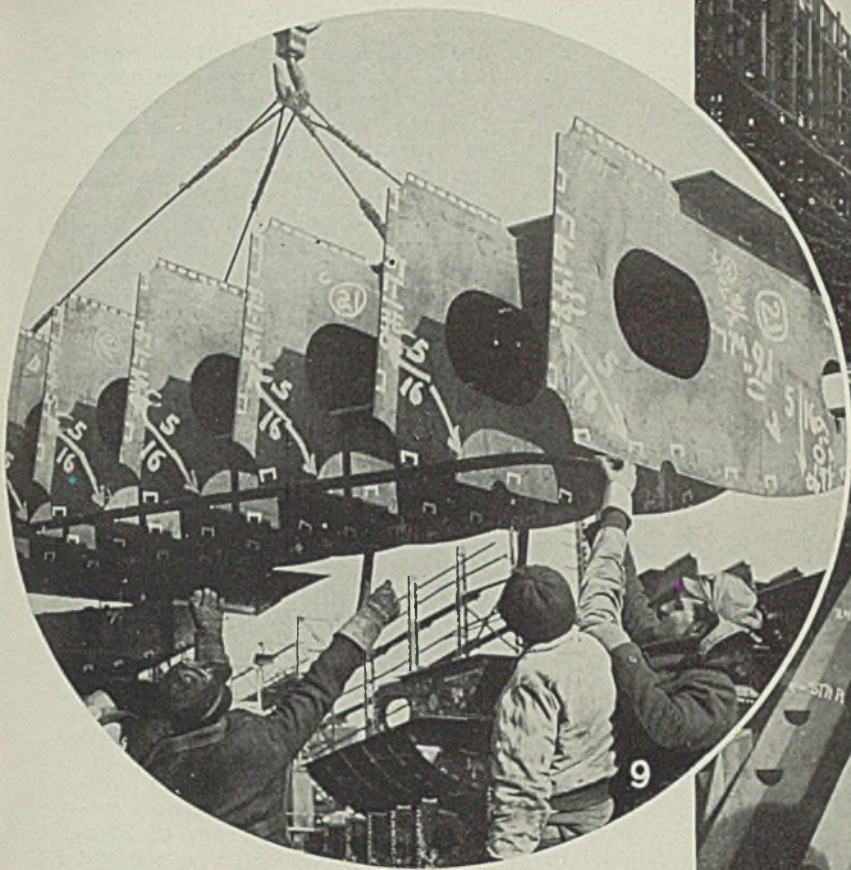
Fig. 5—Large and small, light and heavy manufacturers alike are converting their production facilities to aid the war effort. Instead of freight cars, this huge eastern plant turns out subassemblies for cargo ships. Here are knee brackets ready to be welded between ship deck beams and frames at the start of the production line

Fig. 6—This multiple-torch cutting device accurately cuts two plates at one time. It "reads its own pattern" as the far operator guides the tracer wheel over the exact pattern on the far table. Movement of this tracer is transmitted to the cutting torches by means of a pantograph arrangement. Unit is cutting floor plates for a tank section in this view

Fig. 7—Workman is constructing a wooden templet which will be used as a pattern for laying out a number of steel plates. For details of conversion of much heavy equipment at this plant, see STEEL, Feb. 23, 1942, p. 37, "Pre-Assembly Speeds Building of 'Ugly Duckling' Cargo Vessels"

Fig. 8—This shows part of a huge plate roller of German design built at a cost of \$180,000 in 1919-20 and purchased from a used machinery dealer for \$45,000 when the freight car shop was converted to war production. It would take a year to replace the giant machine. Now it shapes 420 plates a week. It is a one-man machine. Its master, Albert Alms, helped build this wonderful wringer when he was a young machinist, learned to operate it, then made it his career. He has been with it ever since

Fig. 9—These prefabricated subassemblies are inner bottom tank sections. They are ready to be welded into the ship as a unit. They were prefabricated in the old freight car plant and carried six miles on railroad flat cars to the shipyard on the coast nearby. Here sections are being stacked alongside



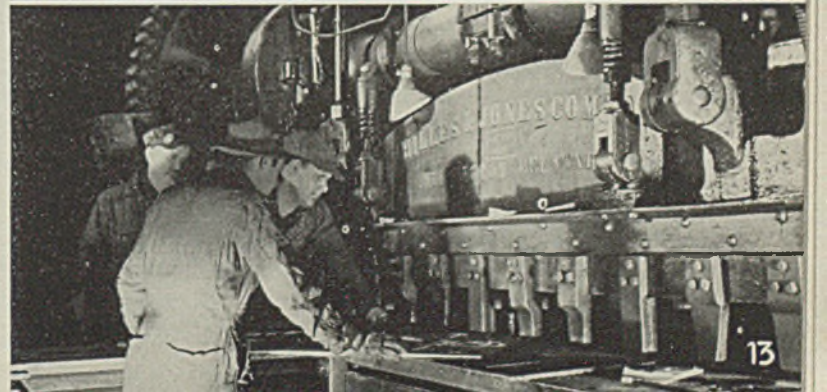
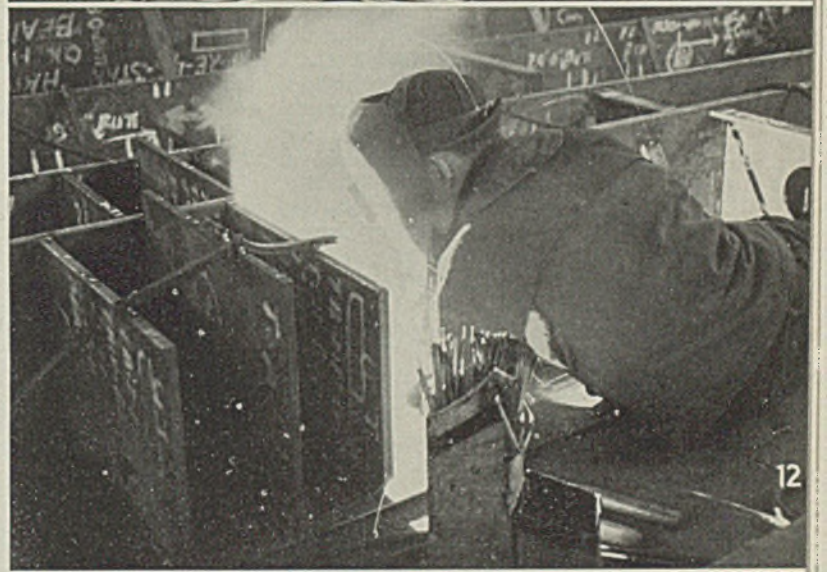
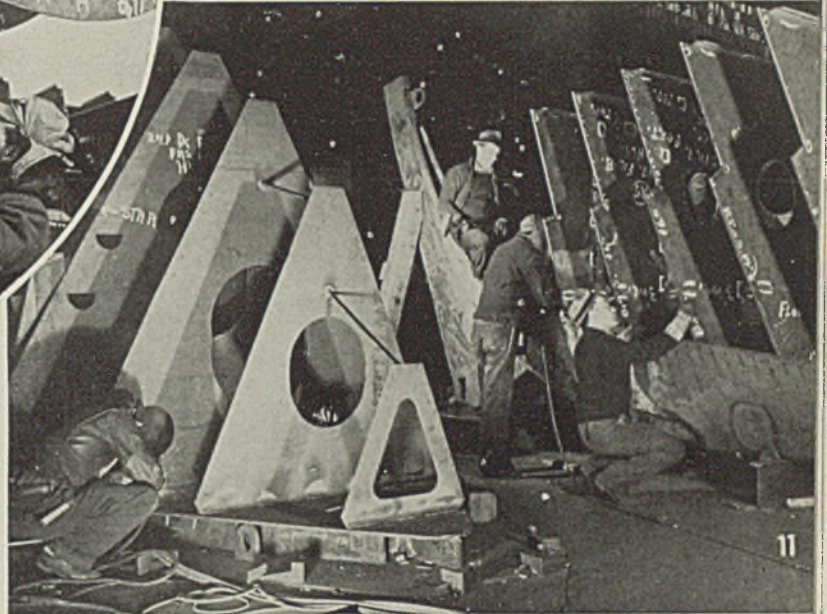
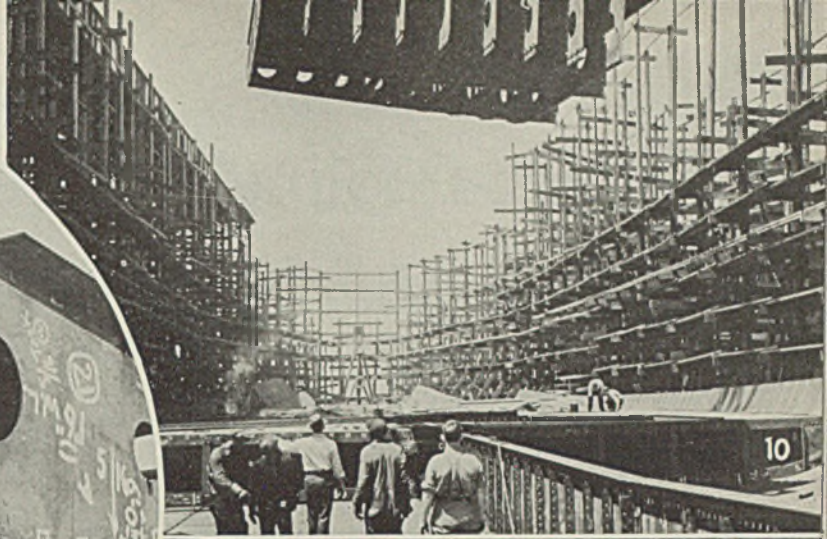
the ship ways awaiting their turn to be assembled into the ship

Fig. 10—At this point the sections are pieced together to make the ship. Several floor sections already installed can be seen in the background. Workmen are standing in what will later be the lowest part of the hold of the ship, near the keel. Another floor section is being lowered in place. All photos from Office of Emergency Management; Figs. 5 to 13 by Palmer

Fig. 11—Here two different subassemblies are rapidly nearing completion. Note plates are tacked into position using rods to space the plates correctly. Instead of making a ship every seven days as now, the workers expect to complete one every six days in the near future

Fig. 12—Welding is more important than ever before in shipbuilding for it saves time, weight and steel. A prefabrication system has been worked out here in which groups of plates are assembled into sections or units which then are joined together at the nearby shipyard to make the finished vessel in a short time. Assembling the parts in groups allows the section to be positioned so the welding can be done in the most favorable position. Most welds are verticals or fillets

Fig. 13—Another big machine is this giant shear which is employed to cut out accurately a multitude of parts in heavy plate. This machine, however, was part of the original plant equipment used to make freight cars



Patent-Pooling Attacks Draw Vigorous Replies By Accused Companies

◆

"Mud-slinging campaign" says Carboloy president. . . "United States would have been at mercy of German sources if we hadn't obtained patents from Krupp"

◆

EXECUTIVES of several large companies accused by government officials of having engaged in monopolistic practices through patent pooling arrangements with German firms emphatically denied the charges last week.

Replying to a statement by John Henry Lewin, an assistant to the Attorney General, before a Senate committee that a shortage of tungsten carbide exists in this country because of a patent-pooling agreement between General Electric Co. and the Krupp armament works in Germany, W. G. Robbins, president of Carboloy Co. Inc., Detroit, a General Electric subsidiary, said:

"At the Senate committee meeting I could keep still no longer. I resent being called un-American even by inference. This is not the first time accusations have been thrown at us—in the form of inferences and conclusions—which have absolutely no foundation in fact and which apparently are designed almost entirely as a mud-slinging campaign.

"The whole business would be silly if it were not seriously influencing public morale and destroying confidence at a time when everybody's effort should be directed toward all-out war production.

"Mr. Lewin states that there is a scarcity of tungsten carbide. There is no scarcity and there has never been any. Carboloy has been able to take care of every United States order, and in addition has also been supplying England and Russia since 1939.

"It is asserted that we maintained artificially high prices even though during the period in ques-

tion the Carboloy company made six price reductions in spite of the fact that it was continuously operating in the red.

"It is inferred that General Electric and Carboloy restricted or is restricting production of this material and is, thereby, slowing up the war effort. This is not true. In 1938 the facts show that there were some 97 manufacturers of Carboloy tools in the United States and at no time were all carbide manufacturers under license or price control. As far as the present patent relationship with Krupp is concerned, there just isn't any. Anybody can make carbides.

Worked with Arsenals

"It was because General Electric appreciated the possibilities of tungsten carbide and secured ownership of the vital patents then owned by Krupp that the government and war industries can now obtain all the carbides they need.

"If we had not done so, the United States would have been at the mercy of German sources of supply just as England was at the outbreak of the war. Fortunately, Carboloy had the production capacity at that time—and still has—to ship enormous quantities of carbides to England—in addition to meeting United States needs.

"For years Carboloy and General Electric have been working closely with the War Department and government arsenals. For years there have been available machine tools designed to employ these fast-cutting carbide tools to the machine. For years, the Carboloy company has been carrying on an effective

and wide-spread educational campaign on the use of these tools. In one two-year period, long before the war, some 10,000 men in industry were given training courses on the use of these tools.

"Even the allegation that an indictment lodged against the Carboloy company resulted in dropping the price of the material is false. It has been said that at that time the price dropped for the first time to \$48 per pound and previously had never been under \$200. As a matter of fact, for a year prior to this Carboloy had been available for actually less than \$48 per pound.

"These are all facts which are well known. In the light of this, it is hard to understand the reason behind the constant reiteration of false public accusations.

"I am indicted in the Carboloy case. Certainly I have the right, as an American citizen, to say that I shall not be smeared before trial by the official prosecutor of my case, either in a Senate committee hearing or elsewhere."

Five companies and five individuals last week entered *nolo contendere* pleas to a series of Sherman antitrust indictments alleging restraint of trade and monopolization of magnesium in federal court in New York. They were fined a total of \$140,000.

I. W. Wilson, vice president, Aluminum Co. of America, speaking for that company and the American Magnesium Corp., said:

"None of us is conscious of any wrongdoing whatever in connection with any of our activities in the development of the magnesium industry. However, we are mindful of the fact that in the recent antitrust suit in which the Aluminum Co. of America was a defendant officials and key employes of the company were required to be away from their regular duties and in attendance at court for many months at a time.

"We feel that in the critical situation which confronts us all today, with the Aluminum Co. of America and American Magnesium Corp. occupying the vital position of supplying so much of the necessary aluminum and fabricated magnesium for the war effort, we must settle this case at any cost as quickly as possible so that all our time can be entirely devoted to the defeat of the Axis powers. The burdens of litigating with the United States government at this time are manifest."

Willard H. Dow, president, Dow Chemical Co., issued the following statement:

"It is generally known the Dow Chemical Co. has for many years been the sole producer of magnesium in this country. The reason we have been the only producer of magnesi-

um in this country was because the demand was insufficient to attract other producers at the price we were quoting.

"Dow Chemical pioneered the development of the magnesium industry in this country. Since 1918 we have been in commercial production of this vitally important war material. We developed and own outright without any strings attached our own process for producing magnesium. Two years before the Pearl Harbor incident we foresaw the increased need for magnesium in this country and doubled the production capacity of our magnesium plant—and shortly again doubled this—all with our own money. Our plants today are producing essentially all the metal being made in the United States.

"In 1934 in order to make available to users of magnesium in this country certain United States patents covering the use of magnesium we entered into a contract with Magnesium Development Corp., whereby we were granted the right to license others under these magnesium use patents. The effect of this has been that since 1934 these patents have been made available to the American public thereby greatly expanding the use of magnesium in this country."

Contracts for a \$20,000,000 magnesium plant in the St. Clair river salt district, to be operated by the

Dow company, have been awarded to Austin Co., Cleveland. Brine will be shipped from Ludington, where a \$40,000,000 plant is being constructed.

In Jersey City, N. J., where the National Lead Co. held its annual meeting last week, it was stated that freeing of existing patents on production of magnesium metal in the consent decree filed in New

York opens the way for National Lead to proceed with a government request to build a plant for production of magnesium.

National Lead expects to use the Pidgin process using dolomite ore as raw material in a plant which the WPB and the MRC have asked the company to undertake. Site has not been selected, though action is expected within 30 days.

"More Subcontracting Will Help Win the War," Says WPB Chieftain

WASHINGTON

INCREASED subcontracting may swing the balance in this war, WPB Chairman Donald M. Nelson said last week in an open letter asking major prime contractors to spread more work among other firms whenever deliveries can be hastened by this policy.

Although subcontracting may increase costs, speed is the essential consideration now, he said.

Mr. Nelson's letter, designed primarily for contractors on critical items, follows:

"More subcontracting will help win the war.

"Production speed is the dominant factor in the race with the Axis; we

have no time to wait for new tools and new plant facilities.

"Every available idle tool that can be put to work must be put to work. This may cost more, but the job must be done fast, and experience has taught us that some prime contracts can be subcontracted as much as 90 per cent.

"Planes, tanks, guns and ships—their parts and subassemblies are needed in an ever increasing flow, and only by full use of existing facilities, by sharing the work, can we get them soon enough.

"Every prime contractor can help. Every prime contractor should consider having an established subcontracting department. Subcontractors should be given engineering assistance. Plants with as few as five or six machines can and should use used in subcontracting.

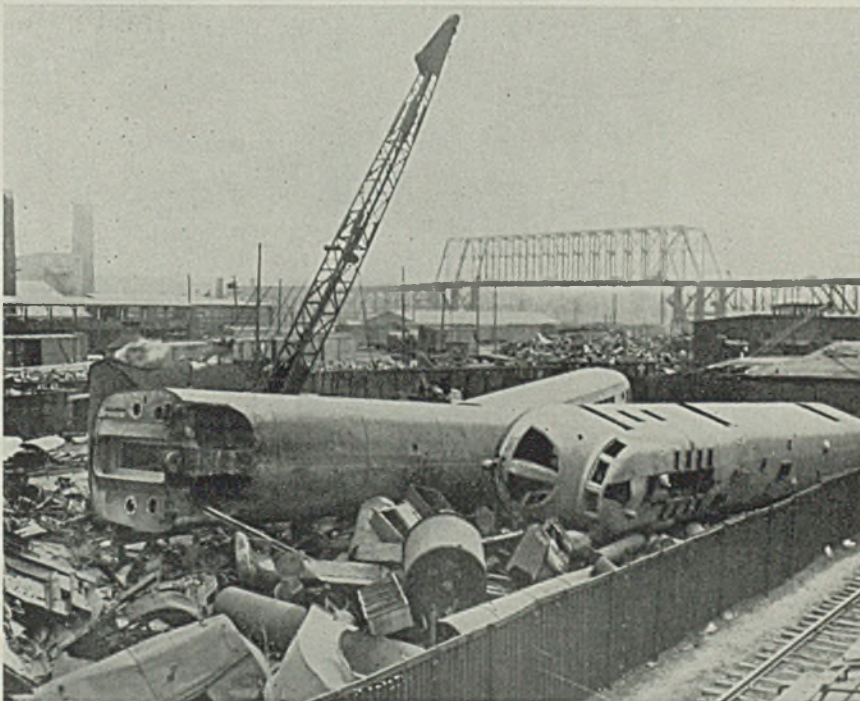
"The War Production Board has established field offices throughout the United States, now grouped in thirteen regions. One purpose of these offices is to effect the fullest and most efficient utilization of facilities within their areas. For this purpose, they maintain records of machine tool equipment and other facilities of manufacturing establishments. I urge you to make your subcontracting needs known to the nearest office.

"With the future of our country at stake, with our armed forces in immediate need of more weapons, imagination and boldness are called for on the industrial front. Increased subcontracting may swing the balance.

"Production lines are battle lines. Let's use all the production we've got."

Mr. Nelson told the American Society of Newspaper Editors in New York last week: "We are over the hump in war production. Today the combined production of America, Russia and England undoubtedly is greater than the combined Axis production. That doesn't mean we are going to win the war next month, or that we can start out tomorrow to take the offensive."

Union Pacific Streamliner Scrapped for Aluminum



OMAHA: Swift obsolescence and war requirements have cut short the career of Union Pacific's former crack streamliner, CITY OF SALINA, shown on the railroad's scrap pile here. The cars will yield 100,000 pounds of aluminum for use after processing in combat aircraft. NEA photo

Knox Says President Should Establish National Labor Policy; F.D.R. Agrees

WASHINGTON

FREEZING of the closed shop issue for the duration of the war and establishment of a national war labor policy by executive order were advocated by Frank Knox, Secretary of the Navy, before the House Naval Affairs Committee last week.

Mr. Knox, testifying on the Vinson bill to suspend the 40-hour week, expressed the opinion the President should set up a national labor policy, but that if he failed to do so in 30 to 60 days, Congress should act. He said it was probable that the President would issue such an order, and Mr. Roosevelt later said it was a good guess the secretary was on the right track.

Emory S. Land, chairman, Maritime Commission, earlier had presented testimony similar to that by Mr. Knox.

Mr. Knox opposed the proposed suspension of the basic 40-hour week in war industry, taking the stand that abolition of time-and-a-half overtime pay would constitute in effect a 10 per cent reduction in wages. To members of the committee who advocated extending the basic work week to 48 hours, he posed this question:

"Would you favor a 10 per cent pay cut throughout industry?"

Mr. Knox said his chief interest was in preventing interruptions to war production.

Although conditions in industry are susceptible to improvement, Mr. Knox said it should not be overlooked that war production is "proceeding 99.97 per cent uninterrupted."

Legislative restriction upon labor, he held, would create interruptions dissensions, and delay.

The secretary was equally opposed to applying statutory curbs to profits. "The profit motive still is relied upon as an important factor in the inducement of extraordinary war production and industrial effort. So long as the profit motive is thus relied upon, the industries in war work will and should make reasonable profits."

While Mr. Knox was insisting interruptions to war production were few at present, Senator Byrd, Virginia, released a report obtained from the Assistant Secretary of Navy showing slowdowns in eight vital war plants had cut their production from 25 to 90 per cent.

The report declared that the Long Island City plant of the Brewster Aeronautical Corp. operated at 40 per cent of capacity "due to labor leaders' demands for slow-

downs, and also because of inefficient management." It continued that in several sections of the plant all employes, including foremen, were enemy aliens.

The Navy's report on the other seven plants:

Atlas Press Co., Kalamazoo, Mich.—"A 25 per cent slowdown has been in effect since Feb. 12 due to SWOC's demand for closed shop and wage increases."

Aluminum Co. of America, Detroit—"This company has been operating at approximately 40 per cent of capacity and it is alleged that CIO leaders are responsible."

Bendix Aviation Co., South Bend, Ind.—"75 per cent production is reported because workers on each shift are reporting for work a half hour late and stopping a half hour early."

Curtiss-Wright Corp., Columbus,

O.—"UAW-CIO local labor leaders are reported responsible for constant discontent. Plant is operating at 60 per cent of capacity."

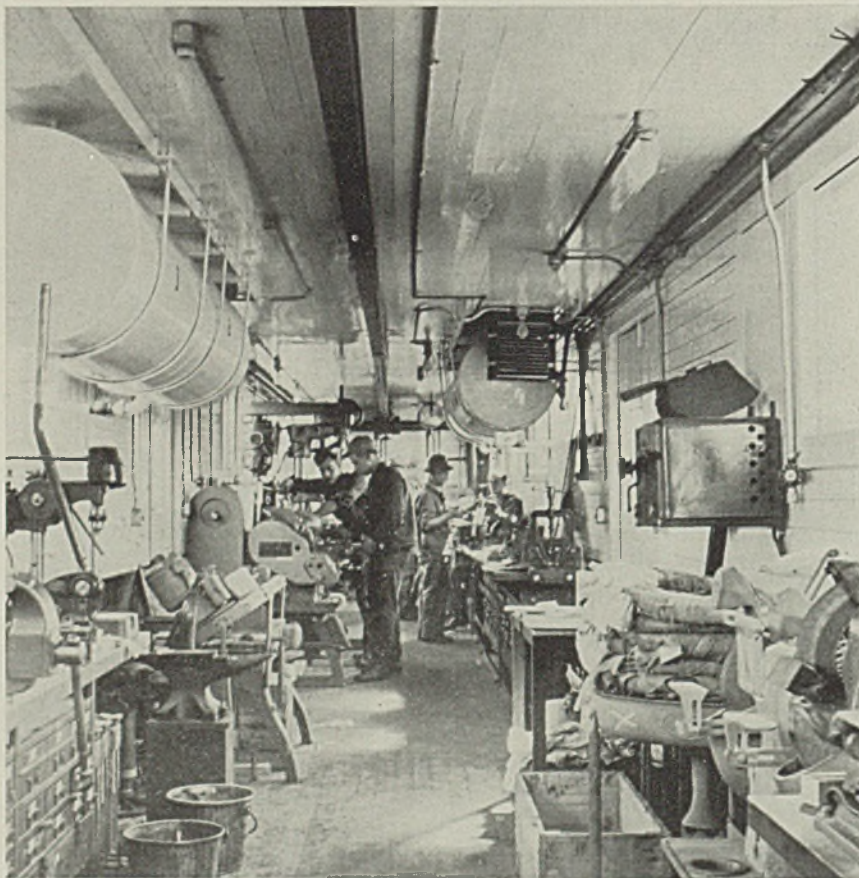
Hayes Mfg. Corp., Grand Rapids, Mich.—"Operating at 65 per cent of capacity. Union demanding wage increases."

Shelmar Products Corp., Mt. Vernon, O.—"As result of a 90 per cent slowdown since April 6, the company has had to close plant."

Police Escort Workers Through Dues-Picketing Line

In a surprise dues inspection, about 50 CIO pickets prevented about 30 of 1200 workers from entering the plant of the American Bridge Co., Gary, Ind., last week, because the men were unable to produce union cards showing paid-up dues. Police escorted all but five or six of the workers through the picket line, these refusing to go through with or without protection. They entered when the pickets departed. It was stated that plant operations were not affected.

Army Uses Rolling Machine Shop To Repair Guns



FORT MONROE, VA.—Army guns in action need constant attention and repair. Rather than ship them to central repair stations, the United States forces use former railroad maintenance cars 72 feet long, now equipped with a variety of machine tools, and welding apparatus. Each car generates its power. NEA

New Texas Plant To Pour First Steel This Week

First heat of steel made in the new Texas plant of Sheffield Steel Corp., subsidiary of American Rolling Mill Co., will be tapped this week and all departments of the new plant are expected to be in operation by late June, Charles R. Hook, president, American Rolling Mill Co., told stockholders at their annual meeting last week.

Mr. Hook showed them a wood culvert developed by company's drainage engineers to ease the steel shortage and provide drainage for cantonments and other war facilities as well as civilian demands.

WPB Experts Ask for More Electric Furnaces

Installation of more electric furnaces has been suggested by WPB steel expansion officials, it was reported last week.

The suggestion has been sent to the subcommittee on expansion of the WPB Steel Advisory Committee, of which Quincy Bent, vice president, Bethlehem Steel Co., is chairman.

WPB officials are insisting that steel mills move refractory brick from brick yards within two or three weeks after the brick order is completed. Request followed reports that mills usually leave bricks at yards for a month or six weeks and that this habit has been delaying work at the yards.

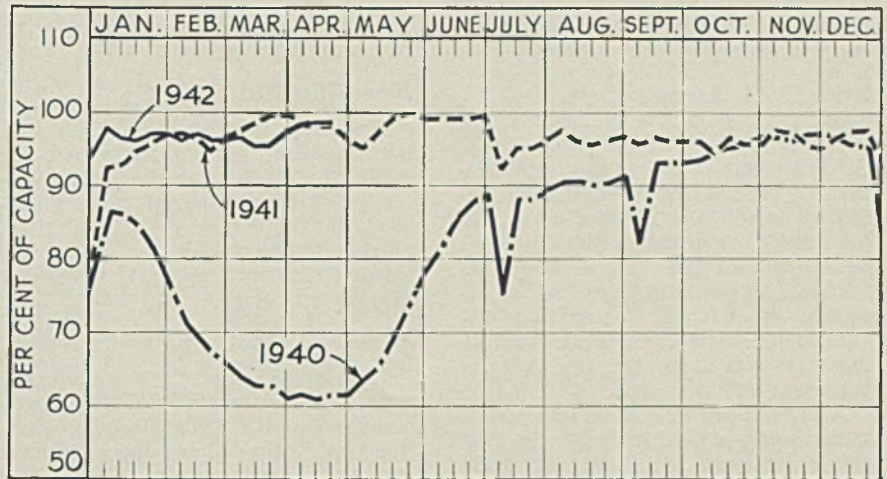
Some mills, it is reported, are building sheds in which to store refractory brick.

Buchanan Resigns as Allis-Chalmers President

Max W. Babb, chairman, Allis-Chalmers Mfg. Co., Milwaukee, last week announced that W. C. Buchanan has resigned as president because of ill health. He retains his membership on the board of directors and executive committee. He also is president, Globe Steel Tubes Co., Milwaukee.

The Allis-Chalmers directors elected Walter Geist, formerly vice president, as executive vice president, but there will be no election of Mr. Buchanan's successor until after the annual meeting, May 7. Mr. Geist has been with the company since 1909.

Designated as a "standby plant", and financed by the Navy, contracts for construction of a one-story addition to the Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., were announced last week. The building will be 460 x 800 feet, will contain eight acres of production space and house cranes, sand hoppers and open hearth furnaces.



PRODUCTION Steady

PRODUCTION of open-hearth, bessemer and electric furnace ingots last week was unchanged at 98½ per cent of capacity. Three districts advanced, six declined and three were unchanged. A year ago the rate was 98 per cent; two years ago it was 61½ per cent, both based on capacity as of those dates.

Detroit—Off 2 points to 90 per cent, as shift was made in active units.

Cincinnati — Declined 4½ points to 91½ per cent because of furnace repairs.

Cleveland — Receded 1 point to 89½ per cent, one interest reducing activity slightly.

St. Louis — Repair work caused the rate to drop 2½ points to 90½ per cent.

Buffalo — Withdrawal of an open hearth by Republic Steel Corp., for repairs, caused a drop of 3 points to 90½ per cent.

Chicago — Advanced 1 point to 105 per cent, a new all-time high. The prior record of 104½ per cent

was made in December and equaled in the week of April 4. Three of the six producers increased output, one held even and two declined. Only two were below 100 per cent.

Birmingham, Ala. — Continued steady at 95 per cent, with 23 open hearths in operation.

Pittsburgh — Lost 1 point to 95½ per cent.

Wheeling — Held at 82½ per cent for the fourth week.

Central eastern seaboard — On better scrap supply steel production rate advanced 2 points last week to 94 per cent.

New England — All open hearths in this district are in production and the rate has increased 10 points to 100 per cent.

Youngstown, O.—With 72 open hearths and three bessemers in production the rate was unchanged at 92 per cent. Republic Steel Corp. added two open hearths at Warren, O., at the week end, planning to operate as long as scrap is available. The rate this week is scheduled at 94 per cent as a result.

Little Chance To Increase Plate Tonnage, Says Batt

Steel authorities believe there is little chance to increase the tonnage of steel plates above that which already has been provided for, William L. Batt, chief, WPB Materials Division, told the War Production Board last week.

Mr. Batt appeared before the board to discuss the steel plate situation in all its ramifications.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended April 18	Change	Same week 1941	Same week 1940
Pittsburgh	95.5	- 1	100	55
Chicago	105	+ 1	102	61.5
Eastern Pa.	94	+ 2	96	56
Youngstown	92	None	97	43
Wheeling	82.5	None	84	73
Cleveland	89.5	- 1	96.5	65
Buffalo	90.5	- 3	90.5	42
Birmingham	95	None	90	81
New England	100	+10	92	60
Cincinnati	91.5	- 4.5	91.5	50
St. Louis	90.5	- 2.5	98	45
Detroit	90	- 2	70	72
Average	98.5	None	*98	*61.5

*Computed on basis of steelmaking capacity as of those dates.

FINANCIAL

Iron, Steel Group's Gain In Income Under Average

Net income of 57 companies classified as "iron and steel" totaled \$326,142,000 for 1941, a 15.6 per cent gain over 1940, according to the National City Bank of New York. Their return on investment for 1941 is reported as 9.6 per cent. For 493 "metal products companies," including iron and steel, the 1941 net return was 12.2 per cent.

A partial list of industrial groups, with their per cent of return in 1941 and gain over 1940, are shown in the accompanying table:

No. of Companies	Group	Per Cent Return-1941	Per Cent Gain Over 1940
57	Iron and Steel	9.6	15.6
12	Agricultural Implement	10.6	27.6
134	Machinery	19.7	40.2
21	Office Equipment	17.1	41.0
25	Automobile	18.3	10.1
27	Railway Equipment	10.5	47.7
34	Aircraft and Parts	48.8	64.5
54	Hardware and Tools	17.8	22.7
42	Building Equipment	11.7	11.7
33	Household Equipment	16.0	25.8
21	Lumber	16.3	71.9
8	Fertilizer	4.3	73.1
1420	Total Manufacturing	12.4	20.7

Otis Steel Co.

Otis Steel Co. reports net profit of \$240,015.46 for the first three months of 1942, compared with \$416,621.97 for the first quarter of 1941. E. J. Kulas, president, said profit for this three-month period was substantially less than for any quarter of the year 1941 due in large part to four factors:

Smaller profit margin on the products manufactured by the company for the war effort than upon the products which it manufactured during normal times; substantially increased operating costs while selling prices are rigidly fixed; shortage of steel scrap which limited the company's production and consequent shipment; and increased federal taxes on income.

Acme Steel Co.

Acme Steel Co., Chicago, reports 1941 net income of \$3,167,101, an increase of 46 per cent over preceding year. Sales in 1941 were up 68 per cent. Federal taxes increased 276 per cent.

Woodward Iron Co.

Woodward Iron Co., Birmingham, Ala., reports first quarter 1942 net profit of \$397,337. This compares with \$551,897 earned in 1941 quarter. Company provided for excess profits taxes of \$350,756 through 1942 March quarter, against \$110,108 in like period of 1941.

Crucible Steel Co.

Crucible Steel Co. of America, Jersey City, N. J., earned first quarter 1942 net profit of \$1,951,-

111, compared with \$1,489,851 in the same 1941 period.

Sloss-Sheffield Steel Co.

Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., reports net income of \$277,741 for the first quarter of 1942, compared with \$512,359 for the same period of 1941. Sales of by-product last year totaled \$2,157,000, against \$2,053,000 in previous year.

Interlake Iron Corp.

Interlake Iron Corp., Chicago, reports 1941 net profit of \$2,406,486, compared with \$829,450 in preceding year. Value of products shipped last year amounted to \$38,517,589, outstripping the \$23,289,605 of 1940.

Superior Steel Corp.

Superior Steel Corp., Pittsburgh, reports net profit for 1941 of \$653,358, after provision of \$1,400,000 for federal income and excess profits and state income taxes and equivalent to \$5.77 per share. This compares with 1940 net of \$349,674, or \$3.08 per share. Company has substantial backlog of war orders.

Wickwire Spencer Steel

Consolidated income statement for the quarter ended March, 1942, of Wickwire Spencer Steel Co., New York, and subsidiary, American Wire Fabrics Corp., shows net income, before taxes, of \$721,580, compared with \$231,172.14 in the previous year.

Copperweld Steel Co.

Copperweld Steel Co., Glassport, Pa., reports net profit of \$1,460,791 for 1941, equivalent after dividends on preferred stock to \$2.61 per common share. Taxes amounted to \$4,635,145.

Sales volume was over 150 per cent above previous record year. Company's Ohio steel plant, operating at nearly 100 per cent on a 24-hour day, 7-day-week basis, is expected to increase steel ingot output to 250,000 tons a year with new facilities authorized by WPB.

Keystone Steel & Wire Co.

For the three months ended March 31, 1942, which was the third quarter in its fiscal year, Keystone Steel & Wire Co. reports net profit of \$364,083 after all charges including provision of \$405,577 for federal income and excess profit taxes. This compared with net of \$410,137 for the same quarter of last year. Net profit for the nine months ended March 31 was \$1,130,496, against \$979,512 for the same period in the prior year.

Cleveland-Cliffs Iron Co.

Cleveland-Cliffs Iron Co., Cleveland, reports for 1941 a net profit of

\$4,149,512.17, after all charges, compared with \$4,382,079.25 in 1940.

Expenditures for new plant and equipment last year totaled \$827,278, with an additional \$639,576 being applied to development of the new Mather Mine of the Negaunee Mine Co., owned jointly by Bethlehem Steel Corp. and Cleveland-Cliffs Iron Co.

Warner & Swasey Co.

Warner & Swasey Co., Cleveland, reported net earnings as \$701,364 for first quarter, after all deductions including provision for federal income and excess profits taxes. Net earnings for the first quarter of 1941 amounted to \$1,040,077.

Minority Proposals Rejected By Bethlehem Stockholders

Three proposals by minority stockholders were rejected by substantial majorities at the annual meeting of Bethlehem Steel Corp. in Wilmington, Del., last week. Proposals were to reduce compensation of certain executive officials, to change the place of annual meeting, and to change the method of selecting public accountants.

Re-elected directors for three-year terms were Quincy Bent, Archibald Johnston, J. M. Larkin, Paul Mackall and R. E. McMath.

Mr. McMath, who presided in the absence of E. G. Grace, president, announced Bethlehem had received Navy "E" awards at the Fore River shipyard and the Staten Island shipyard recently.

Aircraft Standardization Returns Millions to U. S.

Amplifying announcement made recently that the company is returning \$14,000,000 to the government in the form of price reductions on contracts in progress, J. H. Kindelberger, president of North American Aviation Inc., Inglewood, Calif., states that standardization of training airplane designs by the Army and Navy, permitting smoother functioning of the aircraft production system, was mainly responsible for the saving effected.

He also disclosed that additional savings, amounting to almost \$60,000,000, will be transmitted to the government through reduced prices on contracts now held by North American.

"Although the costs of labor and materials are higher now than when the contracts were negotiated, increased efficiency makes it possible to build combat training planes at approximately 66 per cent of the cost of those same planes in the summer of 1940," it was said.

"A large share of the credit must go to the Army and Navy standardization programs."

Construction Industry Facing Best Year, Despite Limitations

WASHINGTON

DESPITE limitations on many types of construction, the building industry this year faces the largest program in history.

Latest estimate of the volume of military and civilian construction, such as air fields, war plants, camps, shipyards and war housing scheduled for 1942 is \$13,750,000,000, more than a 20 per cent increase over the figure for total construction in 1941 when an all-time record was set.

The industry has been converted almost entirely to military and other essential work.

Nonessential civilian construction, which had been declining since the fall of last year, was virtually halted April 9 when Conservation Order L-41 became effective. Establishing rigid controls over all nonwar building, the order banned residential construction costing more than \$500, agricultural building costing \$1000 or upwards, any other construction, privately or publicly financed, costing more than \$5000.

Exempted are projects granted specific permission by the WPB, building for government agencies, restoration of structures damaged

by act of God or by the enemy and certain special cases.

Construction of the type controlled by L-41 is estimated to have amounted to approximately \$4,000,000,000 during 1941. When the order became effective, the volume of this type of construction already had been cut in half and was estimated to be going at a rate of only \$2,000,000,000 a year.

Further reductions, under the order, are expected to keep the total of nonessential construction for the entire year to less than one-fourth of the 1941 amount.

By shutting down nonessential building, approximately 250,000 laborers now engaged on projects of this type will be freed to work on essential programs. Total employment on all types of construction, including maintenance and repair, was estimated to be approximately 2,500,000 in February, last monthly figure available.

In order to complete the huge program of military and essential construction, the volume must reach about \$1,250,000,000 a month. This will need a labor force of approximately 3,000,000. With the 2,500,000 already at work on essential construction programs and the

250,000 to be freed from nonessential projects, there is need for 250,000 additional employees.

Total construction last year amounted to nearly \$11,500,000,000, of which nearly \$7,500,000,000 was classed as essential, military and civilian, and nearly \$4,000,000,000 as nonessential. It is estimated that the total construction for this year will be approximately \$14,750,000,000, divided roughly into \$13,800,000,000 essential and \$900,000,000 nonessential.

Issues Second Report on Critical War Materials

Increasing and spreading shortages of important war materials were reflected in a second report issued by the WPB last week.

The first report was published March 12. The second report indicates that since that time the following metals have come to be considered most vitally needed for war purposes, although they were not so listed in the first report: Nickel scrap, rhodium, tungsten carbides and high-grade zinc.

Other most vitally needed metals: Alloy steel, aluminum and aluminum scrap; cadmium, calcium silicon, chromium, cobalt, copper and copper scrap, iridium, iron alloys, magnesium, nickel, tin, tin plate, terne plate, vanadium and wrought iron.

Listed for the first time as essential basic materials, but not critically limited were: Manganese, steel scrap and pig iron.

Confusion Blamed for Scrap Price Violation Complaint

Confused regulations were to blame if any violations of the OPA scrap price ceilings were made by the Pittsburgh Steel Co., company officials said last week.

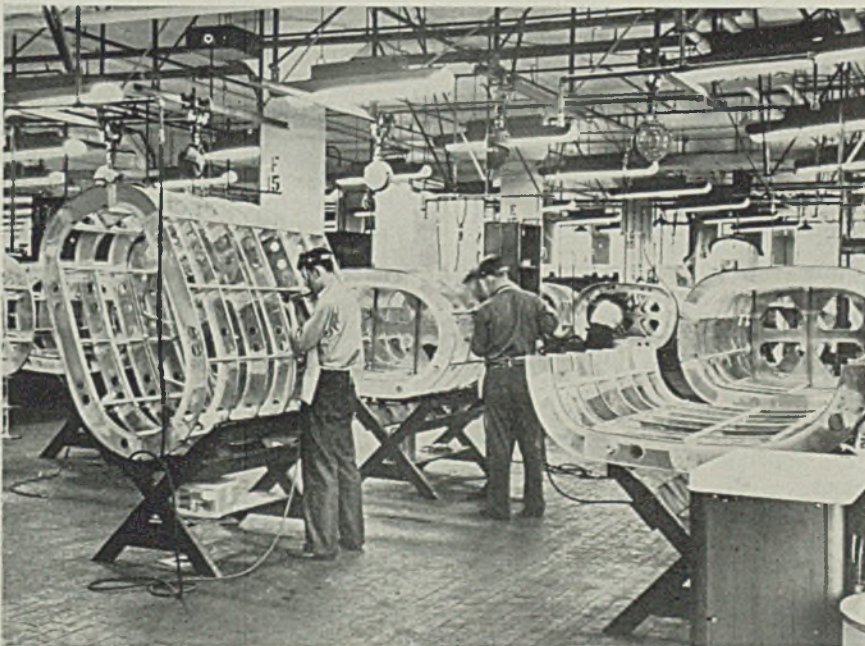
OPA charged the company bought unprepared scrap from Southwestern dealers and paid the maximum price for prepared scrap, \$2.50 a ton more than for unprepared scrap. OPA obtained a temporary injunction in federal court restraining the company from violation of the price schedule.

Company was unwilling to admit or deny any violation but spokesmen said that up to April 2 the regulations regarding mixed scrap were not clear.

Texas-Eastern Seaboard Pipe Line Application Refused

Application to build a pipe line from Texas to the Atlantic coast has been rejected by Joseph Eastman, director, Office of Defense Transportation. Mr. Eastman advised the Trans-American Pipe Line Corp. that the 85,000 tons of steel required for the proposed project is not available.

Fisher Making Auxiliary Fuel Tanks for Bombers



AUXILIARY fuel tanks for Army bombers such as those pictured in construction, are being made in large numbers by Fisher Body Division of General Motors Corp. The tanks augment the normal gasoline supply and permit the bombers to be ferried long distances

Windows of WASHINGTON

Steel producers to be lightly affected by conservation order . . . President shapes five-point anti-inflation program . . . Board of Economic Warfare given power to purchase and stockpile raw materials . . . Cuba seen important new source for nickel . . . Higher ratings for repair materials assigned iron and steelmakers . . . Cast iron soil pipe standardized by WPB order . . . Less metal permitted in furnace manufacture



By L. M. LAMM

Washington Editor, STEEL

WASHINGTON

STEEL conservation order announced recently by WPB Director Nelson has been held up several days so that details may be worked out.

It is reported on good authority that the order, when it is finally made public, will apply to more than 400 items made of steel on which production will be stopped.

Original idea of the order was to keep firms from manufacturing who seemed in some way to obtain steel supplies to which WPB did not think they were entitled.

The effect of the steel conservation order on iron and steel production schedules is not expected to be severe. Producers point out that for months past the bulk of the tonnage moving from the mills has been on high-rated war orders, and that consequently, but a relatively small amount of business will be affected by cutting off the civilian consumer market.

As to civilian goods production however, considerable disturbance is expected. Immediate disemployment of thousands of workers is seen, but the action is likely to hurry along plant conversions to essential war work. This, it is said in official quarters, will more than compensate for any inconvenience and hardships experienced during the period of production curtailment.

Anti-Inflation Measures

Hold President's Attention

Administration anti-inflation policy is beginning to take shape.

Concern expressed by informed persons recently with respect to rising prices and wages is being translated into definite action, it is understood, with President Roosevelt working on a program which will shortly be promulgated.

Principal parts of this program are said to include:

1—Issuance of an over-all ceiling order by OPA covering the most im-

portant retail and wholesale prices still uncontrolled.

2—The President will direct the War Labor Board and other agencies passing on wage demands to put into effect some flexible wage control.

3—The President will ask Congress to enact either forced savings law or a law forcing savings and some taxes in addition to the \$7,600,000,000 already recommended by the Treasury Department.

4—The Federal Reserve Board will strengthen its restrictions on consumer credit.

5—The President will reiterate his directive to the Army, Navy, Maritime Commission and other agencies involved in procurement to renegotiate war contracts where profits are excessive, and review all war contractors' books, with a close check on excessive salaries, bonuses and remuneration to executives.

It is said the OPA's extensive ceiling price order probably will require a more rapid extension of rationing for important consumer goods like food and clothing.

Raw Materials May Be Purchased by BEW Unit

The President has issued an executive order placing the power for buying raw materials in the international market for the United States government under Vice President Wallace's direction in the Board of Economic Warfare. Jesse Jones formerly held this control through the RFC and its subsidiaries.

Under the executive order, the Board of Economic Warfare may "direct . . . the creation, organization and financing of a corporation pursuant to . . . the Reconstruction Finance Corp. Act." This corporation which BEW may organize shall "obtain from foreign sources such materials, supplies and commodities . . . as are necessary for the successful prosecution of the

war. It shall also provide other disposition thereof."

South American copper, Mexican zinc and lead, Australian lead, African manganese, etc., which Mr. Jones has bought and sold, now will be bought and sold by BEW.

Buying and stockpiling of domestic materials has been subject to direction by the War Production Board since that agency was established and this power will continue to be exercised over transactions by the Board of Economic Warfare.

Cuba To Become Important New Source for Nickel

Cuba is on its way to become a new source of badly-needed nickel, William L. Batt, WPB Director of Materials, announced last week.

Large deposits of low-grade ores blanket a plateau on the northeastern section of the island. Treated by a complicated chemical and metallurgical process, recently developed by Freeport Sulphur Co. through its subsidiary, Nicaro Nickel Co., the deposits are expected to yield considerable quantities of the critical alloying metal.

The process has been investigated by a technical committee appointed by the government and pronounced sound.

Several weeks ago, WPB authorized a project for a \$20,000,000 plant (STEEL, March 23, p. 54) to be operated by Nicaro Nickel Co. for the government. Before the final contract was signed the company started construction. At present a crew of several hundred engineers and workers, many of them Cubans, are at work on the project.

Steelmakers Assigned Higher Rating for Repair Materials

Steel producers have been granted a higher preference rating for

materials for maintenance and repair and may extend the higher rating to their suppliers.

Amendment No. 3 to Preference Rating Order P-68 grants a rating of A-1-c to 30 per cent of the dollar value of repair and maintenance materials and operating supplies ordered in any one quarter. An A-3 rating continues applicable to the remaining 70 per cent.

Producers are required to file monthly reports on Form PD-228 with the WPB showing applications of the A-1-c rating.

A-1-a ratings in case of actual breakdowns and A-1-c ratings to make reasonable advance provisions against breakdowns are not changed.

Manufacture of Cast Iron Soil Pipe Limited to Single Weight

Amendment of Schedule IV to Limitation Order L-42 to limit manufacture of cast iron soil pipe to a single weight was announced last week by WPB.

The specifications ordered by the WPB are for a pipe slightly heavier than soil pipe known commercially as "standard", but lighter than pipe now classed as "medium." Effective June 1, only the new weight pipes may be produced, eliminating "standard," "medium" and "extra heavy."

This will also replace the current soil pipe simplification program, in effect since April 1, which discontinued "medium" types, and reduced the weight of the "extra heavy."

The schedule, in limiting non-essential production of cast iron soil pipe, is expected to save about 80,000 tons of pig and cast scrap iron this year. Production of soil pipes and fittings in 1941 reached approximately 550,000 tons. Anticipated requirements for this year will be considerably lower because of a decrease in private building construction.

Copper Prohibited in 13 Plumbing Fixture Products

Addition of thirteen plumbing fixture products to a list of articles for which use of copper or copper base alloy is prohibited was announced last week by WPB.

A new schedule (V-a) to Limitation Order L-42 becomes effective on June 15. It is expected that the regulations will result in a saving of approximately 1000 tons of copper and brass a year.

The articles affected are: Bath tub fillers and nozzles; shower fittings; lavatory compression faucets; lavatory combination faucets; sink compression faucets; combination sink faucets and spout; combination faucets for laundry tubs and spouts; combination faucets for wash sinks; laundry tray faucets; outlet plugs

and strainers; tail pieces; flush ells; flush valves for closet tanks.

Shipment of Alloy Samples To Be Permitted by WPB

Steel companies melting national emergency alloy steels have been given authority to ship specimens to laboratories or manufacturers without regard to preference ratings.

Purpose is to obtain the widest possible testing of these new steel alloys, which reduce quantities of alloys used and are based upon the principle that small quantities of various elements are more effective than larger quantities of a single element.

Those receiving these steels must certify in their purchase orders that the material will be used for experimental purposes; that the amount ordered, together with any on hand or on order from other mills, will not exceed 500 pounds for any one specification, and that the total on hand or ordered for all types does not exceed 10 tons.

Reduce Use of Iron, Steel In Warm-Air Furnaces

WPB has ordered a reduction in the amounts of iron and steel which may be used in the manufacture of warm-air furnaces.

The order (L-22) was effective on April 11, and covers all warm-air furnaces designed to heat the interior of a building, except those commonly known as space heaters or floor furnaces.

The terms of the order limit larger manufacturers to the use during 1942 of 50 per cent of the iron and steel consumed in 1940. Smaller manufacturers, or those who made or assembled less than 8000 furnaces in 1940, are required to reduce iron and steel consumption 10 per cent.

It is estimated by the WPB Plumbing and Heating Branch that the regulations will result in the saving of approximately 100,000 tons of iron and steel, and reduce the consumption of the industry to about 200,000 tons. This is the amount of iron and steel calculated to be needed for the manufacture of furnaces for military, war time housing and essential civilian replacement purposes.

Long-Term Coal Contracts Allowed by OPA Regulation

Sales of anthracite under long-term contracts which stipulate that the price shall be the OPA maximum price in effect as of the date of delivery are allowed by Amendment No. 1 to Maximum Price Regulation No. 112, Pennsylvania anthracite, issued last week by OPA.

Amendment issued in recognition

of the advantage to both producer and consumer of long-term contract transactions. Contracts providing for deliveries over a year, or longer, are common in the coal industry, usually containing open prices or adjustable price provisions.

Typewriter Conversion Order Clarified by War Board

WPB has issued an interpretation of its typewriter industry conversion order to clear up the status of privately operated plants or shipyards controlled by the Army, Navy or other government agencies engaged in financing output of war supplies.

Under the interpretation, No. 2 of Conversion Order L-54-a, WPB will not make new standard or portable typewriters available to private plants or shipyards financed by or controlled by government agencies involved in procuring war material.

Privately operated plants or shipyards covered by the interpretation can obtain new typewriters only through the rationing system set up by the OPA.

The interpretation applies to plants or shipyards privately operated on a cost-plus-fixed-fee basis, as well as to those privately operated and financed or controlled by the Army or Navy, the Defense Plant Corp., the Maritime Commission, or any other government agency engaged in financing or sponsoring production of war supplies.

Production of Golf Clubs Curtailed by WPB Order

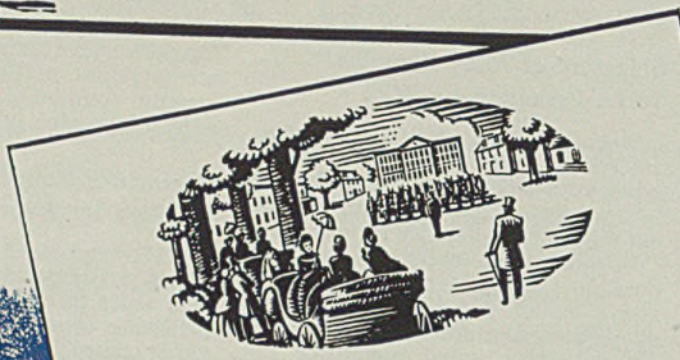
Production of golf clubs has been curtailed and soon will be stopped completely by WPB.

The order, L-93, cuts off the use of iron and steel, other critical metals, plastics and cork, in the manufacture of golf clubs after May 31. Meanwhile, limited production will be permitted.

Under the order, the amount of iron and steel that may be used in golf clubs during the remainder of April and May is cut to 50 per cent of average use for an equal number of days during 1941. Use of plastics, cork, and critical metals other than iron and steel in the production of golf clubs is prohibited, effective immediately. The use of iron and steel in the production of golf clubs must be terminated June 1.

The order immediately freezes all inventories of plastics, cork, and all metals, except iron, steel, gold and silver, in the hands of the golf club manufacturers. On June 1, stocks of iron and steel will also be frozen except for metal in completed clubs or authorized for use by the Director of Industry Operations.

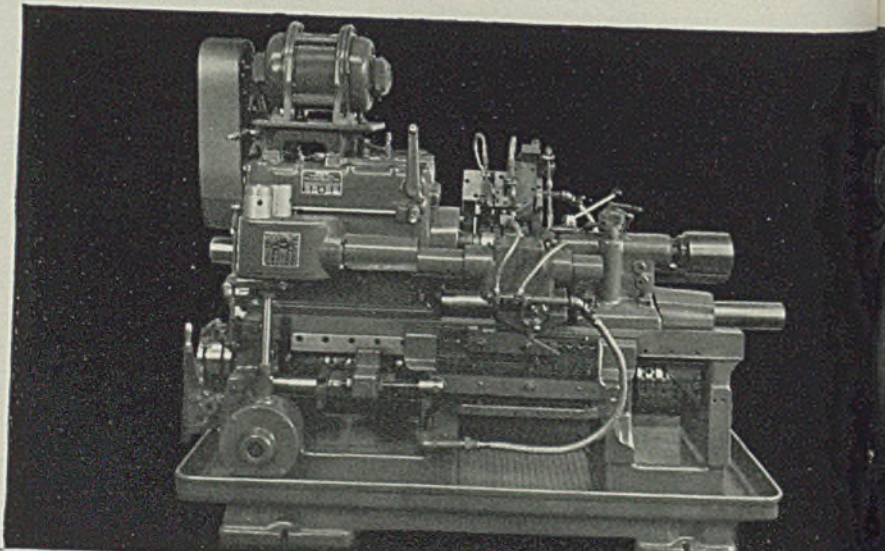
Every modern soldier



BY the end of 1863, complaints from infantry in the field kept coming to Colonel Benton at the Springfield Armory. Cartridges dipped in tallow gathered grit, scoring rifle barrels, causing locks to jam in emergencies. Could the ordnance department find a way to lubricate bullets without covering the whole cartridge with sticky grease? The answer came from Albert Ball of Lamson & Goodnow — direct predecessors of Jones & Lamson. He produced a machine which put grooves in the bullets. The bullets were greased in these grooves, and the grooves covered by the end of the shell when loaded. Ever since then, service cartridges have been dry, and the bullets lubricated by grease in grooves which are not exposed until the cartridge is fired.

JONES &

Manufacturers of Ram & Saddle Type Universal Turret Lathes . . . Fay Automatic Lathes . . . Automatic Thread Grinding Machines . . . Comparators . . . Automatic Opening Threading Dies and Chasers

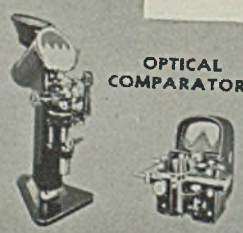


Jones & Lamson 12' Fay Automatic Lathe tooled to face, groove and cam turn automobile pistons.

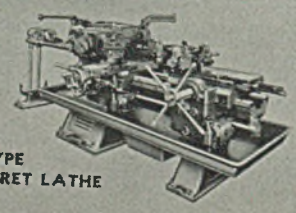
AUTOMATIC THREAD GRINDERS



OPTICAL COMPARATORS



RAM TYPE UNIVERSAL TURRET LATHE



owes a debt to ALBERT BALL

ALBERT BALL'S solution of Colonel Benton's problem was neither the first nor the last of hundreds of such problems overcome by Jones & Lamson engineers and by their predecessors.

Ever since 1833, in the early shops at Windsor, and since 1888 in factories still expanding at Springfield, generation after generation of machine builders has been working in continuous succession. Through more than a century they built up an accumulation of knowledge that forms a background for the rapid, far-reaching developments that characterize the work of Jones & Lamson engineers.

Thus today, Jones & Lamson engineers

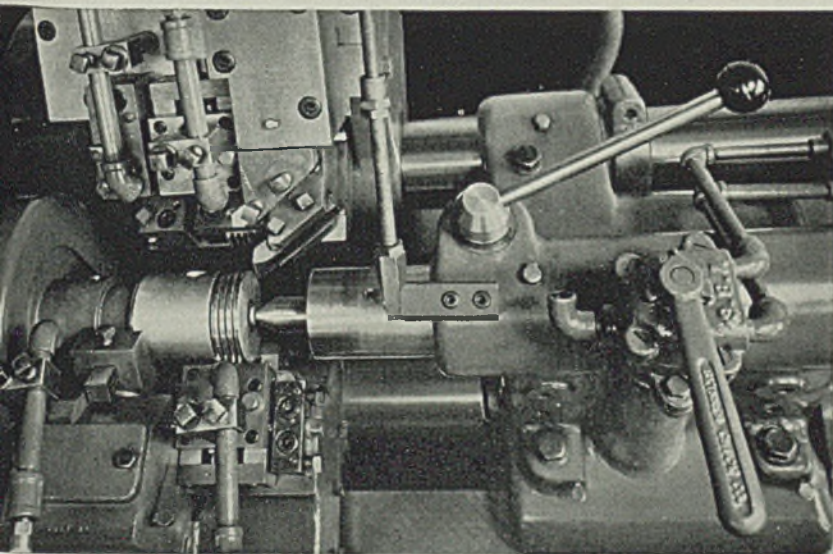
are called upon in turn to design and equip whole new factories for mass production — or to take the kinks out of a single job like the one pictured here.

Time is saved by cam turning while facing and grooving pistons on the Fay Automatic Lathe — grinding time is reduced to a minimum.

Whether your plant is large or small, your production problem big or little, it pays to write for help to Jones & Lamson engineers. With Jones & Lamson equipment you can meet today's wartime demands and still be ready for the hard years ahead. Illustrated catalogs are available.

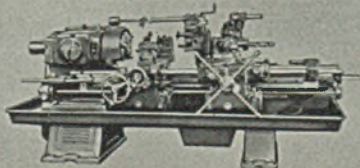
LAMSON MACHINE COMPANY

SPRINGFIELD, VT., U. S. A.

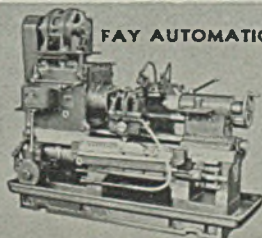


Close view of tooling on a Jones & Lamson 12" Fay Automatic lathe tooled to face, groove and cam turn automobile pistons.

SADDLE TYPE
UNIVERSAL TURRET LATHE



FAY AUTOMATIC LATHES



AUTOMATIC OPENING



PROFIT PRODUCING
MACHINE TOOLS

Metalworking Industry Advisory Committees Appointed by WPB

WASHINGTON

BUREAU of Industry Advisory Committees of the War Production Board has announced the formation of the following additional advisory committees:

Steel Warehouse

Government presiding officer, C. E. Adams, chief, Iron and Steel Branch.

Committee members: Guy P. Bible, Horace T. Potts Co., Philadelphia; C. H. Bradley, W. J. Holliday & Co., Indianapolis; Lester A. Brion, Peter A. Frasse & Co., New York; A. C. Castle, A. M. Castle & Co., Chicago; W. S. Doxey, American Steel Warehouse Association, Cleveland; Sol Friedman, Reliance Steel Corp., Cleveland; Everett D. Graff, Jessie T. Ryerson & Sons, Chicago; Earle M. Jorgensen, Earle M. Jorgensen Co., Los Angeles; W. Kurtz, Peninsular Steel Co., Cleveland; Richmond Lewis, Charles C. Lewis Co., Springfield, Mass.; N. R. Patterson, Patterson Steel Co., Tulsa, Okla.; J. H. Peebles, Peden Iron & Steel Co., Houston, Tex.

Metal Window

Government presiding officer, John L. Haynes.

Committee members: J. A. Sargent, Truscon Steel Co., Youngstown, O.; Frank Garratt, Hope's Windows Inc., Jamestown, N. Y.; Clark Robertson, Crittall-Federal Inc., Waukesha, Wis.; Eugene Bogert Jr., The Bogert & Carlough Co., Paterson, N. J.; Loring Washburn, S. H. Pomeroy Co. Inc., New York; C. A. Raquet, Detroit Steel Products Co., Detroit; F. A. Mesker, Mesker Bros. Iron Co., St. Louis; E. L. Soule, Soule Steel Co., San Francisco; D. Lawrence Carlson, Lundell-Eckberg Mfg. Co., Jamestown, N. Y.; C. R. Wilkins, Rolscreen Co., Pella, Iowa.

Pulp, Paper Machinery

Government presiding officer, L. S. Greenleaf.

Committee members: Elmer H. Neese, Beloit Iron Works, Beloit, Wisconsin; Homer W. Martindale, Black-Clawson Co., Hamilton, O.; S. Harley Jones, E. D. Jones & Sons Co., Pittsfield, Mass.; Leonard J. List, Samuel M. Langston Co., Camden, N. J.; Walter L. Barker, Improved Paper Machinery, Nashua, N. H.; William Buchanan, Appleton Wire Works, Appleton, Wis.; William W. Bolton, Emerson Mfg. Co., Lawrence, Mass.; Samuel J. Campbell, Hudson Sharpe Machinery Co., Green Bay, Wis.

Warm Air Furnace

Government presiding officer, W. W. Timmis.

Committee members: H. S. Sharp, Henry Furnace & Foundry Co., Cleveland; Cliff Ackerson, Agricola Furnace Co., Gadsden, Ala.; W. L. McGrath, Williamson Heater Co., Cincinnati; L. R. Taylor, International Heater Co., Utica, N. Y.; Frank C. Packer, Payne Furnace and Supply Co., Beverly Hills, Calif.; A. W. Wrieden, Lennox Furnace Co., Syracuse, N. Y.; R. S. McNanney, Dowagiac Steel Furnace, Dowagiac, Mich.; F. H. Faust, General Electric Co., Bloomfield, N. J.; Robin Bell, Surface Combustion Co., Toledo, O.

Fluorescent Lighting Fixtures

Government presiding officer, J. L. Haynes, chief, Building Materials Branch.

Committee members: Arthur Miller, The Miller Co., Meriden, Conn.; W. P. Lowell Jr., Hygrade Sylvania Co., Salem,

Mass.; Joseph Markel, Markel Electric Products Inc., Buffalo; Nathan H. Eglostein, Fluores-O-Lite Mfg. Co., Newark, N. J.; E. C. Huerkamp, Westinghouse Electric & Mfg. Co., Cleveland; Ward Harrison, General Electric Co., Cleveland; A. K. Wakefield, F. W. Wakefield Brass Co., Vermillion, O.; Thomas G. Beckett, Beckett Electric Co. Inc., Dallas, Tex.; R. W. Staud, Benjamin Electric Mfg. Co., Des Plaines, Ill.; Leon F. Moore, Electrical Products Consolidated, Denver.

Trucklaying Tractor

Government presiding officer, William Parish. Committee members: E. B. English, Caterpillar Tractor Co., Washington; M. L. Noel, Allis Chalmers Mfg. Co., Milwaukee; W. E. Miles, Cleveland Tractor Co., Cleveland; Neal Higgins, International Harvester Co., Chicago.

Office Machinery

Government presiding officer, N. G. Burlough, chief, Industrial and Office Machinery Branch.

Committee members: Carl W. Brenn, Autographic Register Co., Hoboken, N. J.; Harland W. Rippey, Bircher Co. Inc., Rochester, N. Y.; Lawrence V. Britt, Burroughs Adding Machine Co., Detroit; T. B. Hirschberg Jr., Check-O-Meter Sales Co., Chicago; Ralph C. Coxhead, Ralph C. Coxhead Corp., New York; Merrill B. Sands, Dictaphone Corp., New York; Theodore W. Robinson Sr., Ditto Incorporated, Chicago; Harmon P. Elliott, Elliott Addressing Machine Co., Cambridge, Mass.; Carl M. Friden, Friden Calculating Co. Inc., San Leandro, Calif.; Thomas J. Watson, International Business Machines Corp., New York; Norman Sheras, A. D. Joslin Mfg. Co., Manistee, Mich.; Stanley C. Allyn, National Cash Register Co., Dayton, O.; C. G. Watkins, Simplex Time Recorder Co., Gardner, Mass.; W. J. Bernart Jr., Pitney-Bowes Postage Meter Co., Stamford, Conn.

Postpone Date for Filing Reports on Rough Diamonds

Because of delay in printing necessary forms, the filing date for reports on rough diamonds required by Order M-109 has been postponed to April 30.

The order requires reports on Form PD-376 by all persons who had title, possession or control of 10 or more carats of rough diamonds on March 31.

The order does not apply to cut or polished gem diamonds or to rough diamonds embodied in tools now in use.

The reports are returnable to the War Production Board, Chanin building, New York.

Used Electric Generating Equipment, Boilers Frozen

Used electric generating equipment and used steam boilers have been frozen by the WPB. Action was taken to promote efficient use of such equipment in the war effort, when it becomes available.

Dealers in such equipment have

been notified that they may not sell, lease or option used electric generating equipment or used steam boilers without specific authorization from the Director of Industry Operations. The order, L-102, extends the prohibition to cover all persons with such equipment in their possession.

"Used electrical generating equipment" is defined in the order to mean any used or reconditioned stationary steam-turbine generator unit. "Used steam boiler" is defined as any used or reconditioned stationary steam generating boiler. Equipment which has an actual or market value of less than \$1000 per unit is exempt from the terms of the order.

Broader Priority Assistance Assigned for Mining Machinery

Broader application of priority assistance for the production of mining machinery and equipment is provided by amendments to Preference Rating Order P-56-a.

As originally announced on March 3, the order permitted the assignment of ratings only for material to be delivered to operators as defined in Preference Rating Order P-56, the general mine order.

Amendments will permit companies using ratings assigned by P-56-a to make deliveries to South American copper companies operating under Preference Rating Order P-58, to iron and steel producers under P-68, to smelters under P-73.

Upon application, special permission may also be given by the Director of Industry Operations for deliveries of material obtained by use of ratings assigned under P-65-a to fill other rated orders.

Manufacture of Electrical Appliances Further Curtailed

WPB last week further restricted the production of electrical appliances. It issued an amendment to order L-65 providing a further reduction in the number of electrical appliances that may be made before production must cease altogether on May 31, and providing tighter restrictions on the metals that may be used in the appliances that may be manufactured under the order.

Original order permitted manufacturers to produce, between the issuance date and May 31, appliances having a factory sales value up to 25 per cent of the factory sales value of their products in 1941, exclusive of orders having ratings of A-10 or higher.

Last week's amendment reduces the production permitted under the order to 20 per cent of factory sales value in 1941, exclusive of A-10 and higher orders.

Heavy, Medium Truck Production To Be Halted When Quotas Are Filled

WASHINGTON

ALL production of medium and heavy trucks for civilian use will be discontinued after existing quotas have been completed.

Thus, another large segment of the automotive industry must convert its facilities to the output of war weapons. Production of passenger cars and light trucks was halted Feb. 1.

The stop-production order, Supplementary General Limitation Order L-1-e, applies also to off-the-highway vehicles for civilian use. These are heavy, rubber-tired vehicles too large for ordinary highway travel and used principally in construction and mining operations.

Can't Be Equipped with Tires

Chief reason for the production ban is the shortage of rubber. No tires are available. Therefore, it is necessary to restrict future production to that required for the Army and Navy, certain government agencies, the United Nations, and lend-lease operations.

Trucks produced between now and the time permitted for cleaning up present quotas will automatically be frozen under General Conservation

Order M-100, which put into effect the truck rationing plan now being administered through the joint facilities of WPB and the Office of Defense Transportation.

Under Supplementary Limitation Order L-1-f, producers of medium trucks (weighing from 9000 to 16,000 pounds) will have until April 30 to complete production quotas fixed for February. After that date, further production for civilian use must be halted since quotas originally established for March were canceled.

Producers of heavy trucks (weighing 16,000 pounds or more) will have until May 31 to clean up amended March quotas. Then civilian output must cease. These trucks cannot be equipped by the manufacturer with tires, casings or tubes.

When production ceases, it is estimated that 97,070 medium and heavy trucks will have been produced for civilian use since Jan. 1, as compared with an output of 88,085 medium and heavy trucks during the first three months of 1941.

Off-the-highway vehicles weighing 24,000 pounds or more produced under March quotas may be equipped with tires and tubes only if they are

specially designed to transport materials or equipment on mining, construction, logging or petroleum development projects.

An A-3 preference rating for materials going into the production of medium, heavy and off-the-highway trucks will continue to be made available under Limited Preference Rating Order P-54.

The stop-production order does not apply to output of truck trailers, bodies or passenger carrier buses of certain types.

Industrial Camouflage Described In OCD Booklet

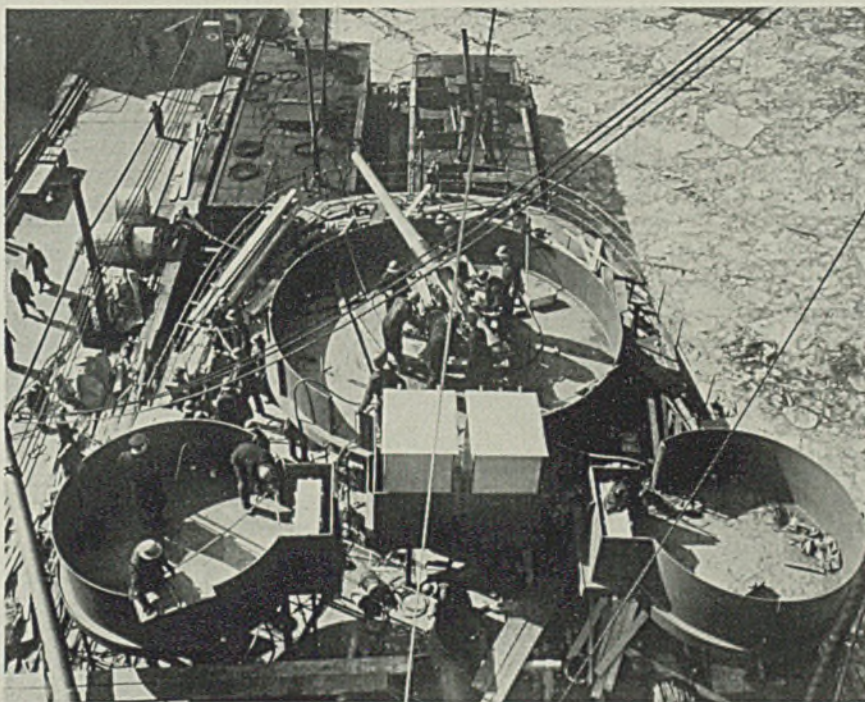
Camouflage methods for industrial plants, railroad yards, airfields, routes of communication, conspicuous landmarks and transportation systems are described in an illustrated 68-page booklet entitled *Protective Concealment* issued by the Office of Civilian Defense.

Booklet was prepared by the War Department under direction of the Chief of Engineers, U. S. Army, with suggestions of the National Technological Civil Protection Committee. Discussed are practical measures for concealment of important installations and equipment from aerial observation.

"Although an enemy may have accurate maps and photographs, he must rely upon visual identification of the target for accurate bombing."

Distribution of the booklet is restricted. Copies may be obtained from the Superintendent of Documents, Washington, for 25 cents each.

Arming Merchantmen with Larger Guns



FINAL mechanical adjustments are made on a heavy gun just installed on a merchant vessel in a shipyard "somewhere in the United States." Gun and crew are protected by a steel emplacement. Official Navy photo from NEA

Civilian Use of Tin Further Restricted

Restrictions on the use of tin by civilians were tightened by WPB last week and eased for certain uses by the military services.

Amendment No. 2 to Order M-43 restricts all persons except retailers from selling any solder with a tin content of more than 16 per cent, any tin-bearing babbitt metal or tin oxide with these exceptions:

On a preference rating of A-9 or higher.

On a preference rating of A-10 or higher where the purchase order specifies that the material is to be used for maintenance or repair of existing equipment.

For manufacture of tin cans within the definitions of Conservation Order M-81, regulating the production and use of tin cans.

Amendment No. 2 to M-43-a removes limitations on the uses of tin for the manufacture of implements of war. These are defined as combat end products, including, but not limited to, aircraft, ammunition, armament and weapons, ships, tanks, vehicles, and parts to be incorporated in them.

Scarcity of Men, Metals Challenges Ingenuity of Machine Tool Builders

CHICAGO

PROBLEMS concerning scarcity of materials and of skilled labor at a time when production must be pushed to new heights drew attendance of 340 to the fortieth spring convention of National Machine Tool Builders' Association, April 13-14.

Speakers included William H. Harrison, director, production division, War Production Board, Washington; George C. Brainard, chief of the tools branch; Howard W. Dunbar, assistant chief, tools branch; and Geoffrey W. Smith, counsel, War Production Board; George H. Johnson, president of the association; Tell Berna, general manager; Mrs. Frida F. Selbert, secretary; Edward C. Bullard, treasurer of the association; and Ralph E. Flanders, president, Jones & Lamson Machine Co.

While Mr. Harrison said that production at present is about as good as reasonably could be expected, demands constantly are developing in unexpected directions. Consequent-

ly, there is no such thing as being able to say that the situation is good enough. It must be improved just as fast as possible and there still is room for longer hours in the machine tool industry.

Mr. Johnson, who is president of Gisholt Machine Co., emphasized this point when he said: "It is of little consequence to explain why the desired objective is difficult of accomplishment. All the reasons which any one of us might bring forward to explain why some of our machines are idle eight hours out of 24—or on Sundays—would seem pitiful to an American private helping to hold Corregidor. The fact is that we in this industry must do what it seems impossible to do. We must get and hold 168-hour operation."

Regarding the materials situation, Mr. Johnson reported as follows: "The War Production Board has requested our foundries to stop using nickel in castings. This is only a forerunner of drastic reduction of all the other vital alloy metals such

as vanadium, tungsten, molybdenum, chromium, manganese, etc., in products not actually used by the armed forces. Already excellent results in reducing use of aluminum have been achieved.

"Continuation of occupational deferment from the draft by no means is assured," continued Mr. Johnson. "Therefore, we must begin right now to consider employment of women in our industry. We are told that already in England and in Canada, as high as 60 per cent of machine operators in factories are women. Our own chief engineer, who recently returned from inspecting Canadian munitions plants, tells me that women there are operating planers and boring mills.

"Bear in mind that employment of women requires its own special setup with respect to plant supervisory personnel and welfare facilities. In addition, the various states and the federal government have set up for women an entirely different set of employment laws than those which govern employment of men. However, it is my firm opinion that before this war is over, most machine tool builders will employ large numbers of women. Then we will be particularly grateful to our designers and engineers for having contrived machine tools whose operation involves the use of push buttons and easily handled levers rather than exercise of great muscular strength."

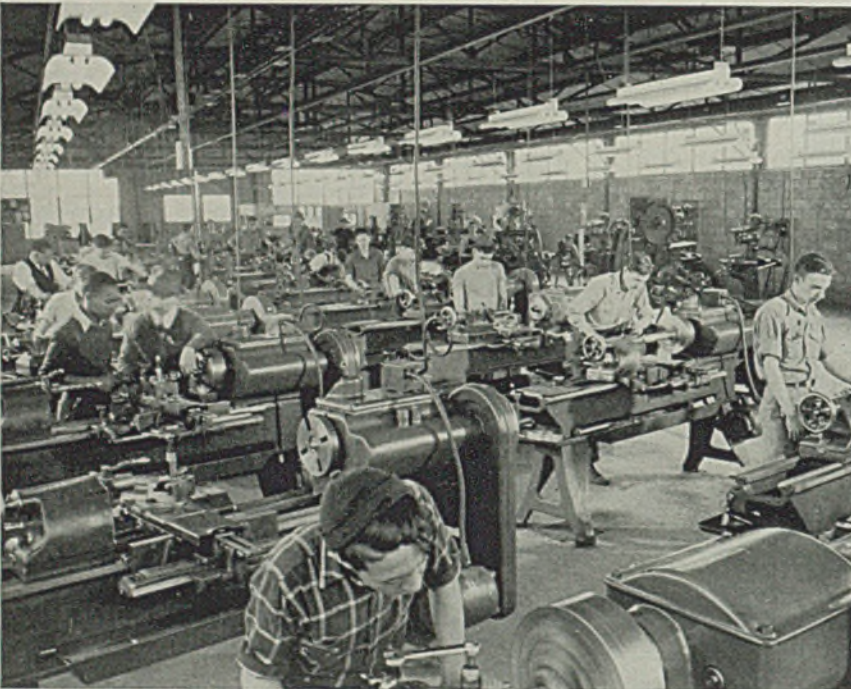
Other subjects discussed included machine tool allocations, speeding up of paint work and saving of materials connected therewith, and use of simplified machine tools.

Closely related to the latter are such expedients as the use of ordinary lathes for small boring jobs. One of the speakers mentioned that in one plant which he visited lathes rigged up with work tables on their beds not only were boring single holes efficiently but in some cases had special attachments which made it possible to bore several holes at once. Only through ingenuity such as this can the shortages in critical machines such as horizontal boring mills be met.

Reviews Steel Literature

Carnegie Library of Pittsburgh has issued its annual review of iron and steel literature for 1941. Edited by E. H. McClelland, technology librarian, it is a classified list of more important books, serials and trade publications issued during the year, with a few of earlier date not previously announced. The list includes only separately published books and pamphlets. No attempt is made to list material included in current periodicals.

Ohio NYA Shops Train 2400 Every 60 Days



THIS war production training shop of the National Youth Administration in Columbus, is one of eight recently opened in Ohio. The eight shops represent an investment of about \$680,000, will train 2400 war workers every 60 days in preliminary production-type work, including machine shop, welding, sheet metal and short wave radio. NEA photo

Women To Be Called to Shops as War Labor Force Is Expanded

NEW war workers must be recruited mainly from women not normally in the labor force. This is the consensus of employment authorities after analyzing the production job to be done and the probable deletion of the present labor force through military inductions.

To determine the size of this potential labor source, the National Industrial Conference Board, New York, has broken down census data to reveal the occupational status of women, by states and sections.

The board's figures show a total of 50,360,000 women over 14 years of age in the United States a year ago. Of these, 28,550,000, or 56.7 per cent, were engaged in their own housework; 12,850,000, or 25.5 per cent, already were in the labor force; about 9 per cent was in school and another 9 per cent were unable to work or were of unknown status.

New war workers must come largely from the group now engaged in their own housework and by transfer of some of those now in the labor force from less essential work.

Labor Division of the War Production Board has estimated that three to four million women workers, possibly more, will be drawn into war industries this year.

Proportion of women workers was largest in the industrial areas, the board's analysis shows. Slightly more than 31 per cent of the labor force in the New England states was made up of women, compared with only 19.9 per cent in the Mountain states.

Analysis of the occupational

status of women in nine of the larger states follows:

	(In Millions)			
	In Labor Force	In Own House-work	In School	Unable To Work
New York.....	1.70	2.87	0.44	0.50
Pennsylvania .	0.97	2.2	0.36	0.31
Illinois.....	0.85	1.78	0.25	0.27
California.....	0.73	1.52	0.24	0.27
Ohio.....	0.64	1.61	0.25	0.23
Texas.....	0.54	1.40	0.22	0.19
Michigan.....	0.46	1.17	0.18	0.15
Massachusetts.	0.56	0.89	0.15	0.18
New Jersey....	0.52	0.89	....	0.16

To produce the forty billion dollars worth of war materials asked by WPB Chairman Donald M. Nelson will require a tremendous expansion of the labor force engaged in war industries. Gordon L. Hostetter, director of the Employers' Association of Chicago, makes the following estimates:

If the average work week continues at 43.1 hours—last year's fig-

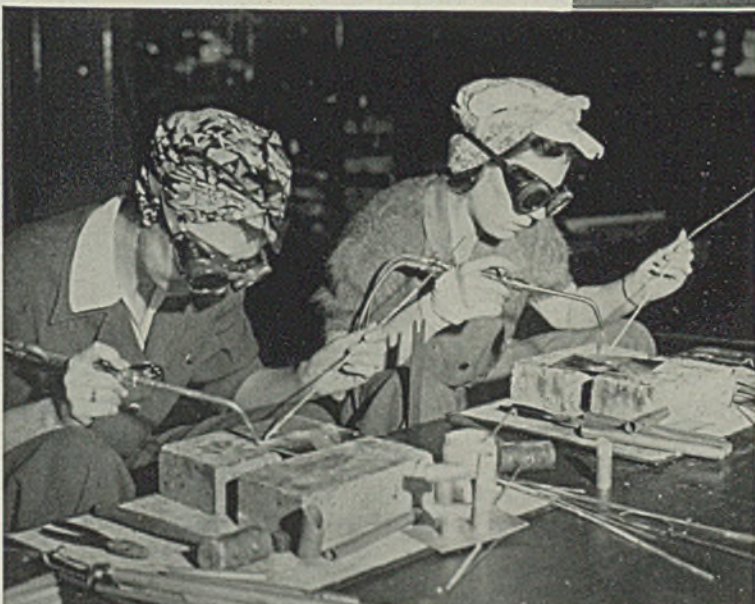
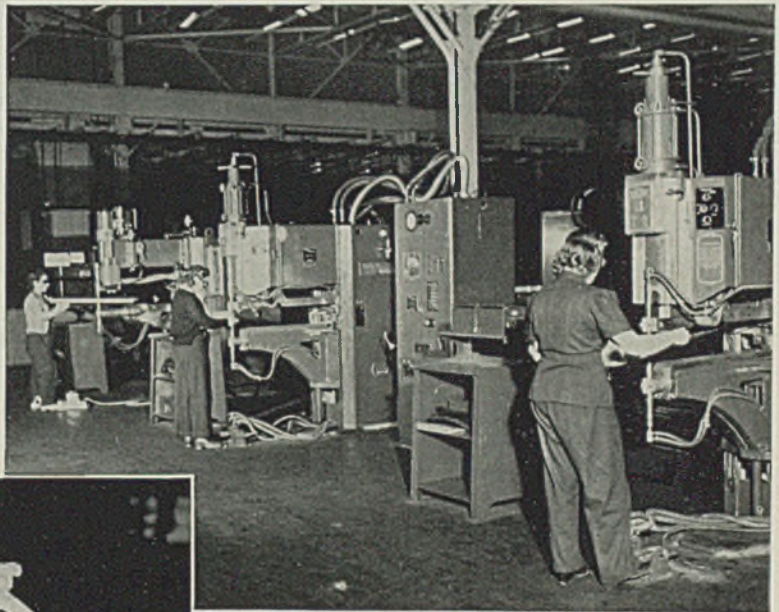
ure in war industries — 17,880,000 workers will be required, compared with only 5,600,000 in 1941. If the work week is stepped up to 50 hours, 15,380,000 will be needed, and if the work week can be increased to 60 hours, 12,500,000 will be required.

"We shall have to employ women by the hundreds of thousands, if not millions, in jobs where women have never been thought of before," Mr. Hostetter says.

"Eye Accidents Rob U.S. Of 9,500,000 Man-Days"

Industrial eye accidents during 1941 robbed America of approximately 9,500,000 man-days—enough working time to have built 17 destroyers—according to Ira Mosher, vice president, American Optical Co., Southbridge, Mass.

Reporting an increase of 1,000,000 lost man-days during 1941 in comparison with 1940, he declared that 98 per cent of the 300,000 eye injuries which occurred are preventable. The direct and indirect cost of these accidents to the country, he said, totals \$200,000,000.

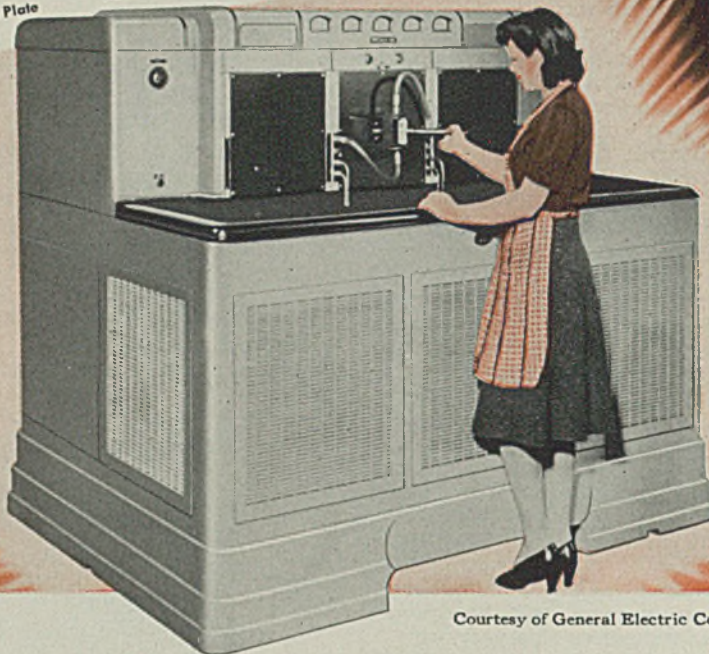


WOMEN are beginning to take jobs formerly considered exclusively men's work. Many will be employed at the new Ford bomber plant at Willow Run, Mich., where some already are at work as shown in accompanying photos. Above, three operators are running automatic riveters, while at right others are performing spot welding operations. NEA photos

WHY 9 OPERATIONS ?



Harden parts
in **ONE**
SIMPLE
OPERATION



Courtesy of General Electric Company

with this new heat-treating process!

Schedules for hardening machine parts often call for these 9 operations: Haul, copper-plate, haul, locally remove copper, haul, pack, carburize and harden, haul, straighten. And often more.

Now, with the revolutionary new TOCCO machine, hardening can be cut to *one simple, high-speed, electric operation*—a push-button start with the entire heating and quenching job *controlled automatically*, precisely—completed in seconds, formerly hours. *Doesn't require skilled labor.*

Compact, clean and cool, the TOCCO machine can be spotted right in the assembly line to eliminate hauling. It is *standard*—can be adapted to peace-time jobs by simply changing work fixture.

Faster heat-treating and fewer operations mean greater production! Users report TOCCO increases output 200% to 600%.

Find out how TOCCO can increase *your* heat-treating production!

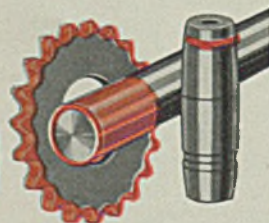
THE OHIO CRANKSHAFT COMPANY
Cleveland, Ohio

SPEEDY ELECTRIC HEAT IS GENERATED WITHIN
THE SECTION TO BE HEAT-TREATED



TOCCO

World's Fastest, Most Accurate Heat-Treating Process



Mirrors of MOTORDOM

*Union willing to give until it hurts—the other fellow . . .
Would like to have everything frozen except wages . . .
Pressure applied for more buses to transport working forces
to and from new war plants . . . Diesels dance cheek-to-cheek
in tank power plant. Radial engines for tanks far from out
of picture . . . Renegotiating more large war contracts as
volume moves up*



By A. H. ALLEN
Detroit Editor, STEEL

DETROIT

UNION labor in the automotive and aircraft industries, through the executive board of the UAW-CIO, has celebrated the dawn of spring and the opening of the baseball season by coming up with another "plan" for the nation, titled, "Victory through Equality of Sacrifice." Released last week in newspaper advertisements and pamphlets, the presentation has a distinctly professional touch, in contrast to the recently disinterred Reuther plan when it was first broached.

Stated to represent the views of 700,000 working people in war industries, the plan is calculated to be a give-and-take proposition—the union will "sacrifice" double-time pay for Sundays and holidays, even though these rights "have been won through decades of struggle," in exchange for which the following are asked: Control of profits on the basis of 3 per cent return on invested capital; restriction of all incomes to a maximum of \$25,000 per year; rigid fixing of prices of food, rent, clothing and other necessities; rationing of all food, clothing, housing and other necessities; raising of wages to meet increased living costs; guaranteed living wage for dependents of men and women serving in the armed forces; moratorium on debts for the unemployed and for those in the armed forces; creation of a labor production division in the WPB to make suggestions for increasing war production; creation of an agency to make plans for postwar adjustment; and finally, dependent upon acceptance of all the foregoing, agreement to accept all wages for time over 40 hours per week in the form of non-negotiable special defense bonds.

Program Sent to Capital

Where any equality of sacrifice exists between relinquishing an extra-pay provision which is utterly indefensible in full-time operations and the fairly complete regimentation of the national economy outlined is difficult to see, but there

is the program. It is now being rushed to Washington for consideration and it seems entirely likely the plan will meet favorable response in administration circles.

As long as the UAW is asking for something, there are a few other points which might be tacked onto the requests, even to use just as "traders." For example:

1. Mandatory closed union shop in favor of the CIO in all war plants.
2. Permission to all UAW-CIO members to purchase new automobiles and as much sugar as they wish.
3. Commissions in the Army or Navy to any CIO member of relative.

Problem of transporting working forces to and from outlying war plants in this district is becoming more acute as these plants approach the full production stage. An oral slugfest developed last week between the street railway commission, Ford representatives and labor representatives in connection with movement of workmen to the Ford Willow Run bomber plant. The company pointed out that 11,000 are now at work in the plant, with 4200 more on construction activities. Hiring is at a rate of 300-400 a day and by next month 17,000 will be at work. The plant is some 30 miles from downtown Detroit and as yet there is no adequate housing nearby. Investigation showed it impossible to develop commuter rail service to the plant, and before long worn-out tires are going to immobilize many private cars, so buses are apparently going to have to carry the bulk of plant workmen. The railway commission finally has decided to purchase 500 new buses, but the question remains whether any of them will go into service to Willow Run.

Irrked at the commission's delay

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in buying new buses, a Ford representative pointed out that his company is still building seven buses a day and has enough material on hand for 300 more, with priorities to continue for six months at a rate of 35 buses a week. He told the commission that if it would not provide service immediately to Willow Run, the company might be forced to set up its own service.

Some of the large haulaway trucks hitherto used to transport new cars to other cities are being converted into buses for emergency suburban transportation. They can be altered at low cost and will carry an appreciable number of workmen, though not in the finest style. This type of transportation has been suggested in Flint, Mich., to transport workmen to the new tank arsenal outside the city.

Diesel Tank Engine Goes Into Volume Production

Though it is said to be still awaiting approval by the ordnance department, the double 6-cylinder diesel engine designed by General Motors for powering the M-4 medium tank is getting into volume production. The unit is an ingenious combination of two standard diesels, one turned end for end so that the accessories, including the large blower, can be mounted on the outside of each engine. The blocks are about 5 inches apart, with exhaust manifolds on the inside. A double clutch arrangement is provided at the driving end, which permits using either one or both of the 225-horsepower engines which are geared to a single power takeoff.

Advantages of the diesel power plant for tanks, as pointed out by the designers, include high torque at low speed, greatly extended cruising range with a given weight of fuel and minimized fire hazard compared with gasoline engines. A further recently discovered charac-

teristic is that the diesels will operate equally well on gasoline. Disadvantages center principally around the much greater weight of the diesel compared with the radial air-cooled engine now used in medium and light tanks, the possible vulnerability of the cooling system on the diesel and the complicated supply problem occasioned by use of oil fuel.

It becomes apparent that there are at least two sharply different schools of thought regarding the type of power plant to be used in tanks, the radial engine having strong backers, in spite of all that has been said and written about its inadequacies in tank usage. A recent development in radials has been a lowering of the compression ratio to permit the use of 80-octane fuel, whereas formerly these engines had required aircraft fuel of 91-octane or better.

Walter Reuther of the UAW-CIO, in his recent oratorio with C. E. Wilson, president of General Motors, solved the tank power problem with a wave of the hand and the statement that present and proposed tank engines should be thrown out altogether and the Ford 8-cylinder aircraft-type engine standardized for this application. Only a handful, if that many, of these engines has been built, none tested extensively in tank opera-

tions, and volume production is months away. Meanwhile the tanks are rolling from assembly lines and they cannot very well be kept standing around waiting an unproved engine.

Renegotiation of War Contracts Probable

Start of what promises to be a fairly complete re-examination of government war contracts for the purpose of renegotiation was the conference between military procurement officials and Continental Motors, which operates plants here and in Muskegon, Mich., building a variety of aircraft-type engines, parts and related items for the war program. Upshot of the "guinea pig" study made on Continental was a renegotiation of its present contracts on the basis of material and labor costs, burden, amortization of investment and a reasonable profit in the light of greatly increased volume, resulting in a reduction of \$40,000,000 on these contracts which amount to several hundred millions.

A score or more of companies supplying war products are slated to follow through a similar recheck and renegotiation of contract prices. In prospect appears a limitation of profits to 3½ per cent when plant facilities are government financed,

8 per cent when those facilities are privately financed.

Renegotiation of many contracts is the natural outgrowth of the expansion of such contracts from small-lot educational orders to high volume. As volume of output increases, costs go steadily downward, in some cases amazingly so. Most industrial executives are perfectly willing to renegotiate such contracts and in fact often initiate such renegotiations. No one knows better than the automobile industry the effect of high volume on unit costs.

The operator of a medium-size castings plant here, devoted fully to war work, summed up the situation approximately as follows: "Our labor and material costs are up appreciably, our labor productivity is down, and our price per pound of output is down from the peacetime level. Nevertheless our total volume is three times what we ever dreamed it could be, so we just can't help making a good profit. And after the starvation years of the thirties in our business we feel we are entitled to a decent profit now."

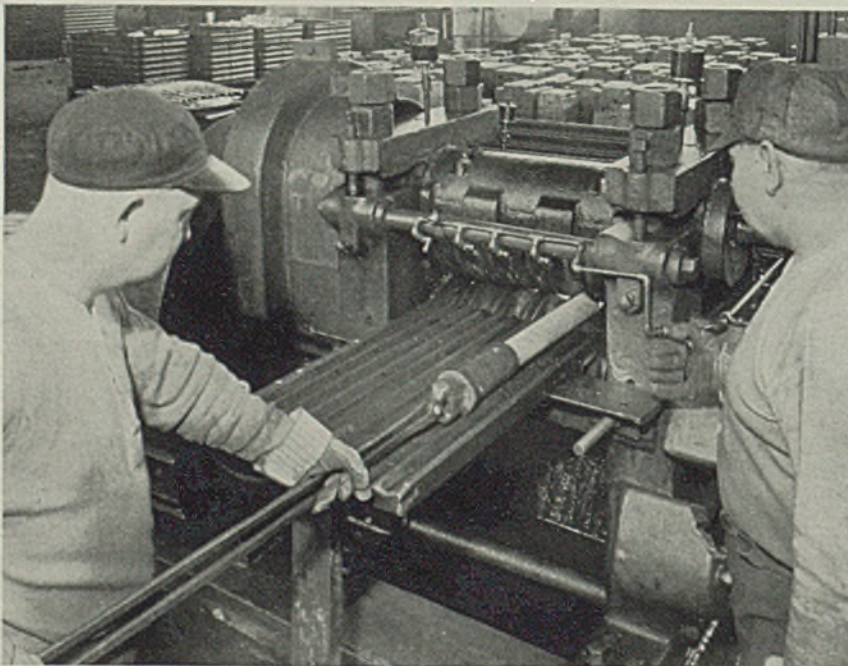
Starts Bond Sale Drive

Nation-wide drive for sale of war bonds to its 220,000 employees in 87 war production plants was launched by General Motors last Thursday. Objective is 100 per cent employe participation and all the devices of promotion and publicity are being used. Three initials of the slogan, "Save and Serve for Victory," appeared on floors and walls of all GM plants two weeks ago to stimulate interest of employes in the drive. Special award banners will be given to plants and offices enlisting 100 per cent participation.

Machine tool and production equipment listing service of the Automotive Council for War Production has classified 80,000 surplus machines available throughout the industry, and has 45,000 more units awaiting classification. Of those tabulated, 50,000 are already operating on war work. About 200 companies in the industry have listed their surplus equipment, exclusive of 84 companies which reported their facilities 100 per cent engaged on war production.

Extension of financial aid to dealers of Nash-Kelvinator Corp. by the parent company began last week with a cash advance of about \$450,000, which would indicate 45,000 new cars in dealers' hands, since the advance is made on the basis of \$10 per month per new car. This figure is reduced somewhat, however, since dealers may elect to receive payments for the months of February and March in the initial disbursement.

Old Roll Forging Machine Does Its Bit



TWENTY-FIVE-year-old roll forging machine, once used to form gear shift levers, has been resurrected by Chrysler Corp., Detroit, and fitted with a new set of rolls to size aluminum alloy rounds preparatory to forging on steam hammers for aircraft parts. Sizing the bars saves hours over working them down on the anvil of the steam hammer

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MEN of INDUSTRY

W. V. PETERS has been elected vice president and a director, Truscon Steel Co., Youngstown, O., subsidiary of Republic Steel Corp. He succeeds **Kenneth D. Mann**, who has resigned to serve under **Gen. Brehon Somervell**, Services of Supply Command, United States Army, Washington. Associated with Truscon 19 years, Mr. Peters heretofore has been sales manager. **C. B. McGehee**, formerly manager of sales, southern area, has been named general manager of sales.

James K. Fulks, associated with Ex-Cell-O Corp., Detroit, 17 years, serving in various capacities, since November, 1940, as factory manager in charge of Ex-Cell-O plants, has been elected vice president in charge of manufacturing.

H. S. Eberhard, vice president, Caterpillar Tractor Co., Peoria, Ill., has been elected a director, to succeed the late **D. G. Sherwin**.

Perry V. Ogden has been appointed factory manager and general superintendent, Boeing Aircraft Co., Seattle. From 1928 to 1934 he served as the company's production chief.

Dr. Paul Martens has retired as manager of Metal & Thermit Corp.'s plant at Carteret, N. J., after completing 33 years of active service.

A. V. Murray, secretary, Scaife Co., Oakmont, Pa., has been elected executive vice president. **R. G. Taylor** has been chosen secretary, and **R. W. Thrasher** has been named plant superintendent.

Wallace K. Brown has been appointed vice president in charge of procurement, Crocker Wheeler Electric Mfg. Co., Ampere, N. J. Associated with the company since 1908, he has since served as district manager in San Francisco and Newark, eastern sales manager in New York, and vice president and general sales manager.

W. D. Fisker has been appointed sales representative and tool engineer in the Detroit district for McKenna Metals Co., Latrobe, Pa. Formerly associated with Vanadium



W. V. Peters



James K. Fulks



Wallace K. Brown

Alloys Steel Co. as sales representative, Mr. Fisher will have headquarters at 14302 Grand River avenue, Detroit.

W. G. Merowit, 436 Niagara street, Buffalo, has been named representative in western New York state by Mahr Mfg. Co., Division of Diamond Iron Works Inc., Minneapolis.

John M. Hassler, chief industrial engineer at Birmingham, Ala., for Republic Steel Corp., has become associated with Consolidated Aircraft Corp., Fort Worth, Tex., as superintendent of industrial relations.

Clarence Tolan Jr., president, Dodge Steel Co., Philadelphia, and **William C. Carter**, executive vice president, Link-Belt Co., Chicago, were elected directors of Link-Belt at the annual meeting of stockholders recently.

Frank A. Hiter, vice president and general sales manager, Stewart-Warner Corp., Chicago, has been elected a director, replacing **Thomas T. Sullivan**, retired.

Alexander M. Hamilton has been appointed executive vice president in charge of the Canadian Tank Arsenal operated by Montreal Locomotive Works Ltd., Montreal, Canada, an affiliate of the American Locomotive Co.

David F. Robinson, New York district sales manager, William Sellers & Co. Inc., has been granted leave of absence for the duration, and is now working under **Commander Paul E. Piehl**, United States Navy Aeronautics Bureau, Washington.

Frederic I. Lackens, advertising manager, Hays Corp., Michigan City, Ind., has been appointed vice president, National Industrial Advertisers Association, Chicago, to fill the unexpired term of **Louis Ott**, advertising manager, Ohio Brass Co., who resigned.

Gaston Estep, cost analyst in the Chicago office of Carnegie-Illinois Steel Corp., has been transferred to Pittsburgh as assistant chief cost analyst. He has been succeeded by **James Thomson**, formerly cost analyst at the Gary works. **James W.**

Kettle, industrial engineer at Gary works, has become cost analyst in the plant, succeeding Mr. Thomson.

P. W. Stansfield, since June, 1939, manager of farm service tire sales, B. F. Goodrich Co., Akron, O., has been given the added duties of directing the sale of industrial tires.

C. H. Longman, assistant to the chief operating officer, Chicago & Northwestern railroad since 1940, has been named assistant chief operating officer.

C. M. Self, executive assistant since 1939, Chicago, Indianapolis & Louisville railroad, Chicago, has been appointed chief operating officer.

E. E. Wright, formerly assistant general manager, New York Central railroad, Detroit, has been appointed assistant to the vice president, with headquarters in Chicago. He is succeeded in Detroit by **Frank McElroy**, while **R. H. DeForest**, succeeds Mr. McElroy as superintendent of freight transportation at Jackson, Mich.

Charles M. Craighead has been named a research metallurgist, Battelle Memorial Institute, Columbus, O. He formerly was associated with Aluminum Co. of America, Reynolds Metals Co., and Braeburn Alloy Steel Corp.

Alfred S. Otton, advertising manager, Robins Conveying Belt Co., Passaic, N. J., has been relieved of his duties as advertising manager so that he may handle assignments in connection with war work. **John M. Lupton**, assistant advertising manager, has been promoted to advertising manager.

Alfred Kent, formerly Dallas, Tex., representative for Manning, Maxwell & Moore Inc., Bridgeport, Conn., is now an ensign in the United States Navy.

Fred Crabbe, who formerly covered the Corpus Christi territory, has been transferred to Dallas replacing Ensign Kent for the duration.

John M. Bush, land agent for Cleveland-Cliffs Iron Co. at Negaunee, Mich., has been appointed chairman of the Upper Peninsula industrial salvage committee by **Eugene duPont III**, assistant regional manager of the industrial salvage section, War Production Board.

Marion P. Crews has been appointed representative at Dayton, O., for Boeing Aircraft Co., Seattle, Wash. The past year chief of the

CAA's aircraft engineering division in Washington, Mr. Crews will serve as liaison man for all branches of the Boeing companies with the materiel division of the Air Corps.

Warren S. Detenbeck, heretofore secretary, Fedders Mfg. Co. Inc., Buffalo, has been elected executive vice president and secretary. **William C. Winkler** has been named comptroller and **Paul C. Fedders**, assistant treasurer. **Edmund R. Walker**, formerly assistant general manager, was promoted to general manager. **Christ W. Fedders** and **C. H. Batchelor** have been re-elected vice presidents.

Robert H. Ridgway has been appointed chief, Coal Economics Division, Bureau of Mines, Department of Interior, succeeding **F. M. Shore**, who has been promoted to assistant chief of the bureau's Economics and Statistics Branch. Mr. Ridgway has been in the Washington office of the Bureau of Mines since 1928.

R. D. Scheldrup, associated with McGraw Electric Co., Toastmaster Products Division, Elgin, Ill., 15 years, has been appointed purchasing agent. He succeeds **P. D. Higgins**, who has become director of purchases, Mills Novelty Co.

Harry B. Davis, heretofore assistant to sales manager, succeeds Mr. Scheldrup as credit manager and traffic manager.

Kenneth C. Jasper, tool supervisor, Westinghouse Ordnance Division, Louisville, Ky., was elected chairman of the newly organized Louisville chapter, American Society of Tool Engineers, at the recent charter meeting of the chapter. Other officers elected are: First vice chairman, **Frederick Brown**, president, Talking-Weighing Machine Co.; second vice chairman, **Fred W. Fieldhouse**, president, Fieldhouse Engineering Corp.; treasurer, **John Thomas**, general foreman, gun erection department, Westinghouse Ordnance Division; secretary, **Sauter F. Reichert**, foreman, brass tool department, American Radiator & Standard Sanitary Corp.

Warren H. Clarke has been appointed assistant general manager, Houde Engineering Division of Houdaille-Hershey Corp., Buffalo. He succeeds the late Frank R. Schubert. Mr. Clarke formerly was Michigan state director of the War Production Board.

H. J. McKenzie, heretofore president of Sterling Pump Corp., Hamilton, O., and Stockton, Calif., which has been acquired by the Peerless Pump Division of Food Machinery Corp., Los Angeles, and Canton, O.,

has joined the Peerless organization as assistant to **Vernon Edler**, vice president and general manager. **Fred Jones**, manager of Sterling's New York office, will continue with Peerless; **John Milkesell**, formerly engineer of Sterling, will become manager of Sterling and small products line; while **Jack Wade**, Sterling's chief engineer, will be in charge of new developments at the Canton plant. Other employes of Sterling will be retained in the Peerless organization.

William D. Reed has been appointed general manager of sales, Sawhill Mfg. Co., Wheatland, Pa., and will supervise sales of tubular products of all kinds. The past three years Mr. Reed has been associated with the Chicago district office of Republic Steel Corp.

H. E. Doughty has been named assistant sales manager, Jessop Steel Co., Washington, Pa. He joined Jessop in 1932 and formerly was district manager at Philadelphia.

H. S. Worthington, general superintendent of the Plattsburg, Calif., works of Columbia Steel Co., has been appointed assistant vice president in charge of operations, with offices in San Francisco. He will be succeeded by **Joseph A. White**, heretofore assistant general superintendent. **J. D. McCall**, assistant general superintendent at Torrance, will become assistant to Mr. White, and his post at Torrance will be filled by **Harlow Dotson**.

Charles J. Hardy has been elected chairman of the board and **Leslie E. Hess**, president, J. G. Brill Co., New York. Other officers elected are: **Charles O. Guernsey** and **Ronald R. Monroe**, vice presidents; **Edmund L. Oerter**, secretary-treasurer; **J. W. Robb** and **B. D. F. Baird**, assistant treasurers; and **H. F. McKillip**, assistant secretary.

V. A. Crosby, Climax Molybdenum Co., Detroit, has been elected chairman, Detroit chapter, American Society for Metals, succeeding **L. C. Massey**, Dodge Division of Chrysler Corp. **Earl L. Morrison**, Budd Wheel Co., is the new vice chairman, and **A. Di Giulio**, Bundy Tubing Co., has become secretary-treasurer.

Executive committee includes **Roy W. Roush**, Timken-Detroit Axle Co.; **I. A. Rohrig**, Detroit Edison Co.; **A. H. Smith**, Republic Steel Corp.; **W. W. Gilbert**, University of Michigan; **E. O. Kirkendall**, Wayne University; **W. G. Patton**, Climax Molybdenum Co.; **H. L. Grange**, General Motors Research Laboratories; **L. C. Dunn**, E. F. Houghton & Co.; **Glenn Coley**, Detroit Edison Co.; **E. H. Stilwill**, Chrysler Corp.

DIED:

George L. Norris, 76, chief metallurgist, Vanadium Corp. of America, New York, April 13, in that city. He was one of the pioneers in the development and application of vanadium. He joined American Vanadium Co. in 1909, and remained with the company when it became the Vanadium Corp. of America. He was a member of American Society for Testing Materials, American Society for Metals, Society for Automotive Engineers, American Institute of Mining and Metallurgical Engineers, American Iron and Steel Institute and British Iron and Steel Institute.

Abel E. Peterson, 53, production manager, Watson Mfg. Co., Jamestown, N. Y., April 7, in that city.

George H. Keusch, 60, district freight agent, Canadian Pacific railroad, Chicago, April 8, in that city.

S. Forry Laucks, 72, president, York Safe & Lock Co., York, Pa., at his home in Wrightsville, Pa., April 11. Born in York county in 1870, Mr. Laucks had been with the company since he was 17. In 1938

he converted the company to the manufacture of ordnance, and the plant now is engaged 95 per cent in war work.

Henry R. Carse, 76, president, Electric Boat Co., Groton, Conn., builder of submarines, April 13.

Hugh Morton Craig, 52, director for heavy steel products, Iron and Steel Control, London, England, March 8.

Charles E. Reinel, 66, manager, Madison, Wis., plant of Allis-Chalmers Mfg. Co., April 7, in that city. He had been with the company since 1896.

George F. Blasler, 63, general superintendent, Buffalo Bolt Co., North Tonawanda, N. Y., April 9, in that city. He had a continuous service record of 36 years with Buffalo Bolt.

Meade W. Patterson, assistant works manager in charge of production for the mill products division of the Bridgeport Brass Co., Bridgeport, Conn., April 8, in that city.

MEETINGS

Foundry Show Preview Opened to Employees

Executives and employees of Northeastern Ohio foundries and allied industries are invited to attend the preview opening of the Foundry and Allied Industries Show to be held in connection with the annual convention of the American Foundrymen's Association, which opens in Cleveland, Monday, April 20. The show will be in Public Auditorium.

From noon Monday to 10 p.m. will be known as Northeastern Ohio Preview Day. Plant employees will be admitted without charge on that day only. Tickets may be obtained from the American Foundrymen's Association in the auditorium.

Scrap To Be Discussed At Cleveland Meeting

An invitational meeting on the general topic of "Salvage for Victory" is scheduled to be held April 20-23 in Hotel Carter, Cleveland, under the auspices of the Cleveland regional branch, Army Ordnance Department.

Among speakers on the formal 4-day program are Major General Campbell, of Washington, Army Ordnance Department, and Russell Whitman, OPA.

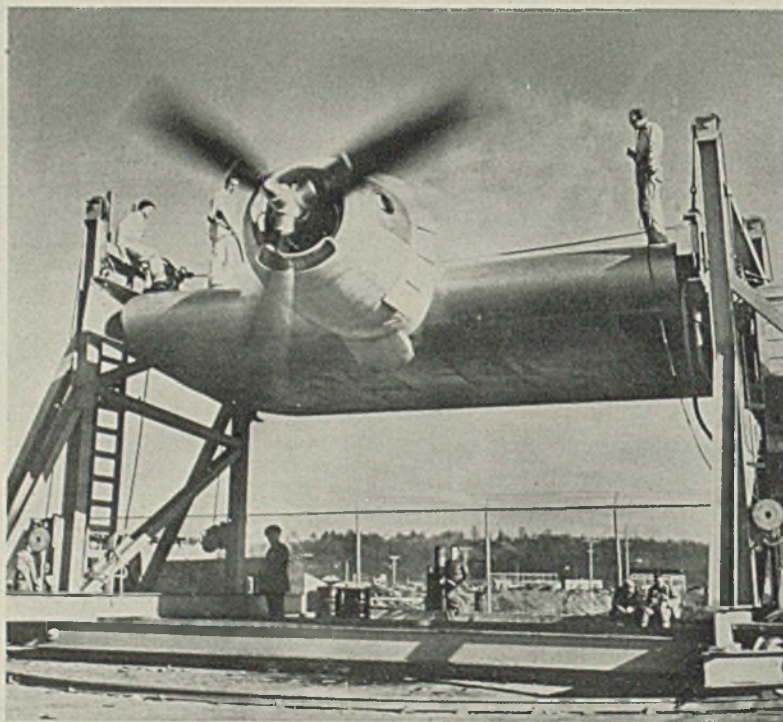
"Floating" Railroad Cars Demonstrated

Three new pendulum-type railway passenger cars were demonstrated to 150 railroad officials and the press in a run between Chicago and Galesburg, Ill., last week. Built by the Pacific Railway Equipment Co., Los Angeles, for the Chicago, Burlington & Quincy; Atchison, Topeka & Santa Fe; and Great Northern railroads, the cars possess an unusual degree of riding comfort, quietness and freedom from vibration.

Their design utilizes recent important developments of aviation and automotive engineering. Mounted at four corners on deep, soft coil springs, "floating" car eliminates much sway and lurching encountered in conventional type equipment operating at high speeds. Much like lightweight streamlined coaches, the new car is of "stressed skin" construction, the outer covering being of high tensile, low alloy steel, forming an integral part of the frame.

The demonstration was sponsored by the Chicago Association of Commerce and Burlington and Santa Fe railroads.

Tests Aircraft Engines on the Ground



ENGINE test laboratory at Boeing Aircraft Co's Seattle plant is designed to put airplane engines through rigid performance tests without taking them off the ground. Laboratory is mounted on a circular track, permitting the engine to be shifted to take advantage of wind from any direction. Through testing the power plants before they are installed in the plane, months of time are saved in getting new models into production. Corner of the control cabin where engineers carefully check all data may be seen at right in photo

Activities of Steel Users and Makers

BRIDGEPORT Brass Co., Bridgeport, Conn., last Thursday put into operation its new brass mill at Indianapolis, the first of five major government brass mills to swing into production. The plant, three times the size of the Bridgeport rolling mill, will make brass at one end and deliver completed products at the other. Defense Plant Corp. holds title.

Whiting Corp., Harvey, Ill., has acquired the Hydro-Clone line of dust and fume suppression equipment. E. F. Fisher, inventor of the Hydro-Clone equipment, is in charge of this department which is a part of the Equipment Division.

A label pointing out that every empty steel drum lying idle means that steel needed for war production is diverted by requiring another drum to be used for shipment is now being placed on all its drums by Acheson Colloids Corp., Port Huron, Mich.

A record installation of General Electric capacitors expected to be made within the next three months will permit existing facilities in a power pool of several companies cen-

tering around Houston, Tex., to deliver from 35,000 to 50,000 kilowatt additional power to important defense loads in that area, chief of which is the new magnesium plant at Freeport. They will be applied on the systems of Houston Lighting & Power Co., Central Power & Light Co., and Lower Colorado River Authority.

Metallizing Co. of America has moved its Chicago general offices and midwestern warehouse to 1330 West Congress street.

Udylite Corp., Detroit, has moved its eastern district offices and warehouse from 60 East Forty-second street, New York, to 11-16 Forty-fourth drive, Long Island City, New York. A complete line of electroplating and polishing supplies will be maintained there.

Wickwire Spencer Steel Co., New York, has published an illustrated pamphlet entitled, "Something About Our Job in Helping to Win the War," to show its employees how the products they turn out are actually used in military combat. The pamphlet was also sent to stockholders, customers and suppliers of the firm.

A booklet, "How One Company Tackles the War Production Problem," a case history of its recovery from lost peace-time production, is being sent to customers by the

Lyon Metal Products Inc., Aurora, Ill. Planning and execution of a campaign to get both prime and subcontracts is outlined in the booklet.

Pennsylvania Salt Mfg. Co., Philadelphia, chemicals, has arranged a contract with the government for construction and operation of a plant in the Philadelphia area for the manufacture of war goods. Cost will be \$1,750,000.

Appreciation for the co-operation of the Lincoln Electric Co., Cleveland, for providing welding instruction for ordnance inspectors was expressed in a letter signed by Maj. Gen. C. T. Harris Jr., assistant to the chief of ordnance, to J. F. Lincoln, the company's president. Lincoln Electric established a course of training for inspectors at its welding school at the request of the Ordnance Department. Primary purpose was to instruct inspectors of welding on tanks. The inspectors' course lasts two weeks, was started Jan. 19 and will continue until July 20. Fifteen are enrolled in each course.

White Metal Smelters Association Organized

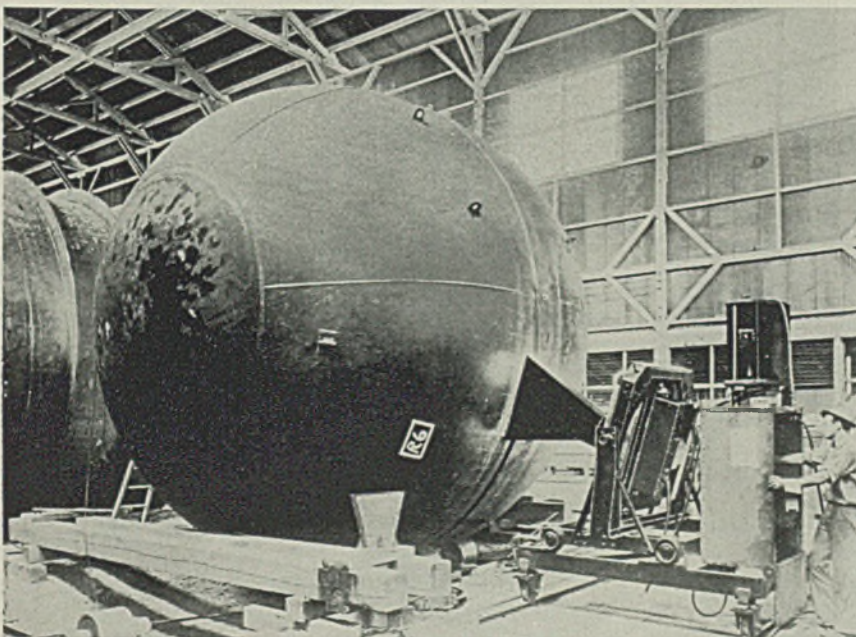
White metal smelters met in Chicago, April 12, and formed an organization known as the Associated White Metals Smelters of America. Purpose is "to assist the OPA and WPB in application and interpretation of their rulings."

The organization will acquaint the trade with a better understanding of the materials being handled by the industry, conservation of tin stocks and other critical materials, and use of materials which they handle for replacement of critical materials.

Albert Rothstein, Chicago, was elected chairman of the association; Harry S. Goldstein, Philadelphia, vice chairman; Oscar M. Pisof, 1720 North Elston avenue, Chicago, secretary; and Hyman Ferrer, Omaha, Neb., treasurer.

Composing the advisory panel, the list as issued follows: Herman Galamka, Kansas City, Kans.; Milton Silverstein, Chicago; J. M. Marks, Detroit; J. Kaplan, Chicago; Mr. Grodin, Cleveland; Walter Schoenbach, Chicago; R. Lipka, Chicago; Sidney Silverstein, Chicago; Whitney Sall, Los Angeles; Mike Helbein, Philadelphia; R. Robinson, Buffalo; Dan Hill, Lincoln, Neb.; Elmer Fisher, Chicago; Morris Wenzer, Chicago; Mr. Goose, Boston; Milton Levinson, Boston; Mr. Pelkies, St. Louis; Albert P. Goldberg, San Francisco; Alex Goldman, Seattle; Mr. Tessler, Denver; J. Viner, Richmond, Va.; and J. Schneider, Detroit.

Steel Plugs for Grand Coulee Inspected by X-ray



NO ORDINARY sink stopper is this 18-foot diameter steel plug which is being examined by means of a General Electric 200,000-volt X-ray unit before going into service at the Grand Coulee dam in Washington. All-welded plugs like this are being used to close off penstocks and pipelines not yet in operation. They are part of equipment built by Western Pipe & Steel Co., San Francisco

Chicago ASM Chapter Elects Dr. J. L. Burns

Dr. John L. Burns, Booz, Fry, Allen & Hamilton, management counselors, Chicago, and until recently manager, wire division, Republic Steel Corp., Chicago, has been elected chairman of the Chicago chapter, American Society for Metals, for the 1942-43 year. He succeeds W. D. McMillan, works metallurgist, International Harvester Co., Chicago.

Fred C. Smith, field metallurgist, Carnegie-Illinois Steel Corp., Chicago, was named vice chairman, and Andrew A. Engelhardt, sales, Eclipse Fuel Engineering Co., Chicago, secretary-treasurer.

Elected to the executive committee were: Lloyd J. Bohan, district sales manager, Michigan Products Corp., Chicago; Richard R. Hartwell, electrochemical engineer, American Can Co., Chicago; Arne Hedstrom, sales metallurgist, Vanadium-Alloys Steel Co., Chicago; Harry W. Highriter, chemist and metallurgist, Vascoloy-Ramet Corp., North Chicago, Ill.; C. T. Prendergast, engineer, Western Electric Co., Chicago; Fred J. Robbins, metallurgical engineer, Bliss & Laughlin Inc., Harvey, Ill.; Elmer E.

Terwell, sales engineer, Driver-Harris Co., Chicago; J. C. Thompson, sales, Park Chemical Co., Riverside, Ill.; Dr. Stephen F. Urban, supervisor of research, Carnegie-Illinois Steel Corp., South Chicago, Ill.; and Retiring Chairman McMillan.

Value of U.S. Mineral Output up 18 Per Cent

Total value of mineral products in the United States in 1941 increased 18 per cent over 1940, according to preliminary data by the Bureau of Mines. The estimated value of \$6,600,000,000 is the highest since 1920, and almost double that for 1934. A general advance in prices of metals accounted in part for the increased value but the major factor was the substantial gain in output of both metallic and non-metallic products. By the end of 1941 the war production program had raised the rate to unprecedented levels.

Estimated total value of metallic products in 1941 was \$1,970,000,000, 17 per cent above that for 1940 and was exceeded only during 1917 and 1918. Non-metallics advanced to \$4,630,000,000, an increase of 19 per cent over 1940 and the highest since

ADDITIONAL COPIES AVAILABLE

IF YOU would like extra copies of this week's poster, entitled "You Are a Soldier of Industry", for use on your factory or office bulletin boards they are available from STEEL, Readers Service Department, Penton Building, Cleveland, Ohio.

1926. Mineral fuels advanced 18 per cent to a value of \$3,630,000,000, highest since 1920. Other non-metallics reached \$1,000,000,000, an increase of 21 per cent over 1940, only slightly below the peak of the 'twenties when construction activities were substantially higher.

Manganese production in 1941 more than doubled that of 1940, bauxite output increased 107 per cent and manganese ore 89 per cent. Aluminum increased 50 per cent over 1940, molybdenum 38 per cent, mercury 16 per cent, zinc 12 per cent, lead 9 per cent and copper 8 per cent. Shipments of iron ore were 23 per cent higher. Gold production declined 0.8 per cent and silver 0.4.

Trapping the Sparks To Salvage Alloys from Grindings

ALLOY steel producers, who work with the more valuable and hard-to-get materials, watch closely their consumption of metals.

Allegheny Ludlum Steel Corp. is salvaging them from grindings produced in manufacturing operations.

The accompanying photograph shows a suction catcher trapping a shower of grindings from an alloy steel billet.

As a result of the company's research, special equipment and procedures have been developed. Even in recent peacetime years, all of the tungsten in grindings was captured and returned to the electric furnaces for remelting. The grindings from low-alloy steels were processed for reclamation, too, even though the expense of salvaging their alloys was disproportionate.

To increase its salvaging capacity, the company reports it is building a new reclamation plant which will concentrate on the processing of low-alloy steels to save the alloy content. To eliminate losses of these alloys until the new salvaging equipment is in operation in the near future, other concerns have contracted to supplement Allegheny Ludlum's present facilities for recapturing the strategic alloy particles from alloy steel grindings.



Canada Moves To Facilitate Steel Deliveries from U.S.

TORONTO, ONT.

TO ASSIST flow of materials from the United States to Canadian manufacturers working on war orders, regional offices will be established in main industrial centers by R. C. Berkinshaw, priorities officer. One has been opened at Vancouver, B. C., and one at Toronto, Ont. A third will be located at Halifax, N. S. Since adoption of the plan placing Canadian manufacturers on the same basis as those in the United States more serious shortages in many commodities have developed in the United States and a new series of regulations has been imposed.

The changeover and addition of new regulations has complicated the situation and many delays have been met in obtaining material under priorities. As many as 7000 applications for United States priorities have been handled in a single week.

War contracts placed and commitments made by the Department of Munitions and Supply and its predecessor bodies on Canadian, United Kingdom and other account to March 31, 1942, totaled \$3,447,269,253, according to government figures just released. Contracts placed on Canadian account, including contracts executed for plants and plant extensions, a portion of which is chargeable to other Empire countries under the Air Training Plan, and other contracts amounting to \$34,428,067 awarded by the Civil Aviation Division for airport construction, etc., totaled \$2,047,115,109. The aggregate for stores placed on United Kingdom account and United Kingdom commitments for plants and plant extensions and orders for output of some of these plants, amounted to \$1,218,871,220. Contracts awarded on other accounts totaled \$146,854,857.

Standardize Bolts

Purchases on Canadian account to March 31 included: Aircraft, \$391,719,381; alloys and metals, \$7,738,570; construction and defense projects, \$189,562,478; machinery, \$19,194,753; ordnance, \$200,496,506; tools, \$6,804,424.

H. H. Foreman, administrator of fabricated steel and nonferrous metals, has issued an order simplifying and standardizing stock production of sizes of carriage, machine, tire, elevator and step bolts and lag screws. The order restricts

production to specified sizes and reduces manufacture for stock purposes by about 65 per cent of the former range. Manufacturers are ordered to report on inventory as of March 31. No restriction is placed on sale and delivery from present stocks but a record of sales is to be kept and a report made to the administration.

To increase collection of scrap from remote sources minimum as well as maximum prices have been established for all parts of Canada. Previous orders regulated prices only in Ontario, Quebec and British Columbia. Heavy freight charges prevented dealers from buying material in areas distant from consumers.

Under the new plan dealers will receive a minimum of \$10 for cast iron scrap in British Columbia, Saskatchewan, Alberta and Manitoba and \$7 per ton on steel scrap in Saskatchewan, Alberta and Manitoba. Loading and handling charges average about \$1.50 per ton, making the price to individuals \$8.50 for cast iron and \$5.50 for steel.

In New Brunswick, Nova Scotia and Prince Edward Island prices are controlled as in Ontario and Quebec by maximum prices which may be paid by a consumer at a basing point.

Electric Power May Be Rationed in Dominion

Some curtailment of nonwar uses of electric power may be necessary in Canada late in 1942 as a

result of war industries being established there, William L. Batt, chairman, United States-Canada Materials Co-ordinating Committee, announced last week after a conference with Canadian officials.

Such a curtailment would affect United States supplies of newsprint, as this industry is one of Canada's largest users of electric power. The time or extent of this possible curtailment, however, is uncertain.

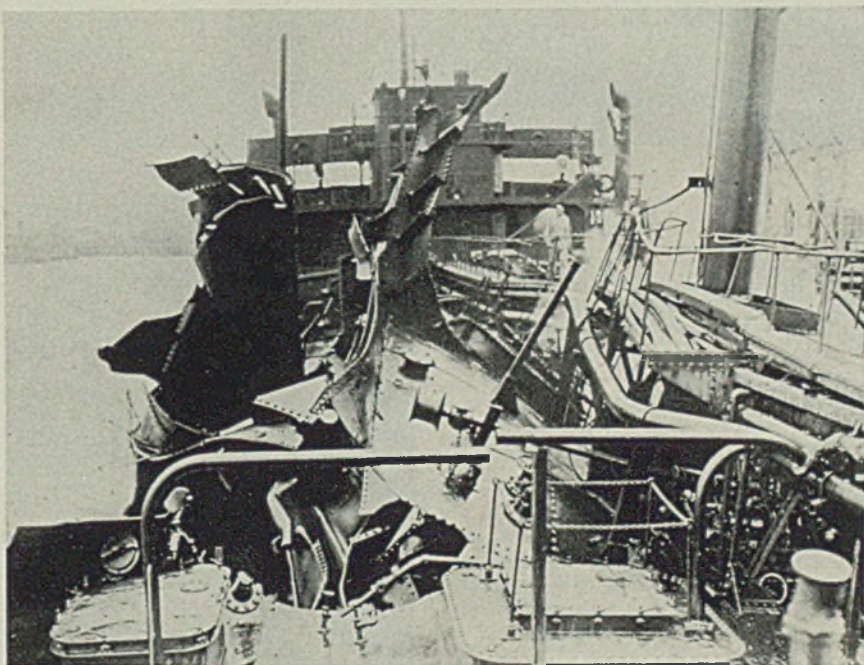
Ruling factor will be waterfall in Canada. Low water may bring drastic curtailment, and plenty of water would reduce it to a minimum.

Aluminum and chemical plants now projected for Canada, at the request of the United States, will take the bulk of the Dominion's available power.

Many Production Records Cited by U. S. Steel Corp.

"Production for Victory" edition of *U. S. Steel News*, published last week, disclosed a large number of production records attained by subsidiaries of United States Steel Corp. One subsidiary was cited as having established 157 new production records in 1941. These included new high marks by 22 of its 57 blast furnaces, by 16 of its 25 steel producing departments, by 46 out of 92 primary and finishing mills, as well as 73 all-time records in plants producing molds, wheels, axles, armor forgings and castings.

Torpedoed Tanker Saves Most of Cargo



TOP decks ripped by an Axis torpedo, this American tanker made port under her own power, under escort of a U. S. destroyer. The highly inflammable cargo did not ignite and most of the oil was saved. U. S. Navy photo from NEA

Armco Men Commended; Repair Furnace in Blast

Making repairs to a blast furnace while it is in blast is seldom attempted. Eight men of American Rolling Mill Co.'s Hamilton, O., plant cheerfully tackled the job of repairing the vortex — centrifugal dust catcher—of the No. 1 furnace there, while the giant structure was still producing pig iron, and came through without an injury or production delay. Similar repairs have been made before, but the furnace has always been shut down. Three days were spent in planning to insure safety of the men.

Word filtered through to Wash-

ington and Col. A. Robert Ginsburgh of the War department, headquarters, Service and Supply, wrote a letter to each of the men, in part: "Congratulations on keeping war production going."

Men of Armco's Middletown division, which includes the Hamilton plant, recently received the following telegram from Under Secretary of War Patterson:

"The Army has been informed that you have broken by 1000-tons previous monthly plant record of pig iron output, steel output by 3600 tons and ingot production by 6000 tons. You are doing your share in giving American soldiers the weapons they must have to take the

offensive in this war. Congratulations on your fine work! Keep it up."

Manufacture of steel artillery shell casings will be started soon at one of the company's plants, Calvin Verity, executive vice president and general manager, announced.

A Detroit company will manufacture the casings, Armco making available certain buildings and equipment, and supplying the special steel blanks from which the casings are made.

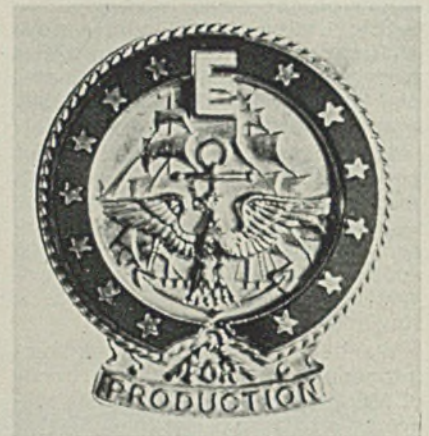
A substantial number of men and some women will be employed in the new project, and arrangements have been made with the Detroit company whereby Armco employees

Awards on the Industrial Front



VOLUNTARY participation in the war bond sales drive by 99 per cent of employes of Mackintosh-Hemphill Co., Pittsburgh, was recognized last week (above) with an award of the Treasury Department's "T", or "Minute Man" flag. Col. George H. Cherrington, assistant executive officer, second military area, is shown presenting the flag to C. V. Wilt, general works manager

Illustrated at the right is the presentation of the Navy "E" flag and pennant to Lukens Steel Co., as reported in **STEEL**, April 6, page 3



WHEN the Navy Ordnance Flag and the Navy "E" pennant are presented to manufacturing companies, Navy "E" lapel pins are issued to employees. Lodge & Shipley Machine Tool Co., Cincinnati, awarded the Flag and Pennant, sent to the editor a picture of the pin—"Now proudly worn by all the personnel"

in the plant, whose employment has been affected by the change over from civilian to war production will be given the opportunity to qualify for work.

"Presses and other machinery will be shipped at once, and operations will be started as soon as possible," Mr. Verity said.

New Texas Blast Furnace Plant Approved by WPB

Charter of the Lone Star Steel Co., with capital stock of \$1,000,000, has been filed with the Texas secretary of state in Austin. Its purpose is to construct blast furnaces near

Daingerfield, Tex., at a cost of \$14,850,000.

Incorporators are John W. Carpenter, Dallas, president of the Texas Power & Light Co.; Nathan Adams, Dallas, banker; Charles R. Moore, W. W. Lynch, E. B. Germany, R. L. Thornton and Fred Florence, all of Dallas; and W. O. Irwin, Daingerfield.

Iron ore for the plant will be obtained from deposits in northeast Texas which have been acquired by the company.

Project has been approved by the WPB and placed high on a building schedule that tentatively calls for completion by Aug. 1, 1943. The Defense Plant Corp. will finance the

project and lease it to Lone Star.

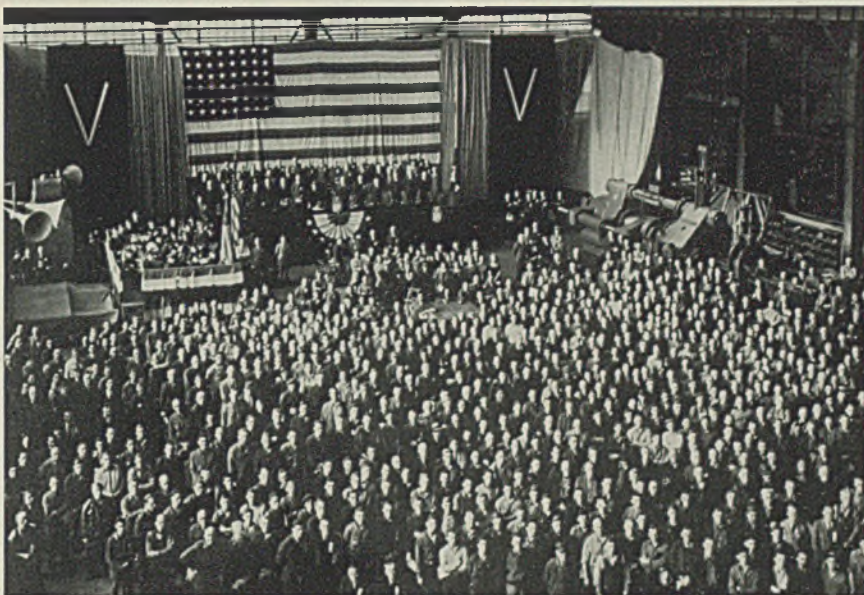
"Application for a steel plant to dovetail into the blast furnace project is pending before the WPB," Mr. Carpenter said. "It would increase the project by \$21,518,750 and give Texas a steel plant of 500,000 finished net tons capacity a year. If approved, the steel plant would feed, primarily, the shipbuilding plants of the gulf coast. . .

"Early thought on this subject was in terms of getting coke from Birmingham, but our studies of Oklahoma coals established, to the satisfaction of the WPB and its consultants, that Oklahoma coal was a coking coal satisfactory for the making of pig iron."

◆

ALL employes and executives of Morgan Engineering Co., Alliance, O., assembled in the main erection room, right, when the Navy "E" pennant was tendered President A. F. Morris by Capt. E. A. Lotquist, chief of staff, Ninth Naval District at Great Lakes, Ill. "E" lapel badges were accepted on behalf of employes by the deans of the workmen, John B. Miller and Charles Schultz, with combined service records of more than 120 years

◆



◆

ALL-NAVY "E" was presented to the New Kensington Works of the Aluminum Co. of America, left, in a ceremony attended by 7000 employes. Roy A. Hunt, Alcoa president told workers the award was earned by: Co-operation of management; co-operative attitude of plant personnel; maintenance of quality standards; and performance on delivery schedules. In presenting the award, Rear Admiral A. E. Watson, commandant, fourth naval district emphasized the importance of aluminum in the war program

◆

Plant Committees Push Speed and Volume Campaigns

EMPLOYEES and officials of Westinghouse Lighting Division, Cleveland, held a meeting in Hotel Statler, that city, Sunday afternoon, April 12, to launch a joint labor-management campaign as an answer to Donald M. Nelson's request for co-operation.

Under the banner "Quicker for Victory," symbolized by "Q4V," the plant labor-management committee is inaugurating new methods. Among them is a new and revised system whereby employes who initiate "victory ideas" will receive higher cash payments, with merit awards for outstanding ideas. Safety work will be stepped up to prevent accidents that would thwart production.

Records are to be compiled and each week a mounted, cut-out life-size portrait of General MacArthur will be placed in the department which made the best record the previous week.

An animated dummy labeled "Slap Happy Jappy" carries various posters and slogans aimed at arousing enthusiasm and team-work. Emphasis is placed on conservation of materials and tools.

A salary deduction plan has been formulated to enable employes to make liberal purchases of war bonds. Employes will wear buttons of bronze, silver or gold, depending on their individual production records.

The campaign is to be intensified still further as new methods and new "stunts" to encourage outstanding performance, are developed.

Labor-Management Groups Tell Of Efforts To Speed War Output

Reports on the formation of labor-management shop committees to stimulate the war production are notable for the absence of labor or management recrimination, WPB reports.

Often the reports refer to local conditions and of how posters, war news, slogans, suggestion boxes and informational literature is being used to increase output.

American Car & Foundry Co.'s Buffalo plant committee reported it had adopted "Volume for Victory" as its slogan.

Erie Concrete & Steel Implement Co., Erie, Pa., announced it was building ships on the same spot



LIFE-SIZE cut-out of General MacArthur for department with best weekly record

where Admiral Perry built ships in 1812 and had adopted for its slogan: "Perry did it and so will we."

Otis Steel Co., Cleveland, and the Steel Workers Organizing Committee announced the formation of a joint committee to spur production and conserve critical materials.

More War Plants On 24-Hour Schedules

Great gain in round-the-clock operation of war industry plants is evidenced by a survey by the National Industrial Conference Board. Of 151 companies covered, 37 reported they are operating plants 168 hours a week. Twenty-three others are operating 144 hours, or six days on a three-shift basis.

Many other week lengths were reported down to 40 hours, as follows:

Hours per Week	No. of Companies	Hours per Week	No. of Companies
40	15	120	9
48	6	121 to 143	10
50	2	144	23
56	2	145 to 159	3
58	1	160	2
60	1	161 to 167	2
61 to 100	9	168	37
101 to 119	6	Varies	23

Forty hours was the most fre-

quently reported work week per employe, but 35 companies reported 48 hours; 21 companies from 50 to 59 hours; and 12 companies 60 hours or more.

U. S. Chamber Proposes Extensive Tax Revision

An overall war revenue program was laid before Congress last week by the Chamber of Commerce of the United States, Washington, through Ellsworth C. Alvord, its federal finance chairman, who also proposed that corporations be permitted to return to the 1940 system of computing normal taxes.

Recommendations included a 100 per cent excess profits tax on "true normal profits," 25 per cent normal tax on corporations, war surtax of 10 per cent and a 5 per cent withholding tax on compensations, dividends and interest paid to individuals.

Other suggestions called for higher individual income taxes, producing another \$1,000,000,000, deductions limited to 20 per cent of net income of corporations and individuals for funds invested in non-negotiable government bonds, and a retail sales tax at a rate of about 10 per cent, raising \$5,800,000,000 new revenue.

Street Car and Bus

Passengers Increased 20%

Passengers carried on street car and bus lines in 109 cities outside New York in the first quarter of 1942 increased nearly 20 per cent over the period in 1941, American Transit Association, New York, reported last week. Charles Gordon, managing director, stated that the industry will be hard pressed for equipment to provide service.

"Based on the trends in 1941, it had been estimated previously that the industry would need a minimum of 12,000 additional motor buses, 800 street cars and 600 trolley coaches in 1942 to handle a predicted traffic increase of 20 per cent this year," he said. Deliveries have fallen far behind, due to manufacturers' difficulty in obtaining materials.

Gear Sales Increase

American Gear Manufacturers Association, Wilkesburg, Pa., reports industrial gear sales for March 1942 were 58 per cent above March 1941 and 28.8 per cent above February 1942. The three months ending with March, 1942 are 35.5 per cent above the corresponding period of 1941. The compilation applies only to industrial gears and does not include automotive gears or those used in high-speed turbine drives.

The BUSINESS TREND



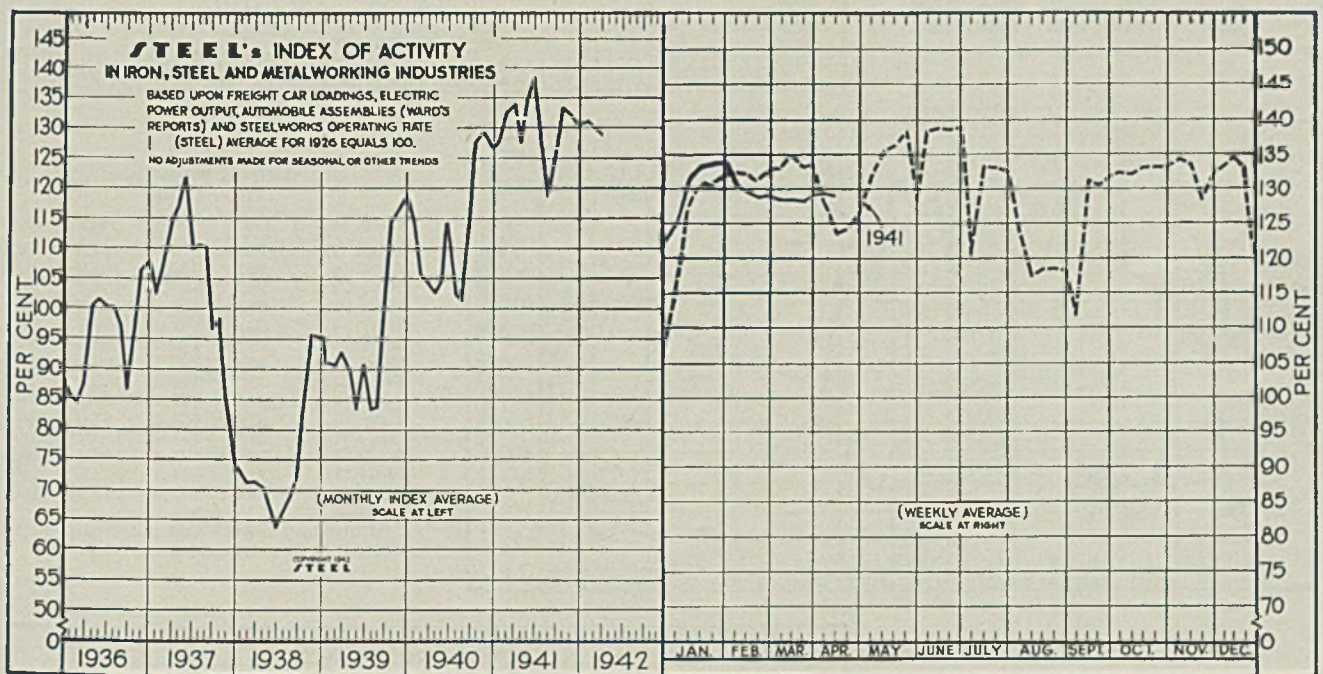
Many Small Concerns Drawn into War Effort

STEADY expansion in industrial production has been aided measurably by the increasing number of small industrial concerns which are being drawn into the sphere of the war effort. Progress in this direction has been particularly noteworthy in recent weeks.

In those instances where output has failed to reach or maintain maximum capacity, shortages of materials remain the chief obstacle. However, war or closely related industries continue to establish new production records. We have made marked progress in the production of military goods but output must rise much further to meet the current and future demands.

STEEL's index of activity in the iron, steel and metalworking industries eased to 129.2 during the period ended April 11. This represents a decline of but 0.4 point from the preceding week's figure and compares with the 123.8 level recorded in the corresponding week last year.

Ingot production established a new weekly record in the period ended April 11. Heavier movement of steel scrap to steel mills is expected to maintain or make it possible to further increase output over the coming weeks. The national steel rate stood at 98.5 in the week of April 11.

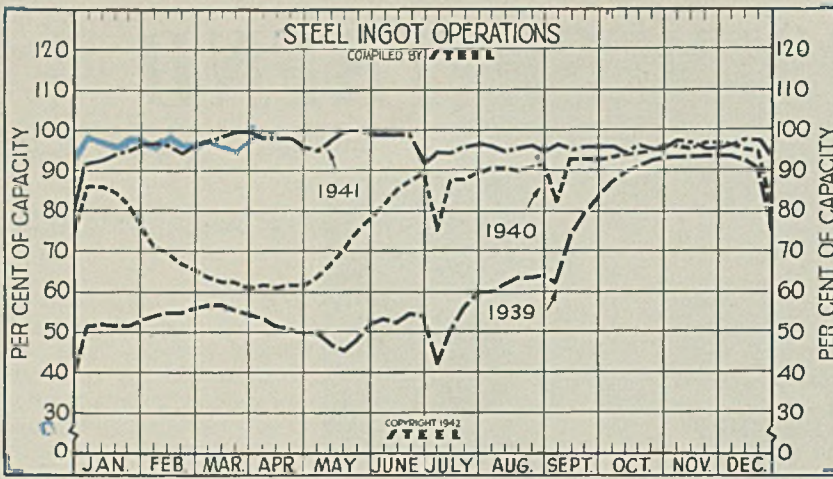


STEEL'S index of activity declined 0.4 point to 129.2 in the week ended April 11:

Week Ended	1942	1941	Mo. Data	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931
Jan. 31	133.9	132.0	Jan.	131.3	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1
Feb. 7	130.6	132.7	Feb.	129.6	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5
Feb. 14	129.8	132.3	March	128.6	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2	80.4
Feb. 21	129.0	131.2	April	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	
Feb. 28	129.1	133.0	May	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	
Mar. 7	128.3	133.1	June	138.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	
Mar. 14	128.3	135.0	July	128.7	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	
Mar. 21	128.1	133.5	Aug.	118.1	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	
Mar. 28	129.1	133.9	Sept.	126.4	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	
April 4	129.6†	128.9	Oct.	133.1	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	
April 11	129.2	123.8	Nov.	132.2	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	
			Dec.	130.2	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	

†Revised.

April 20, 1942



Steel Ingot Operations

(Per Cent)

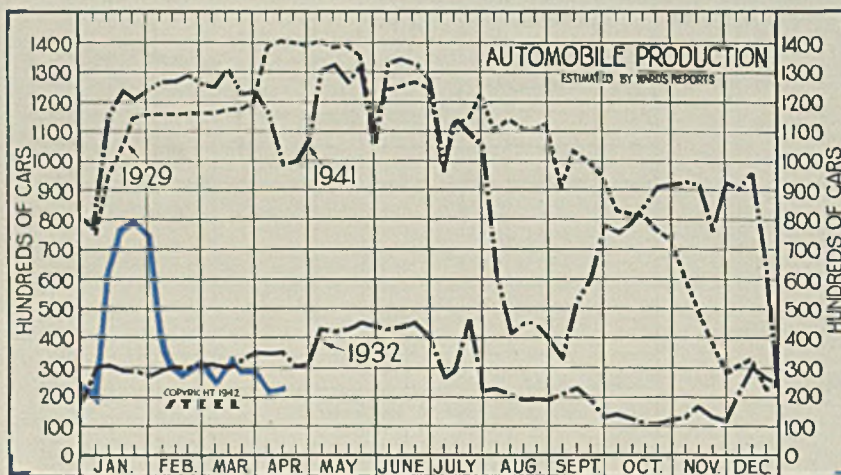
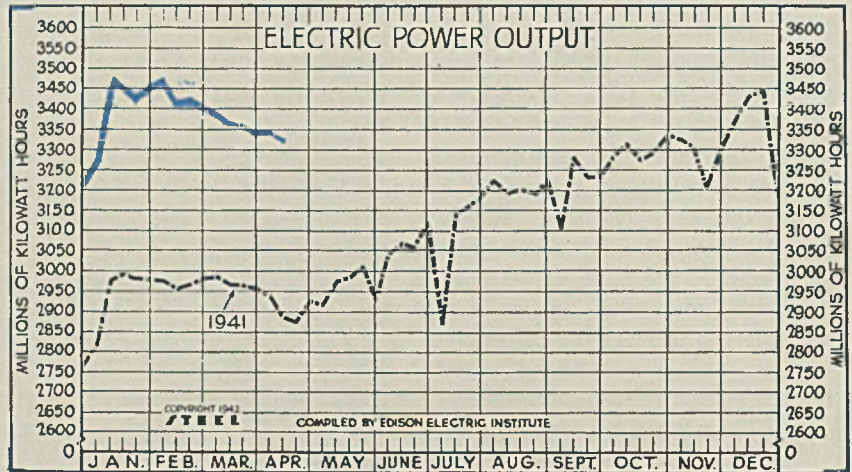
Week ended	1942	1941	1940	1939
April 11...	98.5	98.0	61.0	51.5
April 4...	98.0	98.0	61.5	53.5
Mar. 28...	97.5	99.5	61.0	54.5
Mar. 21...	95.5	99.5	62.5	55.5
Mar. 14...	95.5	98.5	62.5	56.5
Mar. 7...	96.5	97.5	63.5	56.5
Feb. 28...	96.0	96.5	65.5	56.0
Feb. 21...	96.0†	94.5	67.0	55.0
Feb. 14...	97.0	96.5	69.0	55.0
Feb. 7...	96.0	97.0	71.0	54.0
Jan. 31...	97.0	97.0	76.5	53.0
Jan. 24...	97.0	95.5	81.5	51.5
Jan. 17...	96.0	94.5	84.5	51.5
Jan. 10...	96.5	93.0	86.0	52.0

†Since Feb. 21 rate is based on new capacity figures as of Dec. 31 last.

Electric Power Output

(Million KWH)

Week ended	1942	1941	1940	1939
April 11...	3,321	2,882	2,530	2,235
April 4...	3,349	2,938	2,494	2,244
Mar. 28...	3,346	2,956	2,524	2,272
Mar. 21...	3,357	2,964	2,508	2,258
Mar. 14...	3,357	2,965	2,550	2,276
Mar. 7...	3,392	2,987	2,553	2,285
Feb. 28...	3,410	2,982	2,568	2,294
Feb. 21...	3,424	2,968	2,547	2,269
Feb. 14...	3,422	2,959	2,565	2,297
Feb. 7...	3,475	2,973	2,616	2,315
Jan. 31...	2,468	2,978	2,633	2,327
Jan. 24...	3,440	2,980	2,661	2,340
Jan. 17...	3,450	2,996	2,674	2,342
Jan. 10...	3,473	2,985	2,688	2,329
Jan. 3...	3,287	2,831	2,558	2,239
Week ended	1941	1940	1939	1938
Dec. 27...	3,234	2,757	2,465	2,175



Auto Production

(1000 Units)

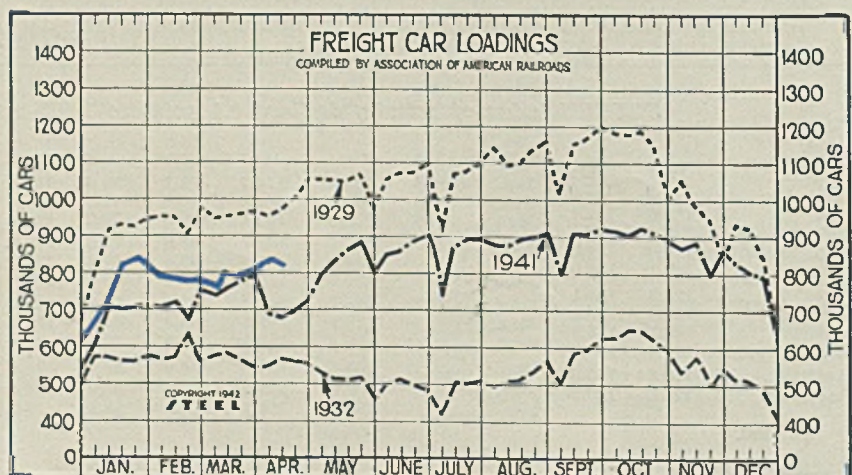
Week ended	1942	1941	1940	1939
April 11...	23.0	99.3	101.9	88.1
April 4...	22.3	116.3	101.7	87.0
Mar. 28...	28.9	124.2	103.4	86.0
Mar. 21...	28.9	123.8	103.4	89.4
Mar. 14...	30.6	131.6	105.7	86.7
Mar. 7...	24.5	125.9	103.6	84.1
Feb. 28...	30.1	126.6	100.9	78.7
Feb. 21...	25.7†	129.2	102.7	75.7
Feb. 14...	29.8	127.5	95.1	79.9
Feb. 7...	37.1	127.7	96.0	84.5
Jan. 31...	73.3	124.4	101.2	79.4
Jan. 24...	79.9	121.9	106.4	89.2
Jan. 17...	75.0	124.0	108.5	90.2
Jan. 10...	59.0	115.9	111.3	86.9

†Canadian trucks and automobiles and United States trucks, since Feb. 21.

Freight Car Loadings

(1000 Cars)

Week ended	1942	1941	1940	1939
April 11...	814	680	619	548
April 4...	829	683	603	535
Mar. 28...	805	792	628	604
Mar. 21...	797	769	620	605
Mar. 14...	799	759	619	595
Mar. 7...	771	742	621	592
Feb. 28...	781	757	634	599
Feb. 21...	775	678	595	561
Feb. 14...	783	721	608	580
Feb. 7...	784	710	627	580
Jan. 31...	816	714	657	577
Jan. 24...	818	711	649	594
Jan. 17...	811	703	646	590
Jan. 10...	737	712	668	587



Finished Steel Shipments

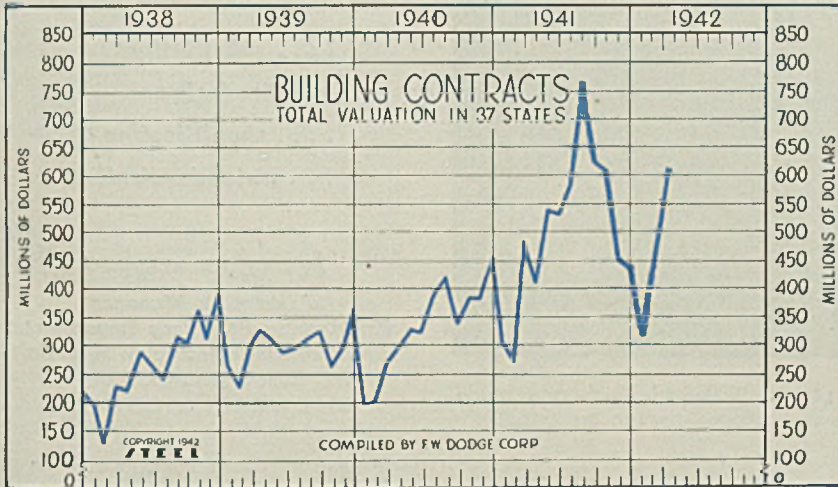
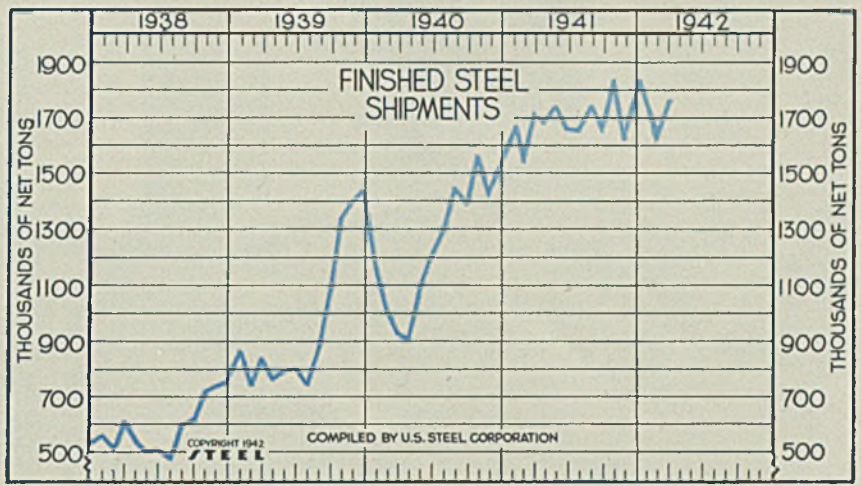
U. S. Steel Corp.

(Unit 1000 Net Tons)

	1942	1941	1940	1939	1938
Jan...	1738.9	1682.5	1145.6	870.9	570.3
Feb...	1616.6	1548.5	1009.3	747.4	522.4
Mar...	1780.9	1720.4	931.9	845.1	627.0
Apr...	.....	1687.7	907.9	771.8	550.5
May...	.....	1745.3	1084.1	795.7	509.8
June...	.....	1668.6	1209.7	807.6	525.0
July...	.....	1666.7	1296.9	745.4	484.6
Aug...	.....	1753.7	1455.6	885.6	615.5
Sept...	.....	1664.2	1392.8	1086.7	635.6
Oct...	.....	1851.3	1572.4	1345.9	730.3
Nov...	.....	1624.2	1425.4	1406.2	749.3
Dec...	.....	1846.0	1544.6	1444.0	765.9

Tot.† 15,013.7 11707.3 7315.5

†After year-end adjustments.



Construction Total Valuation In 37 States

(Unit: \$1,000,000)

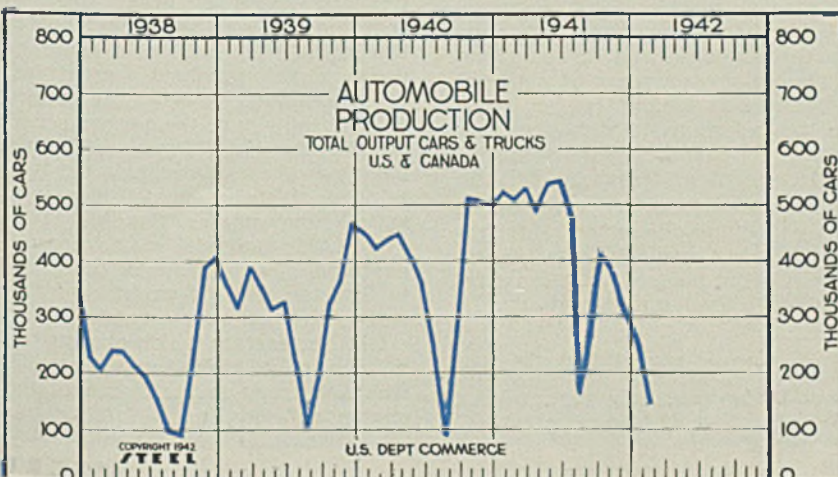
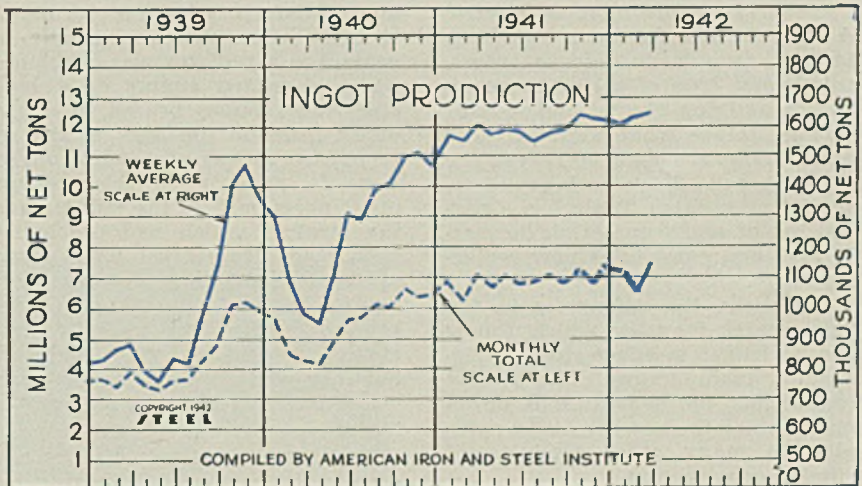
	1942	1941	1940	1939	1938
Jan...	\$316.8	\$305.2	\$196.2	\$251.7	\$192.2
Feb...	433.6	270.4	200.6	220.2	118.9
Mar...	610.8	479.9	272.2	300.7	226.6
April...	406.7	300.5	330.0	222.0	222.0
May...	548.7	328.9	308.5	283.2	283.2
June...	539.1	324.7	288.3	251.0	251.0
July...	577.4	398.7	299.9	239.8	239.8
Aug...	760.3	414.9	312.3	313.1	313.1
Sept...	623.3	347.7	323.2	300.9	300.9
Oct...	606.3	383.1	261.8	357.7	357.7
Nov...	458.6	380.3	299.8	301.7	301.7
Dec...	431.6	456.2	354.1	389.4	389.4

Ave... \$500.6 \$333.7 \$295.9 \$268.4

Steel Ingot Production

(Unit 100 Net Tons)

	Monthly Total		Weekly Average	
	1942	1941	1942	1941
Jan...	7,124.9	6,922.4	1,608.3	1,562.6
Feb...	6,521.1	6,230.4	1,630.3	1,557.6
March...	7,392.9	7,124.0	1,668.8	1,608.1
April...	.....	6,754.2	.....	1,574.4
May...	.....	7,044.6	.....	1,590.2
June...	.....	6,792.8	.....	1,583.4
July...	.....	6,812.2	.....	1,541.2
Aug...	.....	6,997.5	.....	1,579.6
Sept...	.....	6,811.8	.....	1,591.5
Oct...	.....	7,236.1	.....	1,633.4
Nov...	.....	6,960.9	.....	1,622.6
Dec...	.....	7,150.3	.....	1,617.7
Total...	.....	82,836.9	.....	1,588.7



Automobile Production

(Unit: 1000 Cars)

	1942	1941	1940	1939	1938
Jan.	260.1	524.1	449.3	357.0	227.1
Feb.	154.3	509.3	421.8	317.5	202.6
March	533.9	440.2	389.5	238.6
April	489.8	452.4	354.3	238.1
May	545.3	412.5	313.2	210.2
June	546.3	362.6	324.2	189.4
July	468.8	246.2	218.5	150.4
Aug.	164.8	89.9	103.3	96.9
Sept.	248.8	284.6	192.7	89.6
Oct.	401.4	514.4	323.0	215.3
Nov.	373.9	511.0	370.2	390.4
Dec.	302.5	506.9	469.0	407.0

Ave. 391.0 311.0 221.3

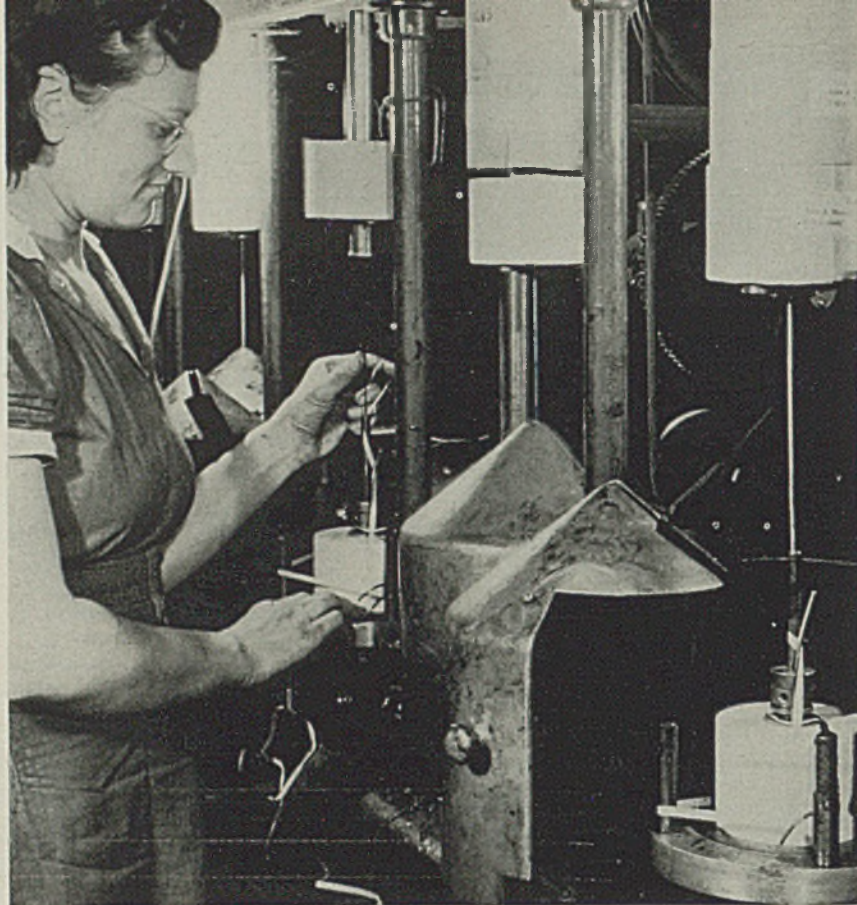


Fig. 1—A domestic substitute for Japanese paper, 0.0005-inch thick and made of old rope, is being wound around the wire as it passes through the spindles

WHILE THE East Pittsburgh, Pa., Works of Westinghouse Electric & Mfg. Co. has for some time been largely devoted to defense orders, this is not true of all of the company's outlying plants, and it is of interest to see what some of these other plants are doing to relieve the situation caused by shortages of essential materials. Table I is a partial list of scarce materials formerly used and substitutes now replacing them.

Obviously, the references to the refrigerator industry which follow are no longer in effect since refrigerator manufacture has about ceased, but the substitutions developed before the ban are still applicable to many other products of similar construction.

At the East Springfield, Mass., plant, where refrigerators and motored domestic appliances are made, the brass evaporator for the refrigerators has been changed over to vitreous enameled steel. This was the way the earliest refrigerator evaporators were made. Cracking of the enamel used to cause some difficulties, but extra strong reinforcement and somewhat heavier sheets than were formerly used are expected to prevent recurrence of this trouble.

Before the problem of scarcity of materials developed, some refrigerator parts were redesigned to make use of copper brazing. To replace

the fan-cooled radiator, which was quite satisfactory in its performance in the earlier model, a couple of years ago a radiator was developed which consisted simply of a long steel tube copper brazed to a pan which fitted in the back of the refrigerator. It was cooled by convection. In addition to this, certain other parts such as the muffler and the strainer which had previously been made from brass with silver-soldered connections had been converted to steel stampings copper brazed together. Not only do these changes now save vital material, but they also save many man-hours—and man-hours are as precious as material.

High-grade fans a few years ago employed a zinc-base diecasting for the base as well as for the frame. This has been abandoned to the extent that the bases, which constitute by far the greater mass of material in the fan—aside, of course, from the actual motor itself—are now made from cast iron with appropriate treatment and organic finishes.

At the Mansfield, O., plant, where ranges, cooking devices and refrigerator cabinets are fabricated, hardware is being made of cast brass instead of aluminum diecastings. In

From a paper presented at the convention of the American Society of Mechanical Engineers, New York, Dec. 2, 1941.

How a Large Company Conserves Material

By

- substitutions
- redesign
- simplification
- standardization

By DAVID R. KELLOGG

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the case of those parts which have no function other than to occupy space and give a pleasing appearance—as, for instance, escutcheon plates and hinge caps—lead-antimony alloys are being employed. Thermo plastics are used in some places instead of anodized aluminum, and while these are not too easy to get, the difficulty is not as serious as in the case of the phenolics.

The economizer well on the ranges is now vitreous enameled steel instead of aluminum. The heater tubes for the Corox heating units have been made from a special stainless steel containing silicon. When this became a critical material, studies were undertaken to provide a different material which would not come under this classification. After a great deal of searching, it was found that one of the high-chromium steels could be used, but this involved a great deal of development work at the factory to determine just the proper schedule for swaging. These difficulties have now been overcome, and it is felt that this element will give quite satisfactory service. Possible shortage of this material may force the adoption of a plain steel tube, cast in iron, or even, if worst comes to worst, an open wire ceramic heater.

On thermostats which operated at a relatively high temperature, it was necessary to make one of the current-carrying parts from some-

thing which would not oxidize at this high temperature and would have a reasonable conductivity. Stainless was used for this, but as the supplies of this material went lower and lower, it finally became impossible to obtain even the small amount needed for this piece. Silver is now being used here with success and, strange as it may seem, with not an unduly great increase in cost.

The new fully automatic washing machine had been carefully designed around the best materials available from the standpoint of corrosion resistance and overall performance. This meant a great many aluminum-base diecastings as well as some zinc-base diecastings, which, running under oil in an enclosed space, could be expected to give a long life with freedom from corrosion. While all these have been given up by re-design and the cost of manufacture is going to be rather seriously affected, the product is still expected to give satisfactory service.

Ice cube trays, which were anodized rubber with a special coating to prevent adhesion, are now rubber with wire inserted handles and stiffeners to permit putting a tray full of water into the freezing space without spilling.

At the Lighting Division in Cleveland, it has been necessary to abandon the use of the Alzac treated aluminum reflectors for civilian work, although this process is still being employed on war production jobs as it produces results which cannot be obtained in any other

Fig. 2—Sun glass replaces asbestos in insulation for copper wire. Operator is inspecting the glass strands before they are machine-woven around the wire



TABLE I—Substitutes Now Being Used by Westinghouse		
Material	Substitute Material	Application
Nickel steel	Molybdenum steel	Shafts, bolts, gears, etc.
Tungsten steel	Molybdenum steel with small percentage of tungsten	High-speed steel tools
Nitriding steel	Chromium steel	Circuit breaker
18-4-1 steel	High-carbon, high-chromium steel	Blanking dies
Stainless steel	High-chromium steel	Electric range heater tubes
Aluminum	Copper	Disk for watt-hour meter
	Brass	Shaft for watt-hour meter
	Enameled steel	Cover for electric roaster and cooking well for electric range
	Rubber, enameled steel sheets, or plastics	Ice cube trays
	Enameled steel	Ice cube compartment door
	Rubber, capaco brass, plastics, or enameled sheet steel	Parts and agitator of domestic laundry equipment
Aluminum diecastings	Sheet steel with water-proof finish	Sockets for outdoor watt-hour meters
Zinc die castings	Steel or brass	Handles and hinges for refrigerators
Aluminum, brass, and alloy castings	Cast Iron	Luminaire parts for lighting lamps
Brass	Steel plated with copper or brass or gilding metal	Bases for incandescent lamps
Nickel	Nickel-plated steel or copper	Supports for incandescent lamps
Spun aluminum	Spun steel	Searchlight reflectors
Aluminum sheet, alzak	Iron sheet with high-reflecting porcelain enamel finish or glass with silvered finish	Reflectors
Zinc diecasting	Cast iron	Fan bases
Silk	Cotton, glass, or asbestos	Insulation fabric
Mulberry fiber	Old rope	Jap paper insulation
Tung oil	Dehydrated castor oil, soy bean oil, ethleca oil	Insulation varnish
Aluminum	Plastic	Nose or windshield for anti-tank and anti-aircraft shell

way. Certain of the commercial lines have been modified by dropping units from them, and others have been changed over to spun steel with vitreous enamel. Silvered glass reflectors will be used in some places and these, while they have the dis-

advantage of high cost and fragility, do have excellent reflecting properties.

Some of the pole line hardware employed by this division has been changed over from a galvanized finish to rust inhibiting primer and paint, and while this is not as satisfactory as the galvanized job, it is a finish which will fail in a gradual manner and will advertise the beginning of failure so that repainting may be done before corrosion becomes serious.

At the Lamp Works in Bloomfield, N. J., experiments are being carried out to utilize a brass-plated drawn steel shell for lamp screw bases. This is already in production on certain lines and will probably be completely adopted as soon as a few more of the wrinkles have been ironed out. The nickel support wires will be replaced by nickel-plated steel in some cases, and in others where the mechanical shock is not so severe, copper will probably be used.

At the Bryant Electric plant in Bridgeport, Conn., the molding of urea resin dishes has been abandoned. Some of the thermo plastics are still being used on civilian work as well as thermo setting resins for more critical applications.

The little heater incorporated in
(Please turn to Page 105)

Electrographic

ANALYSIS

. . . . a comparatively new method of analyzing metals that does not destroy the sample; takes only a few seconds or minutes; gives positive color reactions entirely; shows uneven distribution of the element sought

By E. A. ARNOLD
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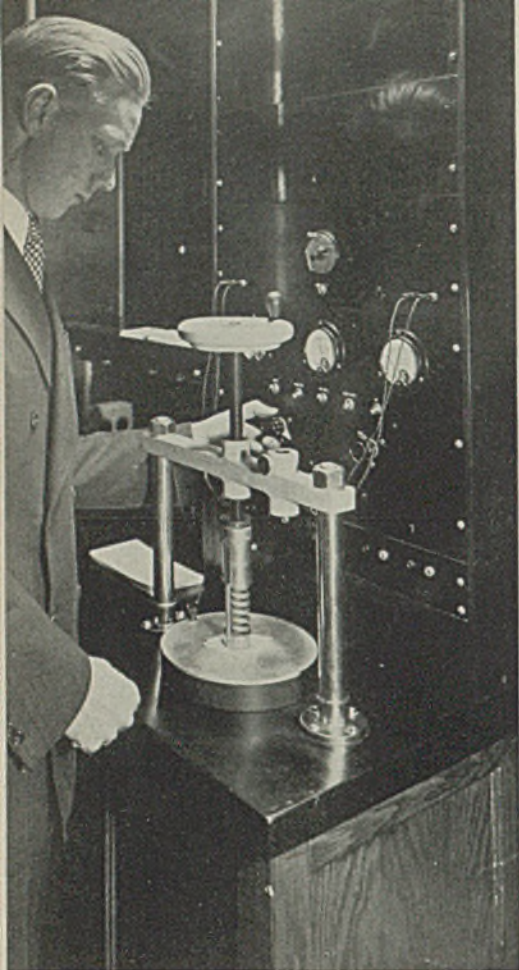


Fig. 1—Simple equipment for electrographic tests can be made up in portable form and the metal analyzed without removing it from other parts to which it may be attached. Shown here is a laboratory setup. Illustration by Bell Telephone Laboratories Inc.

THE MOST characteristic chemical reaction that one can obtain to confirm the presence of an element in a complex unknown substance is a color reaction. Therefore, many of the reactions used for the purpose of confirmation in the ordinary scheme of qualitative analysis are color reactions. The number of these characteristic color reactions has been greatly increased by the work of Professor Feigl, and the technique which he worked out to employ with many of these new reagents is now known to many chemists under the name of "spot tests."

But the usual scheme of running a qualitative analysis is relatively slow and further requires the destruction of a sample of the material to be analyzed. For example, a certain steel is to be tested qualitatively for nickel. For usual process involves dissolving a sample of the steel in acid and after necessary chemical treatment to prevent interference by the iron, adding dimethyl glyoxime, resulting in the appearance of the characteristic red precipitate if nickel is present. The

whole procedure requires considerable time and also the actual chemical transformation of the material used as a sample. Further, if an uneven distribution of the iron and nickel exists, one has no knowledge of this as the qualitative test shows only the presence or absence of nickel and tells nothing about its distribution or segregation.

Electrographic methods, although known since 1929, have been recently developed to a high state of usefulness. The principal advantages gained in using this type of method are: First, the sample is not destroyed; second, the methods are rapid requiring only times measured in seconds or, at the most, minutes; third, color reactions are used entirely, thus making the identification more positive; fourth, the result shows any uneven distribution of the metal sought.

The principle of electrographic analysis is extremely simple. It is a known fact that if a metal is made an anode in an electrolytic cell, oxidation takes place on the surface and ions of the anode go into solution in the electrolyte. Further, since the ions are charged positively, they are directed in solution toward the cathode and lateral diffusion is negligible.

The application of these principles to electrographic analysis is at once evident. The metal itself is made an anode with an inert metal as a cathode. A filter paper or any other suitable unsized paper is soaked with a solution of a reagent that gives a precipitate with the metal ions to be investigated. This paper is placed under slight pressure

between the anode and cathode and a voltage applied for a definitely measured time of the order of 5 or 10 seconds, rarely longer than one minute. The metallic ions passing into the solution react and form either a characteristic colored precipitate or a colorless one. This contact print is then treated with various solutions to dissolve out of the paper other ions dissolving at the same time, or, in some cases, to react with a colorless precipitate to produce a colored one. After suitable washing, the print may be dried and preserved.

A few examples of this technique may be given. To determine whether or not a sample of steel contains nickel, a piece of the steel to be tested is employed as an anode in the test. It is covered with a piece of filter paper saturated with a solution of dimethyl glyoxime and dilute acetic acid. The electrical circuit is closed for the proper length of time and small amounts of both nickel and iron are dissolved from the surface and enter the solution in the pores of the filter paper. The nickel ions react with the dimethyl glyoxime to form a very characteristic red precipitate of nickel dimethyl glyoxime.

The iron which enters the solution as the divalent ion tends to form a brownish stain which somewhat masks the red precipitate characteristic of the nickel. But this interference on the part of the iron can be overcome readily by washing the print in very dilute acetic acid. The nickel precipitate is insoluble in this medium while the iron compound is soluble. After washing with water,

the nickel precipitate becomes easily distinguishable against the white background of the filter paper.

Another case where this technique is of value is in showing pinholes in metallic coatings. The inspection of chromium plated surfaces may be used as an example. The paper in this case is impregnated with a solution of dimethyl glyoxime made alkaline with a dilute barium hydroxide. When the electrographic exposure is made, the chromium leaves the anode as the oxidized chromate ion and reacts with the barium hydroxide in the paper to form a yellow insoluble barium chromate while nickel exposed by pinholes in the chromium plate enters the paper and forms red insoluble nickel dimethyl glyoxime. After washing the excess reagents out in water much as one washes a photographic positive on paper, the print appears as a yellow coating with red spots in it wherever a pinhole existed. It is easy to see how this might be an extremely useful test.

One further example will be given since it shows a modification of the technique. Zinc forms no simple insoluble colored compounds so that if a zinc or zinc coated material is to be examined, the filter paper is impregnated simply with a salt solution such as sodium acetate. Zinc passes into the paper as zinc ions and a small amount of acetic acid is formed. The compound of zinc is neither insoluble or colored, and immediately the paper is fixed by immersing it in a dilute sodium sulphide solution. The zinc then reacts with the sodium sulphide to form insoluble but white zinc sulphide. The zinc compound on the paper is now insoluble but still not visible against the background of white paper. It is next rinsed thoroughly in dilute acetic acid solution which removes the excess sodium sulphide. The paper is then treated with a dilute cadmium chloride solution, and the white zinc sulphide is replaced by yellow insoluble cadmium sulphide which is visible.

One or another of these types of electrographic tests or similar ones can thus be employed for an extremely wide range of analysis work. It is only necessary to know the color of the various compounds formed and to manipulate the material deposited by electrolytic action till the compound is obtained. Thus the method has possibilities of wide usage in qualitative analysis work.

The apparatus for making electrographic prints is fairly simple. The sample is contained in the press shown in Fig. 1. Between the bottom plate, made of inert or relatively inert metal such as platinum or aluminum, and the specimen is inserted the unsized paper impregnated with a solution of the proper

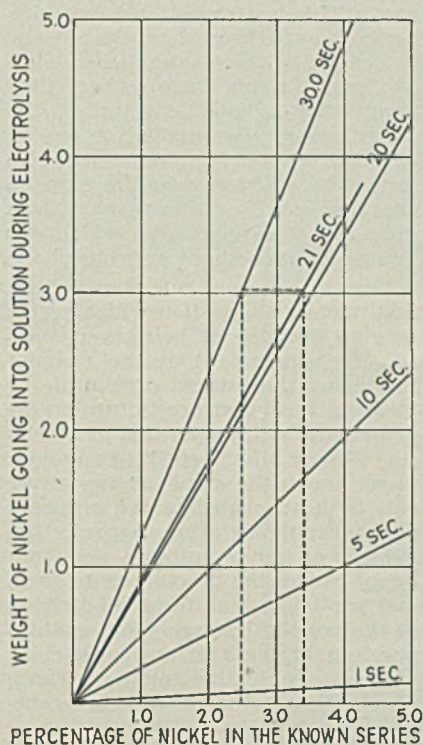


Fig. 2—Graph showing amount of nickel going into solution according to the amount of nickel in the material being tested and for various electrolysis times. These curves can be interpolated for other electrolysis times

reagent or reagents. The specimen is held in place by clamping by means of the hand wheel. The specimen itself is connected to the positive pole of a 6-volt storage battery while the bottom plate is connected to the negative pole. In the electrical circuit, there are the necessary toggle switches and rheostats so that the voltage may be controlled and varied at will. The lower two meters are a voltmeter and a milliammeter. The upper meter to the left is an automatic time switch so that the time during which current flows can be controlled accurately.

When the circuit is closed, the metal from the anodic specimen dissolves and passes into the paper at a rate controlled by the strength of the current and in a quantity controlled by the time during which the current flows. The washing, fixing, and developing reactions can then be carried out in separate small porcelain dishes. Reagents used to impregnate the paper in which the reaction takes place may be drawn in many cases from those suggested by Professor Feigl in his book "Qualitative Analysis by Spot Tests." In the event that the reagent is an organic one or dissolved in an organic solvent, it must be remembered to add a salt to make the solution an electrical conductor.

So far, all of the suggested uses

have been qualitative in nature, but Glazunow and Krivozhavly have suggested a procedure for making the method quantitative. The method proposed by these two men involves the electrographic determination of nickel in steel. These authors go into the theory of the passage of metallic ions into solution under the action of an impressed voltage and derive an equation to express this mass of metal in terms of the current, the time during which the current flows, the cross-sectional area of the test specimen, the percentages of nickel and iron in the test specimen, and their respective electrochemical equivalents. Using this equation on a series of known nickel steels, a series of curves is plotted in which the weight of nickel passing into solution is plotted against the percentage of nickel in the known specimen for various time intervals. The form of this set of curves is shown in Fig. 2.

The number written on each of the curves denotes the time interval in seconds during which the current flowed. It can be seen that these are all straight lines. This is to be expected as it stands to reason that as the percentage of nickel in the series of known standards increases, the amount of nickel passing into solution will be directly proportional to the time and also to the percentage of nickel in the test specimen. Therefore, if a filter paper saturated with a solution of dimethyl glyoxime and a little dilute acetic acid is placed between the known sample and the inert electrode, the nickel that enters the solution reacts to form a characteristic red precipitate of nickel dimethyl glyoxime and any iron entering the filter paper at the same time may be washed out with dilute acetic acid before washing with water.

Obviously the intensity of the red stain will be proportional to the time interval during which current flows and to the percentage of nickel in the known steel. It is only necessary to run a set of three or four spot tests on the unknown steel at various time intervals measured in seconds until a spot is produced for the unknown which exactly matches in color intensity one of the spots in the standard series for which both time interval and percentage of nickel are known. When the color intensity of two spots given equal time match, it is evident that the quantity of nickel is the same in both. If there were an exactly constant difference between the curves, the nickel content of the two steels would then be inversely proportional to the time intervals. This is perhaps not quite true so it is more advisable to use a graphic method of solution.

Let us assume that for a certain unknown steel a spot was obtained

in 21 seconds of the same intensity as a spot requiring 30 seconds for a known steel containing 2.5 per cent nickel. A perpendicular is drawn on the percentage axis at 2.5 per cent nickel. From the intersection of this line with the 0-30 curve, a horizontal is drawn until it intersects an interpolated or actually plotted 21 second line for the series of known steels. From this intersection a perpendicular is erected on the percentage axis. The intersection of this perpendicular on the axis corresponds to a nickel content of 3.4 per cent. If the inverse proportionality were assumed, the nickel content indicated would have been 3.56 per cent. The steel for which this spot was made actually contained 3.43 per cent nickel by the usual analytical methods—an extremely close check. These construction lines are shown in Fig. 2 as dotted lines.

The quantitative application of this method may be extended to a variety of determinations. The only conditions necessary are, first, that a satisfactory reagent or set of reagents be found to give a specific color reaction in the filter paper; and second the metallic alloy on which the determination is to be made be homogeneous at least in the range of compositions consid-

ered. This last condition is very important as it is evident that if one is dealing with a heterogeneous alloy such as, for instance, an alloy containing a eutectic mixture, the rates of solution under the action of the electric current will no longer be uniform over the exposed cross section. For this reason, then, only alloys can be used which are composed of one homogeneous phase.

Yagoda has gone one step further and made a suggestion which seems to give promise of being very useful. He suggests that the reagent producing the colored precipitate or yielding a colored precipitate on development be incorporated in a gelatine film or other peptizing agent on paper much the same as the silver salt is incorporated in the ordinary photographic printing paper. The gelatin or other suitable peptizing agent causes the precipitate to form and persist in a state of subdivision in the colloidal range. This enables one to examine a print of a surface under magnification for the purpose of observing structural heterogeneity. In using the ordinary print or filter paper already described, this is impossible due to the fibrous nature of the paper itself. Using this suggestion, Yagoda has obtained photographs showing the distribu-

tion of chlorides in various plant sections. *Modifications of this technique might be used to study structural variations in heterogeneous alloys.*

A brief survey of the readily accessible articles in the technical literature having a bearing on this subject may be of value. *Qualitative Analysis by Spot Tests* by Fritz Feigl appears in an English translation from one of the German editions and is of value in suggesting reagents that may be used for a variety of ions.

Glazunow first reported on the technique of the electrographic method before the Eighth International Congress of Applied Chemistry in Paris in 1929 and is reported on page 2 of a special supplement of *Chemie et Industrie* volume 21. This article is in French.

Glazunow and Krivohlavsky report in volume 161, page 373, of the *Zeitschrift für Physicalische Chemie, Part A*, on the procedure for the quantitative determination of nickel in nickel steels. This article is printed in German.

Clarke and Hermance report in volume 9, page 292, of the analytical edition of the *Journal of Industrial and Engineering Chemistry* on the applicability of spot tests in general.

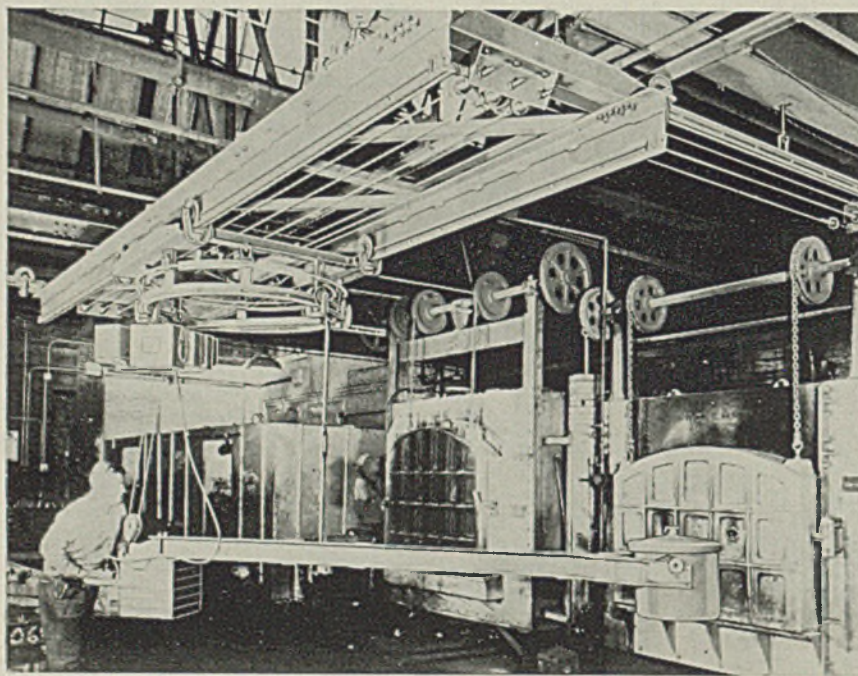
Hermance describes the principles involved in these methods in an article in the issue of the Bell Laboratories Record, volume 18, page 269, and gives a number of beautiful color photographs illustrating applications for the telephone industry.

Jirkovsky published a summarizing article in *Mikrochemie*, volume 15, page 331. This article, in German, lists the progress made in this field to the date it was written.

Yagoda's suggestion appears in volume 12, page 698 of the analytical edition of the *Journal of Industrial and Engineering Chemistry*.

A summarizing article bringing the subject to date appeared in the analytical edition of the *Journal of Industrial and Engineering Chemistry* in October, 1941. This article is a section of a more complete article on Instrumental Methods of Chemical Analysis by Muller.

Quenching Crane Moves in Every Plane



MOVING OF ANNEALING pots from furnace to quench in quickest possible time is the job of this quenching crane made by American Monorail Co., 13107 Athens avenue, Cleveland. Moving easily in every plane, it can serve a compact area containing four or more furnaces set by pairs at right angles facing the quenching machine. One man operates the crane by hand with a 1/2-ton electric hoist to raise or lower a 900-pound counterweight which handles the 400-pound pots. Seven-foot arm for reaching into furnace is mounted by porter bar on swivelling truck. This allows rapid swinging of load

Practice on Roofing Ternes Now in Print

Printed copies of simplified practice recommendation R30-42, "Roofing Ternes", now are available according to the Division of Simplified Practice, National Bureau of Standards, Washington. These embody the current revision which eliminates four weights of coating 15, 25, 30 and 32 pounds per double base box—leaving the 8, 20, and 40-pound coatings as the simplified list.

Copies of the practice may be obtained from the Government Printing Office, for 5 cents each.

How to Conserve Stainless Steel and Increase War Production!

When you were turning out war equipment and parts in smaller numbers, Stainless Steel scrap losses in fabrication involved fewer pounds of vital metals. But now that output has leaped into mass production, scrap losses must be reduced to an absolute minimum.

With nickel and chromium so precious to our war needs, it is vitally important that you *check your fabricating methods at every point*. Waste is terrifically expensive in loss of time and strategic materials.

Helping to get the most out of every pound of Stainless Steel is a part of Carpenter's Wartime job. The knowledge and experience we have gained from pioneering the fabrication and use of Stainless Steels is now being offered to you. Let your Carpenter representative help you check your tools, dies and lubricants—to make sure your set-up is right for maximum production from a minimum of material. Meanwhile, here are specific suggestions to help you speed war production and conserve material. Be sure to check these points in *your plant now!* Time is short.



✓ Check your Physicals

Find out if you can take advantage of the natural strength of Stainless by using a lighter gauge strip. Often, an embossed rib can be used to add strength, allowing the use of lighter gauge stocks. Still another way to speed war production is to make sure that each order to your supplier is *complete*—from physical specifications to priority information.

✓ Check your Scrap Losses

If you are blanking, forming or drawing parts from sheet, find out if using a narrow strip could *eliminate slitting* and reduce your scrap loss. One plant reported a 40% material saving by adopting strip to the specified width for the particular part. Jobs were laid out more economically, and time spent handling material was reduced. The accurate gauges and tolerances of Stainless Strip save wear on dies and reduce rejects.



✓ Check your Rejects

If your rejects are high, it's time to start checking all along the line. Material too much *undersize* can cause wrinkling in the die. *Oversize* material may explain galling and tearing. Check your tool layouts, die clearances and lubricants. And if your scrap pile *continues* to show a high percentage of rejected parts—it's time to call in an expert.

THE CARPENTER STEEL CO., Reading, Pa.



The Carpenter Stainless Selector Slide Chart can give you quick answers to your questions on the grades of Stainless to meet your requirements. It shows the machining, heat and corrosion resisting properties of each analysis of Stainless Steel. A note on your business letterhead will bring you a Slide Chart—free to Stainless Steel users in the U. S. A.

Carpenter STAINLESS STEELS

BRANCHES AT Chicago, Cleveland, Detroit, Hartford, St. Louis, Indianapolis, New York, Philadelphia

HOW TO AVOID CRACKS IN WELDS

... approached from a study of forces encountered

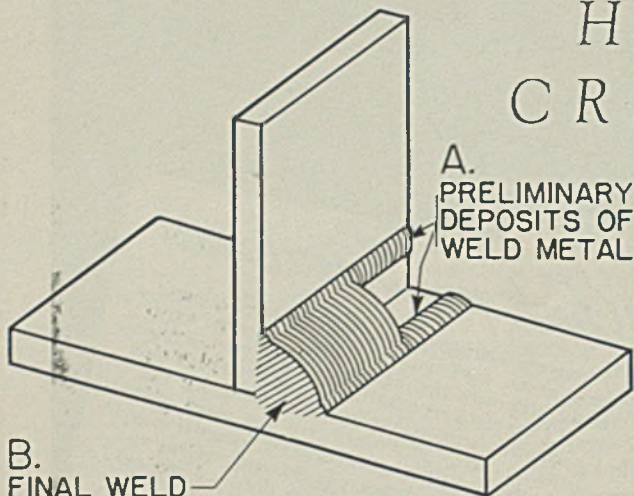


Fig. 1. (Above) — To avoid interior cracking, "double welding" first deposits weld metal on both plates as shown at A. Main weld B is then made between the original deposits. This avoids an abrupt change in section

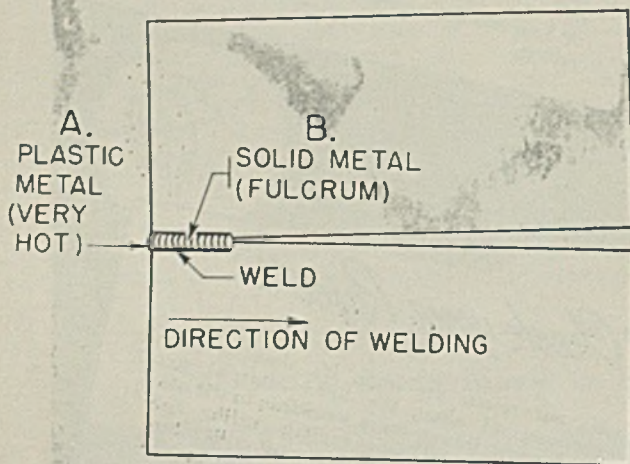


Fig. 2. (Below) — Since point A has less metal surrounding it to carry off the heat of welding than does point B, it solidifies more slowly, even though it is welded first. While A is still molten, B has solidified and acts as a fulcrum about which the remainder of the plate draws together as the weld progresses. This, added to natural shrinkage of the cooling metal, tends to pull A apart

addition, the weld metal just inside the starting point solidifies faster than the edge or starting point because of the more rapid conduction of heat away from it by the adjacent metal.

The air surrounding the free edge or starting point is a relatively slow cooling medium; consequently, while the initial point is still at a white heat the next interior stage has cooled to a yellow heat. In other words, the edge is lagging behind and is still in the tender or brittle condition when the adjacent stage along the weld is in the tough and ductile conditions. This intermediate point acts as a fulcrum, so that the scissors-like action, which brings the edges of the seam together, tends to stretch the white-hot brittle starting point of the weld. Moreover, as already stated, the shrinkage is also stretching the same point, and if the combined effect is great enough, a crack occurs. The manner in which these forces act to produce cracking is shown in the sketch Fig. 2.

The considerable amount of contraction which occurs when metal freezes and cools is not generally appreciated. Not considering the contraction of the cooling but still molten metal, and starting instead at the moment of solidification, the metal shrinks about 5 per cent in volume in merely changing to the solid state. An additional contraction of almost 1 per cent then occurs before the temperature has fallen to a yellow heat. Still another contraction of 1 per cent takes place when the metal cools from a yellow heat to ordinary temperature. This sudden and considerable contraction is only one of the stretching or cracking forces that must be controlled intelligently in welding. If the solidifying metal could stretch, it would not crack; or, if the adjacent parts could yield, the contraction could be compensated.

Usually cracks are located in the base metal right at the edge of the weld. There are several reasons for this. The principal reason for this particular location is that the section is thinner than the weld and its shape changes more or less abruptly at this point. In the second place,

FIRST, LET'S look at the cause of cracks. Obviously cracking results from the liberation of tensile stresses; otherwise there would be no cracking. Likewise, no cracking would occur if these stresses were absent or so slight as not to exceed the strength of the metal at any time during welding. Steel is first heated to the fusion temperature in welding. Then while the cooling and solidifying metal is at a white heat, it is devoid of ductility because although the individual grains have solidified, they do not cohere to each other. Any slight force will pull the grains apart, air will enter at the grain boundaries and what is termed a "heat crack" will occur.

A study of the forces encountered in welding provides a basis for crack elimination. First of all, forces are developed through the expansion on heating and contraction on cooling. Secondly, residual stresses in the metal parts themselves may be liberated by the welding flame. Third-

ly, stresses may be introduced in the welding operation. The majority of "heat cracks" fall into the first group; that is, those developed by expansion on heating and contraction on cooling. Typical of this type of crack is the "edge crack," which starts at an external edge of a part and follows the weld into the part.

It is a matter of common experience that when two pieces of sheet metal are butted together or when one is lapped over the other, they will come together in the first instance, or move together scissors-like in the second instance, when welded along the seam of the two edges. A crack is likely to start at the edge where the weld is begun. The following analysis of the forces at work is offered in explanation of a crack of this type.

After the weld has progressed slightly from the starting point at the edge, two forces begin to operate, both tending to stretch the metal at the point where the weld was begun. One of these forces is produced by the contraction of the solidifying metal. This of itself would tend to produce a crack. In

From a paper by A. K. Seemann, engineer, The Linde Air Products Co., New York, presented at annual meeting of the American Welding Society, Philadelphia, October, 1941.

ZINC IN WAR



"Keep 'em healthy"

It is rather ironic that zinc is used in the brass for shells that wound men—and in pharmaceuticals that heal them. Such is the futility of wars, yet such is the widespread importance of zinc when wars are thrust upon us. The use of zinc oxide in the preparation of adhesive tape, ointments and other medicinal products is one which carries an unquestioned preference rating. Pharmaceutical (U.S.P.) zinc oxide is the purest type of zinc oxide known and it is characterized by several outstanding qualities. It is protective, mildly astringent and adhesive. The exceptional fineness and whiteness of this zinc oxide makes it especially suitable in ointments, dusting powders and adhesive tape.

While most of the war uses, shown in the index of this book, involve larger tonnages of zinc than U.S.P. zinc oxide, few are more important from a utility standpoint. The needs of the Medical Departments of our armed forces are just another reason why civilian users of zinc may not be able to obtain all of the metal or pigment they would like to use.

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METAL
SPRAYING

GALVAN-
IZING

NICKEL
SILVER

1
HULL
PLATES

2
RUBBER

3
PAINT

4
BRASS

5
CERAMICS

6
DIE
CASTING



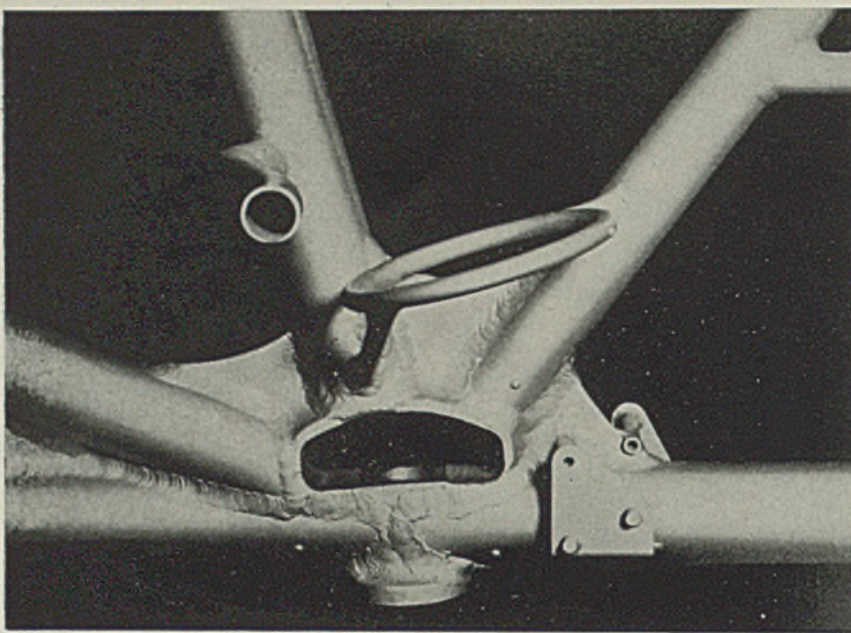


Fig. 3—This welded joint of converging tubes joined to a special control fitting is strong, yet it adds a minimum amount of weight to the structure

the base metal, because of its nature, is usually more tender at a white heat than the weld metal. Third, the thin section at the starting point on the edge remains hotter a trifle longer than the thicker, reinforced section of the weld just inside the edge. This is especially true of the lap seam where the double thickness of base metal causes a more rapid cooling rate.

An obvious remedy for the edge-type of crack has been recognized and adopted by some plants: namely, to begin the weld at some point on the seam and weld toward an outside edge rather than to start at an outside edge and weld inward along a seam. A slight compensating compression is thus brought to bear on the weld.

Sometimes the forces operating on a weld compensate or neutralize one another, and since the net result is zero, the metal is not stretched or cracked. In other words, although contraction always takes place, there may yet be forces of compression exerted in the surrounding areas which squeeze the contracting area. On the other hand, external conditions or a combination of circumstances may be such as to exaggerate the cracking tendency. The adjacent parts may be so rigid, either from their massiveness or because of being held immovable, that pure contraction occurs, resulting in a crack.

Conditions conducive to another type of cracking, known as interior cracking, can be overcome by a "double-welding" technique, which is particularly useful in joining thick material to thin material, such as a forging to a tube. Welding with this technique is performed in two steps. A deposit of weld metal is first made on both materials to be welded, as shown in Fig. 1 at A, following the outer limits of the proposed weld. The weld then is made, as shown

in Fig. 1 at B, care being taken to terminate the weld within the original deposits of weld metal. In this manner an abrupt change of section is avoided, cooling takes place less rapidly, and residual stresses in the base metal are removed prior to the welding operation.

A weld is a casting, so good casting practice is also good welding practice. In a foundry, for instance, the melting and casting procedures affect the tendency to produce heat cracks, and pouring is performed as near the solidifying temperature as practicable. The welding operator, then, should employ similar principles. The welding flame, through proper adjustment, should be slightly reducing or neutral, but in no event oxidizing. The rods should contain beneficial ingredients which will further assist in avoiding oxidation. *For this reason a rod of the same composition as the base metal is seldom satisfactory.* Likewise, the metal should not be overheated.

Mention has already been made of the tensile stresses created by contraction of metal on cooling. It may be convenient to compensate these forces mechanically or thermally. Jigs may be so designed that a slight compressive force is exerted during the welding operation, but obviously this force should not be of sufficient magnitude to cause upsetting. If the parts to be welded are so positioned that end-wise movement is prevented, the local application of heat to the metal adjoining the weld area produces compressive forces sufficient to compensate for the contraction and thus avoids tensile stress on the part during cooling. This can be accomplished by local heating with the blowpipe, or, as practiced in a few plants, by enveloping the weld in an oxy-hydrogen flame. This expedient has the added advantage of insurance against oxidation, but has the obvi-

ous disadvantage of increased welding costs. Entirely satisfactory results are obtainable by local preheating with a properly adjusted oxy-acetylene flame.

Local preheating also serves to eliminate another cause of cracking. Tubing and sheet metal are not always stress-free prior to welding. This condition is brought about by such cold-working operations as straightening, bending, forming, and rolling. Residual stresses resulting from these operations are not usually uniformly distributed, and in localized areas may be sufficiently great to cause cracking if they are released during welding. Preheating these areas locally to a dull red will relieve the major residual stresses, and can be performed as a part of the welding operation.

There is a third cause of cracking which is relatively unimportant but which should be considered during examination of any cracked parts. If at the conclusion of the welding operation the part is stressed while hot, cracking may occur. Such practices as dropping parts out of jigs, careless or rough handling, and use of improperly designed jigs may cause enough stress to cause cracking.

In review, then, there are three kinds of cracks: (1) those which originate from the heat of welding, (2) those which result from stresses which reside in the metal and are released by welding and, (3) those which are introduced after welding. Understanding of the principles underlying each cause will enable the designer or operator to prevent their occurrence.

GE To Distribute Film Series on Welding

To speed up war production training, the Visual Instruction section of General Electric Co., Schenectady, N. Y., has taken over Raphael G. Wolff's color film series, "Inside of Arc Welding", for noncommercial distribution to schools and other instruction groups.

The first picture in the series, "Fundamentals", was recently completed at the Wolff studios in Hollywood. Five additional subjects are now in script, with the whole series scheduled to be completed by June.

Subjects to be covered by the films are flat arc welding, horizontal arc welding, flat and horizontal alternating-current welding, vertical arc welding and overhead arc welding.



Your shoes and *Ours*

*Y*ou must have steel to do your part for Victory.

To take care of your needs, our plants are running day and night at capacity. Our men and women are **AT WORK**. We are busy producing our share of steel that America must have.

Is there enough steel for Victory? We say--Yes. We believe the nation's present difficulties with this critical material will be solved by cooperation between all users and producers, as partners for Victory.

When we at Youngstown look at your needs for steel, we try to put ourselves into your shoes; when you view the producer's problems, won't you try our shoes?

THE YOUNGSTOWN SHEET AND TUBE COMPANY
YOUNGSTOWN, OHIO

25-32E

Manufacture of ALLOY-CLAD SHEETS

Conservation of strategic nonferrous metals is afforded by a process new in this country of copper and copper-alloy cladding steel sheets. Ductility is superior to that of base metal. Preparations being made to clad with brass, gilding metal and stainless steel

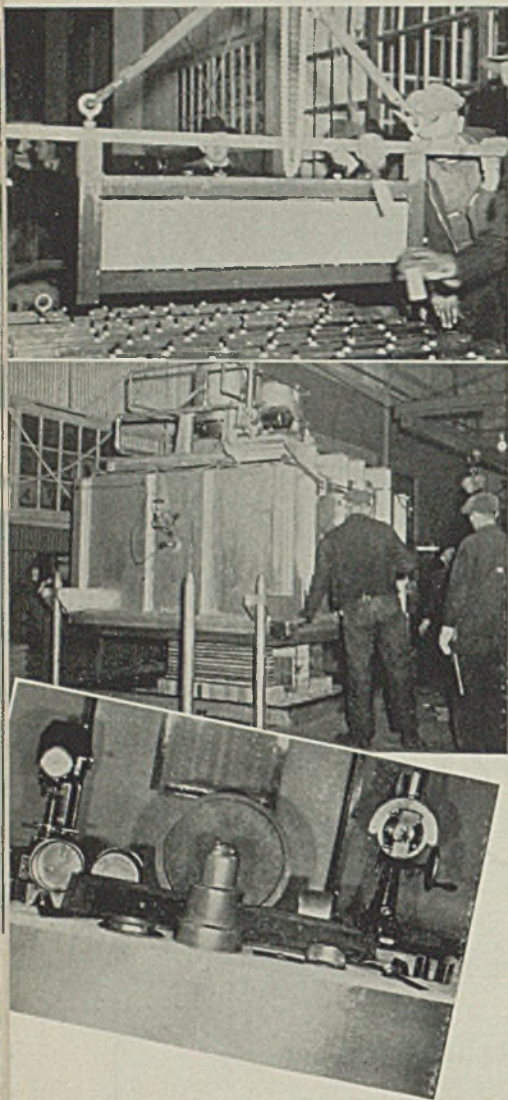
FOLLOWING the recently completed installation of special production facilities, Follansbee Steel Corp., Pittsburgh, is now manufacturing copper and cupro-nickel clad steel by a process new in the United States, but in extensive use in several European countries.

Under the practice of Follansbee, W. Va., a forged and rolled steel slab, Fig. 4, first is coated electrolytically, as shown in Fig. 1, after which the cladding sheet is applied. The slab then is charged into a special electric furnace chamber of the bell type, shown in Fig. 2, using an atmospheric gas which is inert to the material to be treated. The charge then is subjected simultaneously to high pressure and the application of accurately controlled and scheduled electric heat. Thus the whole charge is homogeneously fused into units, commonly known as platines, of a steel base and cladding surfaces, each of which is separated by thin layers of dissimilar material. From these platines are produced the finished sheets by hot rolling, cold rolling and finishing.

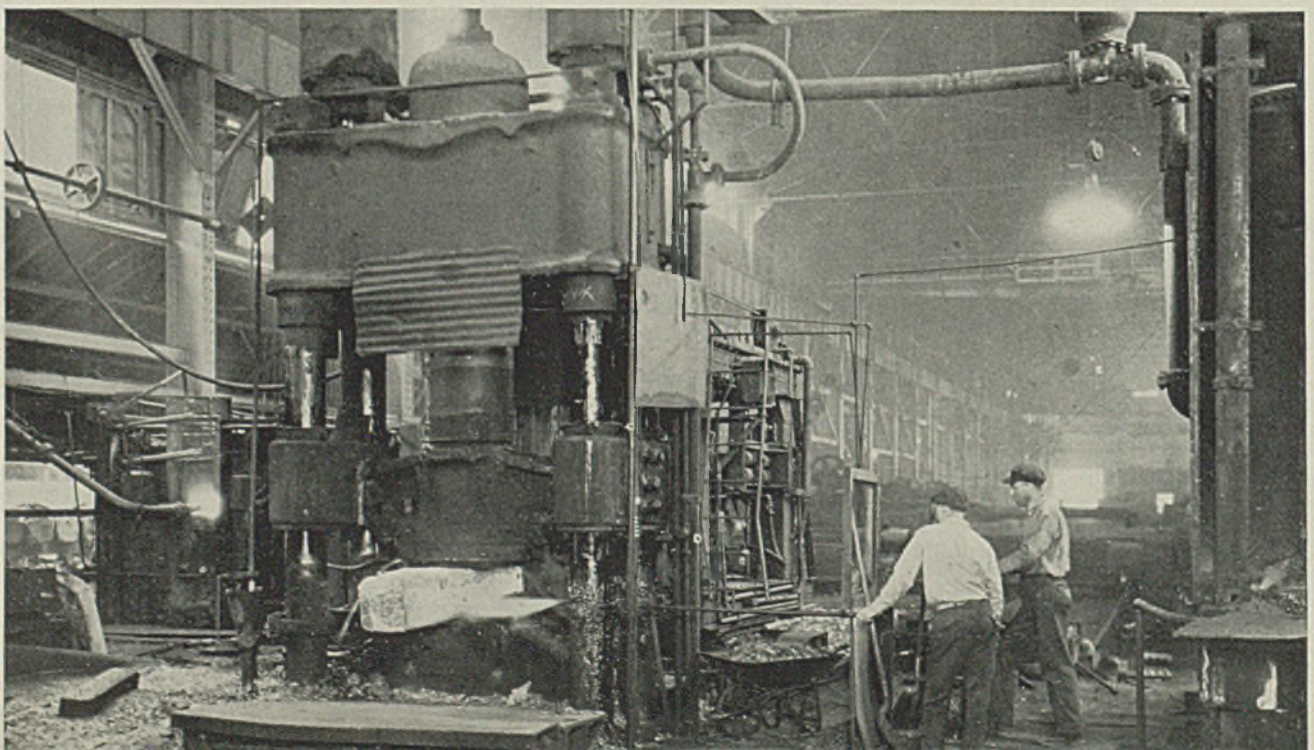
The clad sheet is even and smooth, with the clad surface ranging from 5 to 20 per cent, thus increasing the availability of strategic nonferrous metals, by as much as 80 to 95 per cent. The thickness of the cladding is governed by the service requirements of the fabricator. From exhaustive tests made of the clad material, it possesses a ductility superior to that of the base material, withstanding any stress up to the breaking point of the base to which it is clad. Test specimens of the material are shown in Fig. 3. The cladding may be applied to one or both sides of the sheets, again depending upon the service required.

Follansbee is currently producing sheets in 36 x 96 inch maximum sizes, and in gages ranging from 7 to 28, inclusive. A variety of obvious applications include bullet jackets, electrical housings, utensils and containers.

In addition to cladding with copper or copper alloys, the Follansbee production will include cladding with brass, gilding metal, and stainless steel.



Top to bottom, Fig. 1—A coated sheet being withdrawn from electrolyte solution. Fig. 2—Electric furnace in which the charge is fused into platines. Fig. 3—Test specimens of clad material. Fig. 4. (Below)—Forging press used to convert ingots into slabs



... and **KEEP YOUR POWDER DRY!**



It was in 1642 that Oliver Cromwell admonished his never defeated British army, the Ironsides; "Put your trust in God, and keep your powder dry." This order applies equally today as when soldiers carried powder horns.

... FIBREEN is Keeping America's "Powder" Dry on Land and at Sea —

Powder, today, means shells, grenades, and bombs—and also planes, tanks, food, clothing, radios, range finders, surgical equipment, medicines and chemicals, electrical supplies; in fact, all the complicated equipment of modern warfare.

Damage to any of this material while in storage or in transit, while exposed on shipping platforms or yards, at docks or at supply dumps, can be just as disastrous, today, as water in the powder horns of Cromwell's musket men in 1642.

FIBREEN is doing its part in providing safe packing and protection for goods of war. It's tough and strong.

It's waterproof. Used as a liner or wrapping, it furnishes vital protection, guarding against damage by rain, dirt, sea water, salt air, and long exposure to all kinds of weather from extreme heat to freezing cold.

FIBREEN is a pliable, rugged paper—reinforced by wire-tough, closely spaced fibres running crosswise and lengthwise—embedded in two layers of asphalt, between two layers of strong kraft. It's inexpensive—an effective replacement for packing fabrics and materials no longer available.

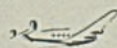
FIBREEN is available to those in essential industries. If your product is in this class, write explaining what you make, and how it is now packed. We'll try to help you.

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SERVING INDUSTRY, CONSTRUCTION AND AGRICULTURE THROUGHOUT THE WORLD

WELDING

Domestic Oil Furnaces

By J. E. WAUGH

Manufacturing General Department
General Electric Co.
Schenectady, N. Y.

BOTH DESIGN and fabrication of steel domestic oil-fired furnaces at General Electric's Bloomfield, N. J., plant are approached with a view to making most efficient use of welding processes. Arc and resistance welding are used. The choice for a particular piece of work depends on several important factors: Quality and speed of the process; volume of production; initial cost, maintenance and depreciation of equipment; and labor costs.

The construction of steam and hot water boilers is controlled by the ASME low-pressure heating boiler code, which specifies minimum thickness of shell plates, heads and tubes.

All shell plates must be a minimum of $\frac{3}{4}$ -inch in thickness, while all heads must be a minimum of $\frac{5}{16}$ -inch in thickness, and tubes must have a wall thickness of at least $\frac{1}{8}$ -inch. These thicknesses are governed primarily by corrosion and are not necessary for strength re-

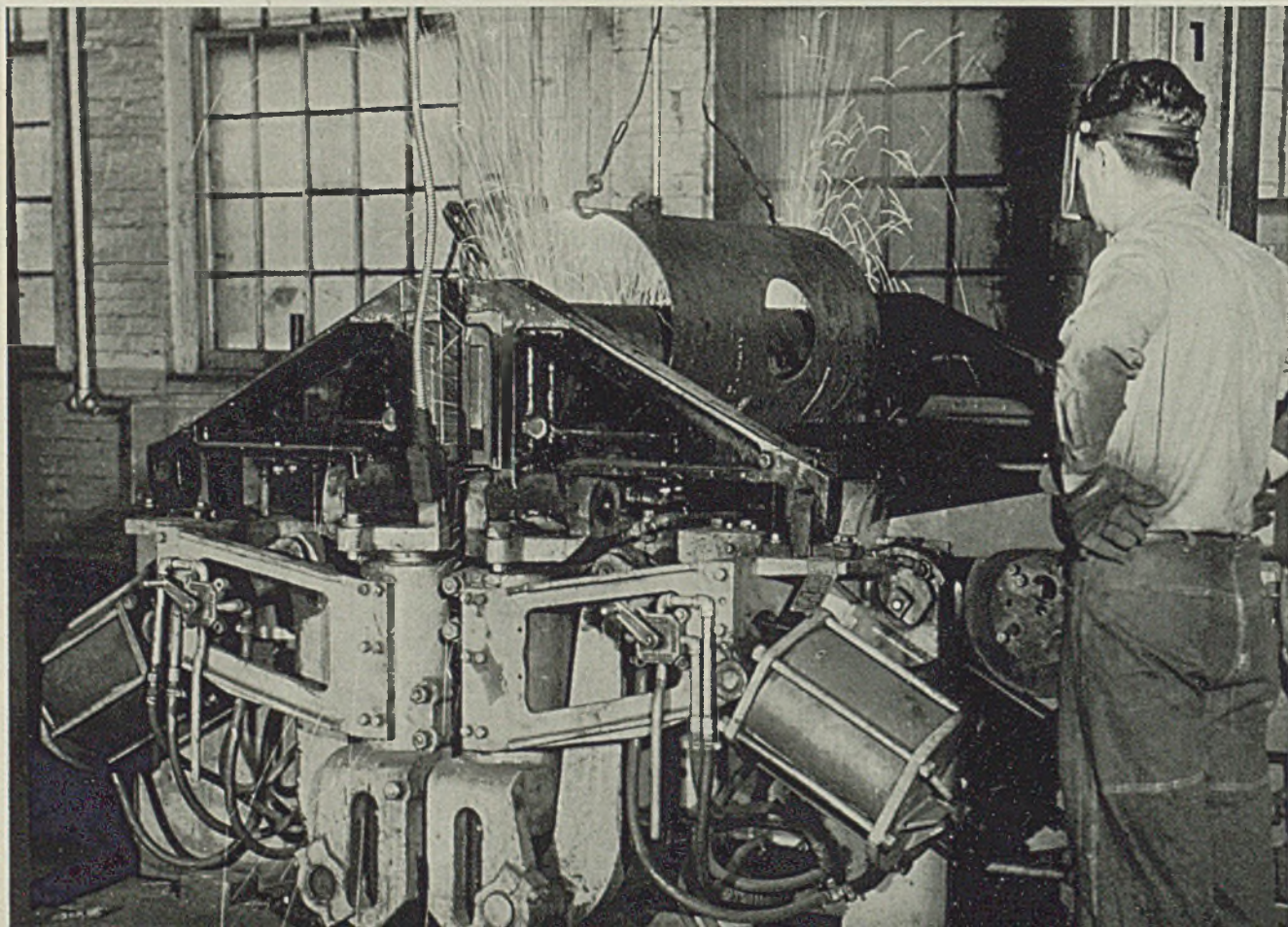
quirements. With adequate production, it becomes economical to resistance flash weld the longitudinal seams of the cylindrical shells. The attachment of heads to these shells by means of flash welding would require flanged heads to form a butt joint, and very accurate alignment of the $\frac{1}{4}$ -inch shell to the $\frac{5}{16}$ -inch head. In this case it appeared more economical and practical to use arc welding because of the greater flexibility of the process where accurate alignment is difficult to obtain. Arc welding is also used for joining the integral parts and for attaching the fittings to the outer surface.

The steam and hot water boilers are designed to consist essentially of a vertical cylindrical combustion chamber surrounded by water on all

sides and top, having a dry bottom and an outer shell to confine the water around the combustion chamber. In some cases an inner "bustle ring" or water chamber is included for additional capacity. Seven different combinations of units and sizes provide a similar number of different ratings.

The cylindrical shells composing the combustion chambers and outer shells vary from 18.5 inches in diameter by 30 inches long to an ellipse having a minor axis of 27 inches and a major axis of 30 inches by 49.5 inches long. These shells are all $\frac{1}{4}$ -inch thick and, with the exception of the longest sizes, are flash welded in a standard mechanically operated 1000-kilovolt-ampere flash welder of the type commonly used in barrel manufacture. The flashing

Fig. 1—Flash welding of outer shell of boiler. When pressure is released, the clamping jaws at the front of the machine are swung into a horizontal position to permit removal of the shell



1902-1942

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"PITTSBURGH" toasts its employees, with whom relations have ever been in tune — no discordant note, no interrupted work in forty years.

"PITTSBURGH" toasts its peace-time customers and suppliers, the relationship down through the years now cemented in a matrix strong enough to stand the strain of war's temporary dislocations. Above all, "PITTSBURGH"

salutes our country and toasts the coming victory, a victory the surer, sooner,

sweeter, if it comes with unity,

total concentration, and

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PITTSBURGH TOOL STEEL WIRE CO.

MONACA, PENNSYLVANIA



DRILL RODS AND COLD FINISHED FINE STEELS FOR ARMS AND MUNITIONS, PLANES AND TANKS, TOOLS AND GAUGES, MOTORS AND INSTRUMENTS, AND A THOUSAND AND ONE SPECIAL PURPOSES IN SUPPORT OF ELECTRIFIED AND MECHANIZED WARFARE GEARING

and upset time vary from 15 seconds for the smaller to 25 seconds for the larger cylinders. A total of approximately $\frac{3}{4}$ -inch of material is consumed in the flash and upset. The upset pressure is calculated to be of the order of 100,000 pounds. Due to the distribution of the cross section of the joint, it is necessary to carry the welding current slightly into the upset period. The flash is removed from the shells by means of manual chipping.

From this point the boilers are completely arc welded as a straight-line production job. A floor-type roller conveyor extends the entire length of the line with welding booths, each 10 feet square, along the line. The various assembly, welding, and testing operations are performed in these booths, each

booth being equipped with an alternating-current welding transformer.

Wherever possible on welding operations the work is placed on positioning equipment to obtain the advantages of better appearance and better quality at higher welding speeds through the use of larger diameter electrodes and higher currents. For these operations, an electrode of the General Electric W24 type of "flat and horizontal position" electrode is used, $\frac{3}{4}$ -inch diameter at 300 to 340 amperes producing approximately a $\frac{5}{16}$ -inch fillet weld at 8 to 10 inches per minute travel speed.

It is not necessary for the operator to maintain a physical length of arc once it has been established. Since the flux coating of the electrode is insulated, its "cupping" characteristic provides the correct arc length so the operator can rest the tip of the electrode against the work continually during the welding, allowing the electrode to advance along the seam as it is consumed. This produces approximately an inch of weld per inch of electrode.

If a second or subsequent passes were required, it would be necessary for the operator to maintain a physical length of arc for these passes. For this work, the parts are mounted on the positioning equipment with the turntable in a horizontal plane. The table is next tilted manually to a 45-degree angle and then driven by a variable speed motor at welding speeds. The operator controls the speed of rotation by means of a foot switch.

In the case of subassemblies, such as the inner water chamber, the

work is light enough to be handled manually from the floor conveyor to the positioner. As these assemblies increase in size through the addition of the combustion chamber and later the outer shell, they are swung into place on the positioning fixture by jib cranes. To obtain maximum efficiency and relieve the welder from fatiguing assembly operations, the assembly operations are segregated from the welding operations whenever possible along the line. Minor assembly and tacking operations are done while work is on the conveyor. Major operations are done with work removed from the conveyor.

For the necessary connections between the inner and outer units, such as flue connections, sight door and burner sleeve as well as for external fittings, both $\frac{3}{8}$ and $\frac{1}{2}$ -inch diameter electrodes of the "all position" type are used at 200 to 220 amperes and 280 to 300 amperes, respectively. In many cases the use of $\frac{1}{4}$ -inch electrode is impractical because of the relatively short welds of constantly changing contour. The predominant size of weld is a $\frac{5}{16}$ -inch fillet, joining $\frac{1}{4}$ and $\frac{5}{16}$ -inch plate.

Each boiler is subjected to a 60-pound hydrostatic test at three different stages of manufacture. A final test is conducted for an insurance company inspector who puts the ASME boiler code stamp of approval on the boiler.

The construction of the warm air line of furnaces is not yet regulated by any code, so manufacturers are free to use any plate thickness desired. Here again arc welding plays the major role, being used on all

(Please turn to Page 105)

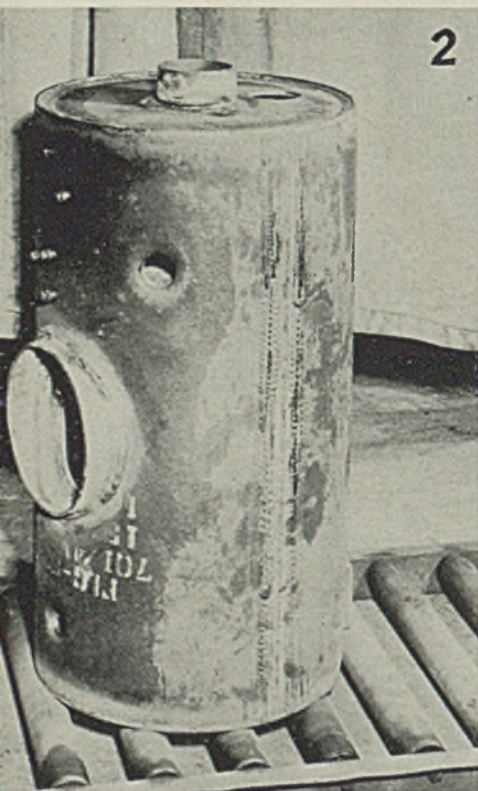


Fig. 2—Combustion and outer shell assembly of steam and hot water boiler showing flash welded longitudinal seam and arc welded sight door and top plate

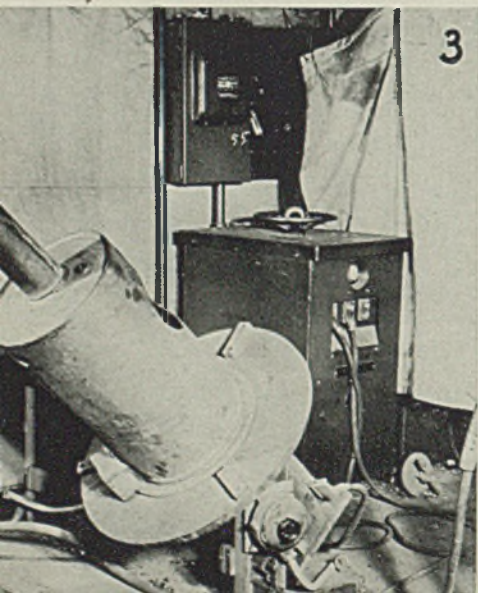
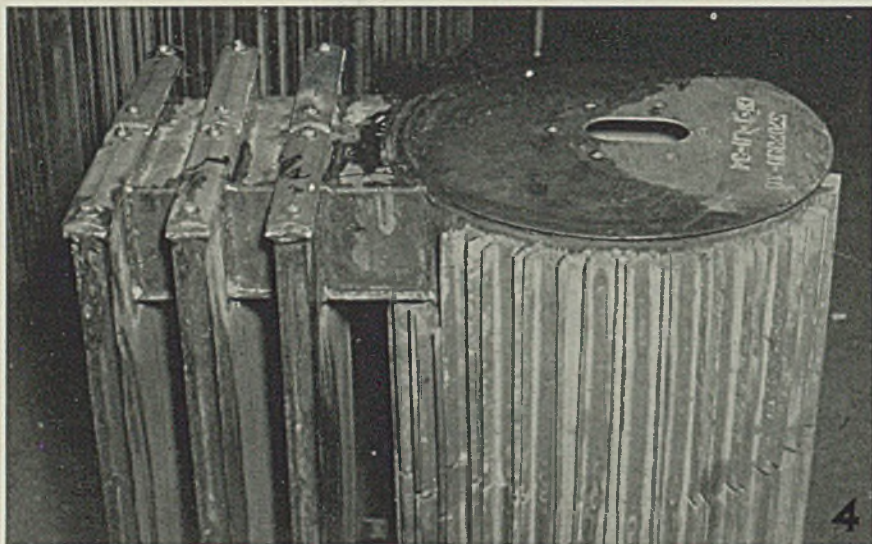


Fig. 3—Combustion chamber assembly of steam and hot water boiler mounted on motor operated welding positioner

Fig. 4—Resistance welded fins, arc welded secondaries and flue passes on combustion chamber and secondary heat transfer surface assembly of warm air furnace

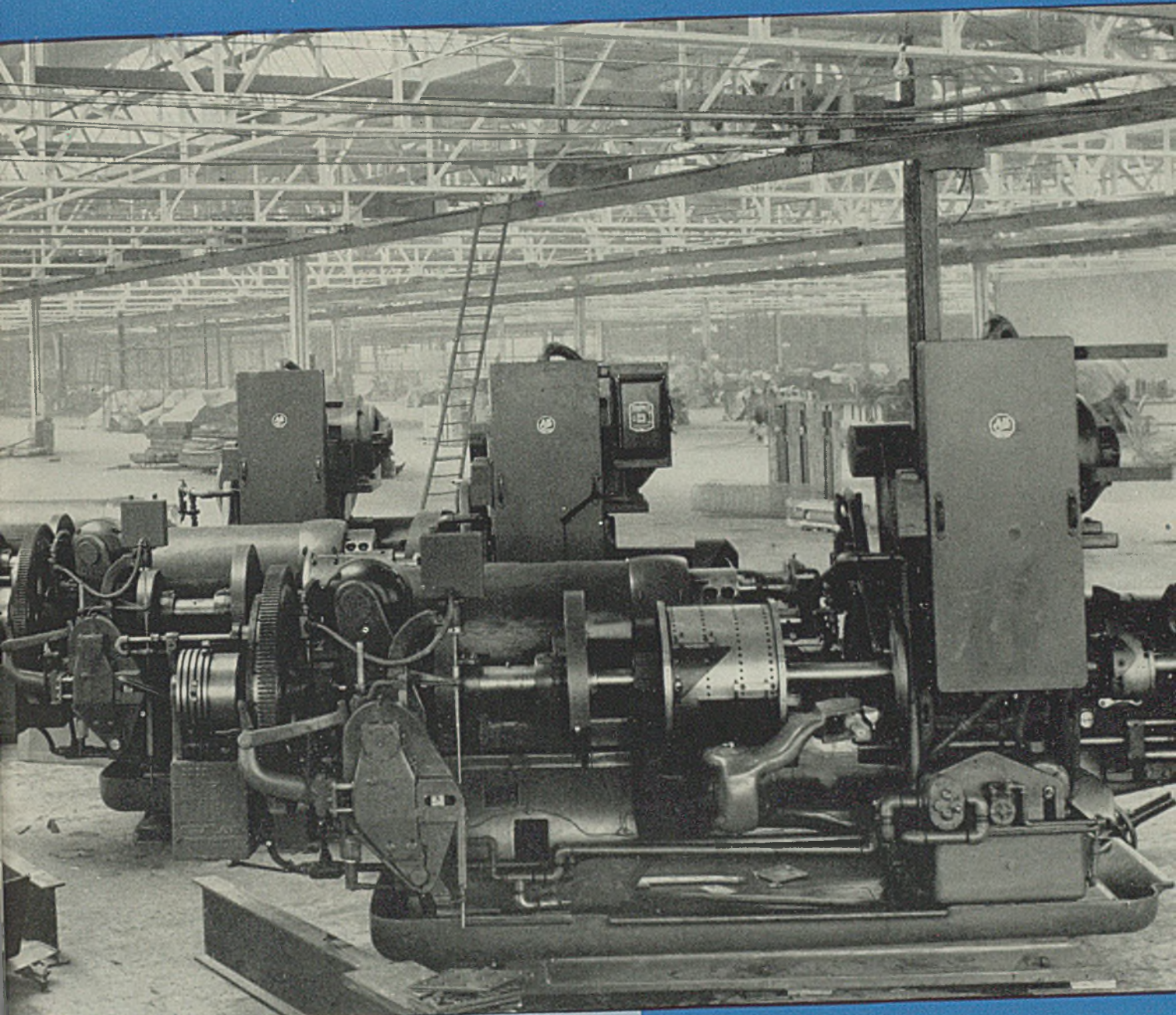


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Thompson Products, Inc. WASTES NO TIME

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• In the recently completed Thompson Aircraft Products Company plant, the very first machine tools installed in one large bay shown here were new 5 $\frac{1}{4}$ -inch Model A Cleveland *Single Spindle* Automatics. Maintenance crews were at work when this photograph was made, and not many hours later a steady stream of parts essential to our increasing war production effort was coming off these machines. For *small lots and short runs* their adaptability and ease of tooling up make Model A Clevelands particularly valuable. You can get descriptive literature for any size Cleveland *Single Spindle* Automatic you might use on request.

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HIGH-IRON CHARGES

in Open-Hearth Practice



By LEWIS B. LINDEMUTH
Consulting Engineer
140 Cedar Street
New York

Need for charging more molten iron at American open-hearth shops is becoming more urgent because of the scrap supply

HANDLING of high-iron charges is, to my mind, the major problem confronting the open-hearth producers today. The scrap shortage is permanent and we will never again, except in scattered instances, return to the operating conditions that we have heretofore considered normal. We are dipping exhaustively into our normally future scrap supplies and thereby, for the present, partially staving off the problem and maintaining production. This is proper because now is the critical time while we wait for the product of the new blast furnaces. It is also a time we must take advantage of to work out what we are going to do when high-iron charges are the normal condition.

High-iron charges may be spoken of as a ratio of iron to scrap, or the iron proportion may be based on the total metallic charge, including the iron in the ore. It makes considerable difference because the ore used, with any given ratio of iron to scrap, varies considerably. Silicon in the iron, the nature of the ore, the quality of the scrap, depth of bath, speed of the furnace and the grade of steel being made, are the principal factors affecting the

amount of ore used in the charge.

From the open-hearth operators' point of view, the ratio of hot metal to scrap is the most informative basis for discussion because it eliminates local conditions and classifies clearly the basis they are working on.

For example, if the percentage of hot metal based on hot metal and scrap is 70, the makeup of a charge, under a fixed set of conditions with the only variable being silicon in the iron, will be:

Silicon, %	Hot metal,		Iron from	
	%	Scrap, %	ore, %	ore, %
0.70	65.5	28.0	6.5	
1.00	63.7	27.3	9.0	
1.30	62.3	26.7	11.0	

A difference in the grade of scrap under these conditions will, between good heavy melting and light rusty scrap, represent a difference of 8 per cent in the amount of ore charged, with silicon in the iron at

1.00 per cent. For accounting purposes, however, the inclusion of the iron in the ore in the "metallic charge" is necessary. Unless otherwise stated, the percentage of hot metal in this discussion will mean the percentage in relation to pig and scrap only.

Sixteen years ago in Australia 20 per cent scrap, 80 per cent hot-metal, and hematite ore containing a fair percentage of lumps were available for charging. The practice at that time was to charge sufficient limestone to make a slag without a "run-off." This meant a slag volume of about 30 per cent. In order to produce at a rate consistent with United States practice, the furnaces were driven, which resulted in abnormally short furnace lives and high fuel. Hot metal analysis follows:

C	— 3.85%
Mn	— 2.25%
Si	— 0.75-1.25
P	— 0.08-0.10
S	— 0.04

The duplex process was considered but given up because of several ob-

Table I—Analysis of Typical Run-Off Slags
RICHARD THOMAS—REDBOURN WORKS

Heat No.	Fe	SiO ₂	P ₂ O ₅	CaO	CaO P ₂ O ₅	Solubility of P ₂ O ₅ —%
F-212	10.5	16.0	21.5	29.0	1.34	26.71
Same 25' later	10.0	16.0	25.7	34.0	1.71	84.62
Same—end run-off	9.2	11.6	16.8	36.8	2.18	84.35
	8.0	14.8	17.2	33.0	1.91	90.63
	18.5	10.0	21.1	28.1	1.33	32.60
	18.0	9.5	22.2	28.5	1.28	34.41
	14.5	12.0	18.7	28.6	1.52	41.72
	21.2	10.2	18.8	31.4	1.66	92.61
LYSAGHTS—NORMANBY PARK WORKS						
H-591	25.7	14.8	18.8	12.4	0.66	18.0
H-469	28.5	14.5	19.0	11.5	....	16.0
G-345	31.4	11.5	19.6	8.4	....	22.0
G-275	29.8	16.7	19.5	18.1	....	26.0

This paper was presented at the annual conference of the Open-Hearth Committee, Iron and Steel Division, American Institute of Mining and Metallurgical Engineers, Netherland Plaza hotel, Cincinnati, April 16-17.

*A New Principle
Cuts Pig Casting Costs*

Bailey

Stationary Wheel

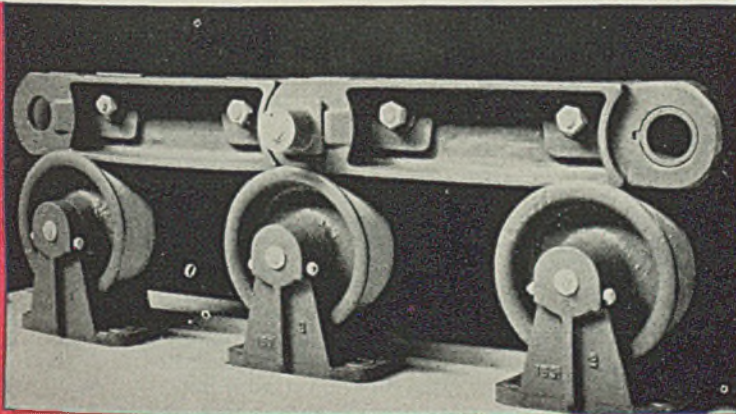
PIG CASTING MACHINE

Breakdowns and delays on your pig machine add rapidly to casting costs. Bailey design cuts these delays to a minimum . . . cuts your casting costs to rock bottom.

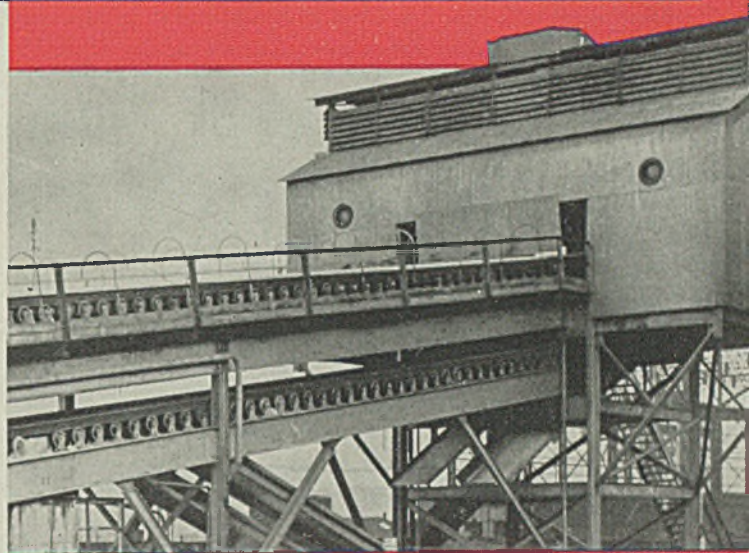
No more traveling wheels . . . but stationary, roller-bearing, idler wheels support the new Bailey 24"-link mold-chain which has only half as many moving parts . . . one-quarter as many points of wear. Special high manganese steel pins and bushing in the links take all the wear . . . are quickly replaceable when necessary . . . and because there is no friction except when the links are passing over the sprockets, motion and wear is minimized.

Every feature of the Bailey Stationary Wheel Pig Casting Machine is designed to give maximum speed and flexibility in casting, long continuous service under top-speed operating conditions and an absolute minimum of maintenance.

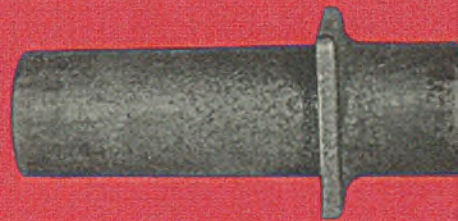
Why not have a Bailey engineer go over these facts with you or write for the descriptive bulletin today?



Outside view of chain link shows why no movement occurs in links during travel except when passing over the sprockets. Spacer rods maintain accurate alignment.



Rugged, cast steel links are twice usual length (24") . . . use only half as many moving parts . . . move only when passing over sprockets . . . have quickly replaceable pins and bushings.



High manganese steel pins and bushings take all the wear . . . give maximum service . . . are quickly replaceable and interchangeable.

WILLIAM M. BAILEY COMPANY
ENGINEERS

PITTSBURGH, PENNSYLVANIA

Table II—Data on High-Iron Charges in Basic Open-Hearth Practice

Silicon in hot-metal, %	Per cent ore	RATIO OF SCRAP TO IRON IN THE CHARGE							
		40 : 60		30 : 70		20 : 80			
		Metallic charge % pig & scrap	Ingots from 1-ton pig & scrap	Per cent ore	Metallic charge % pig & scrap	Ingots from 1-ton pig & scrap	Per cent ore	Metallic charge % pig & scrap	Ingots from 1-ton pig & scrap
0.40	6.0	103.0	0.945	10.1	105.1	0.955	14.5	107.8	0.979
0.60	6.9	103.5	.....	11.5	105.8	.....	16.0	108.0	.....
0.80	8.3	104.7	.....	13.0	106.5	.....	17.8	108.9	.....
1.00	10.0	105.0	.....	15.0	107.5	.....	20.0	110.0	.....
1.20	12.0	106.0	0.970	17.3	108.7	0.985	22.7	111.4	1.014

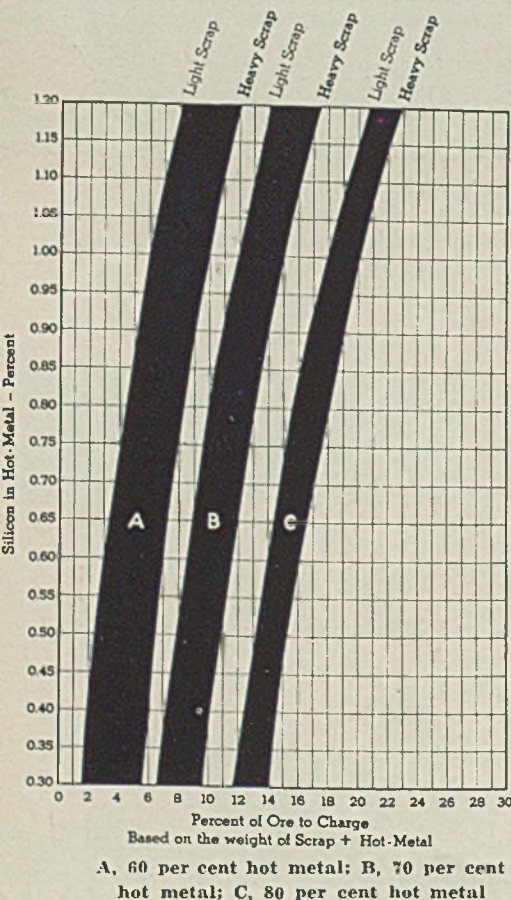
jections. One of these, the high manganese, was not disclosed to not be a major objection until about 1936, when tests made at South Chicago revealed that 2 per cent manganese could be blown without major difficulty. By that time the high iron charge was working so satisfactorily and economically, that there appeared little or nothing to be gained in cost with the duplex process.

Australian open-hearth proceeding today is as foolproof as any open-hearth process can be, and they would consider it a hardship to have to go to a 50 per cent scrap charge. Ratings of their basic stationary furnaces and size of heats follow:

Furnace No.	Rated capacity, g.t.	Size heats tapped, g.t.	Length between knuckles, ft.
10	65	120	34
3	100	140	36
4	150	150	44
2	175	250	44
1	200	300	46

Annual production, 2,100,000 gross tons ingots. Ingot yield, 89.0 per cent.

On account of the size of the heats



for the size of the furnaces, these baths would all be considered deep.

Charging procedure under present practice using a runoff slag, 80 per cent hot metal and 20 per cent scrap, follows:

1. A thin layer of scrap is charged on the bottom for the purpose of preventing stone from sticking.
 2. Limestone next, 5½% of stone regardless of silicon in iron. (Burned lime is not satisfactory.)
 3. Lump ore, nothing under 1". The amount of ore depends upon silicon in iron and other considerations.
 4. The balance of the scrap.
- A heating interval of 2± hours for the smaller furnaces, and 3± hours for the larger ones.
5. All of the hot-metal as rapidly as possible.

One of the essential considerations is to secure a complete runoff slag before the lime starts to come up. Whatever is done in the way of charging times, sequences, hot-metal additions, etc., must be done to further this objective. After the slag settles down, the finishing of the heat is about the same as any other.

The interval between charging the scrap and adding hot metal is such that the scrap is heated to above the temperature of the hot metal. It is the point where the exposed scrap is dripping fairly freely.

The ore by then should be heated clear through the pile, but the limestone should not have been calcined to any great extent. When the hot metal is added, all of it should go into the furnace without delay between ladles. 10 to 20 minute intervals should be ample time, but sooner if possible.

When the metal first is added it usually lies quiet for several minutes during the beginning of oxidation of the silicon. When the carbon reaction starts, the slag boils up until it gets above the slag hole level where it runs from the furnace. This reaction lasts for 30 to 45 minutes, after which the slag settles down.

During this boiling interval, all of the slag possible must be given a chance to get out of the furnace, which means that the slag hole should be large enough for a fast flow. The "hunch" holes, which I have seen in this country, are en-

tirely inadequate. The holes should preferably be flat on the bottom side and 18 inches or more long, and so arranged that the level can be altered by building up with dolomite or tearing down to correspond with the condition of the furnace bottom.

A round slag hole, large enough to take off the slag in the time available, permits metal to run out with the slag. The 250-ton furnaces have two slag holes, one on each side of the tap hole, but far enough away not to interfere with tapping. The slag hole should be about 6 inches higher than the level of the metal in the furnace when the heat is melted. The slag holes on all of the Australian furnaces are on the tapping side and the slag runs into thimbles in the pit. A man is stationed at the slag hole during the entire run-off period to keep the slag flowing properly or to raise the level if metal comes over.

Charge Ore

Equally important with procedure is the physical condition of the charge ore. Lumps or the equivalent is the only form that has been possible to use. The reason being that a pile of fine ore cannot be heated in the open-hearth furnace within a time which would permit maintaining a normal production rate.

In this country the lake ores are fine and also contain considerable moisture. During the interval between charging and adding hot metal it is not heated sufficiently to drive off this moisture. Hot metal poured in on this results in one or more of the following, in varying degrees:

1. Violent "blows."
2. Chilling the heat, thereby delaying it.
3. Floating the ore out with the runoff slag, lowering the yield.
4. Finally melting at almost any carbon content.
5. Damage to the furnace bottom by having a high silica finishing slag, due to an interrupted run-off slag.

Fine ore, even though not wet, is still impossible to heat except on the surface of the pile. This results in "blows". They are usually much less violent than with wet ore, but are frequently deferred, often as much as several hours after the hot-metal addition.

At times heats about ready to tap and which have been ored, sud-

(Please turn to Page 109)



ACCURACY IN ACTION

Ohio Seamless Tubing gears up routine to meet vital new responsibilities . . .

Performance under fire . . . to that end steel tubing can make a most vital contribution to the production of firearms. It accounts for the variety of applications to firearms manufacture for which Ohio Seamless Tubing is now being used. Nor is accuracy the whole story. The rest is speed in manufacture—more guns, faster! That means geared-up routine to help meet ever-increasing demands of top-rating priorities. Precise machining to close tolerances, uniform workability, accurate sizes and gauges, smooth surfaces inside and out—all these qualities make for high speed production. So when the Army and Navy specify that tubing must be straight, sound, clean, and free from pits, scores, and other surface imperfections of any nature, Ohio Seamless Tubing can fill those requirements at a far greater pace than ever before. All this adds up to a vast new experience in the manufacture of Ohio Seamless Tubing to help you meet post-war reconstruction requirements.

THE OHIO



SEAMLESS TUBE COMPANY

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ROTARY INDEXING PRESS FEED

AN EXAMPLE of the present trend toward use of built-in handling equipment to facilitate processing machine operations is a 3-station revolving indexing table that handles work in and out of a 3-column hydraulic press manufactured by Williams, White & Co., Moline, Ill., and shown in Figs. 1 and 2. This table permits one man to load work into dies and another to remove formed work from dies while the press ram descends automatically to form work at a third station. This greatly increases production of the press since it does not have to remain idle while being loaded and unloaded.

The table is 102 inches in diameter and is fitted around one column of the press. It passes over the press bed and is arranged so when ram descends the force is transmitted through the table to the bed. Table can be set to work stopping at three stations each 120 degrees apart or at two stations 180 degrees apart.

When the press is set for the 3-station operation, each of the two operators has a floor-type pushbutton. These can be seen in Fig. 1. They are connected in series so that both must be actuated before the automatic press cycle starts. When work has been loaded upon the empty die or dies at the first station and formed work stripped from die or dies at the third station, operators press pushbuttons and table automatically in-

. . . speeds blanking and forming operations in aircraft manufacture by positioning work under ram automatically. Ram then is operated in proper sequence by the automatic controls. System is equally applicable to a wide range of other press operations using universal rubber female die on press ram

dexes 120 degrees so that work just loaded into die at first station is moved to second station, which is under the press ram; formed work from ram comes to third station to be stripped from dies, and empty dies move from third station to first station where they are ready to be reloaded.

As the table indexes, it passes over an indexing pin and then backs up against it. This motion energizes the solenoid control of the press, which starts the down movement of the press ram. The backing-up feature of the table against the pin is a patented construction which permits fast travel of the table to the work and yet eliminates any possibility of shock due to overcoming inertia of the table against a stop. The back-up motion of the table is produced by the same forward-motion motor but with extra resistance thrown in the power circuits to slow down the movement.

After the press solenoid has been tripped for a down stroke, automatic controls operate to build up maximum pressure, to reverse

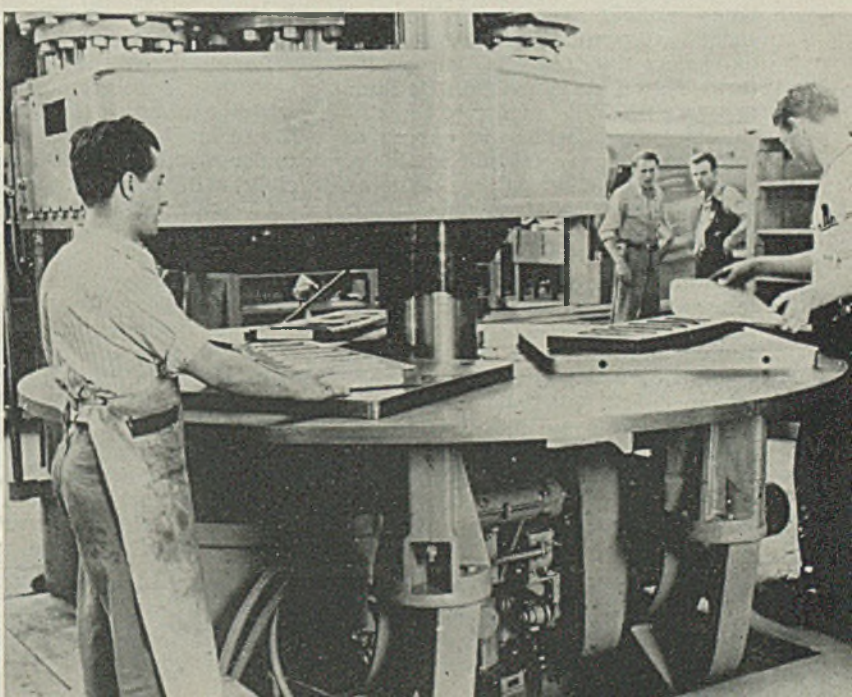
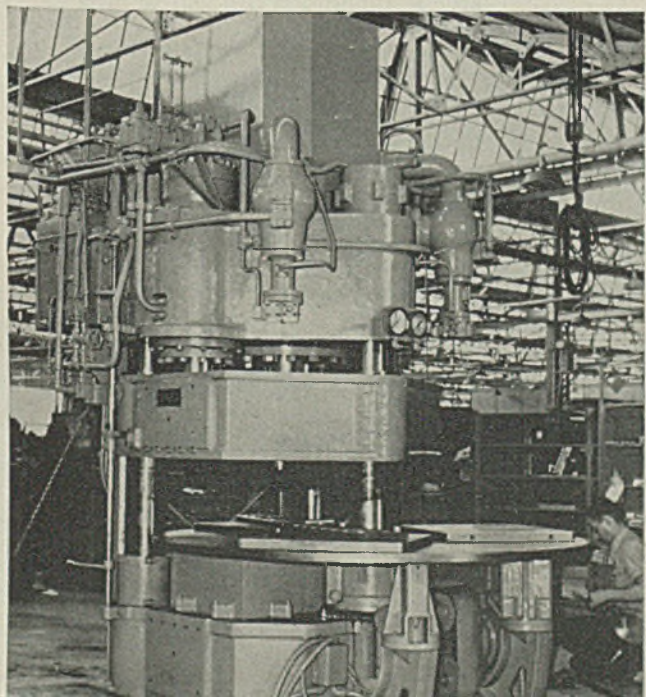
ram, and to return it to top of stroke, where automatic cycle ends. As the ram descends, ascends and then stops, first and third stations are being loaded and unloaded by the two operators. Fig. 2 shows die being loaded by operator at right and completed work being removed at left. Ram has formed piece at second station and cycle has ended, to be repeated only when both operators have completed their tasks and again pressed their pushbuttons. This timing sequence is necessary as the bulk of the time between press strokes is required by operators stripping formed pieces from the die or dies and placing new blanks on the other die or dies.

The press illustrated is in operation in a west coast aircraft plant. It has a capacity of 1200 tons on the main ram with travel at this tonnage of 12.7 inches per minute. But two speeds are provided so unit can also exert 390 tons at a travel speed of 40 inches per minute. At rapid traverse or no load, ram speed is 550 inches per minute. The work shown can be done at four cycles per minute when pressing at the maximum of 1200 tons. The 2-tonnage feature can be utilized to allow faster operation at lower pressure for it will permit five cycles of the press per minute, at a maximum pressure of 400 tons.

(Please turn to Page 106)

Fig. 1—(Left, below)—Operator setting up 3-column hydraulic press which features revolving work table to carry work under press ram automatically

Fig. 2—(Right)—Closeup of revolving table in operation. The table indexes 120 degrees automatically as soon as the first operator removes the formed work from the die and the second operator has reloaded the die at his station, the indexing movement being started by the operator pressing a pushbutton at each station



A GREAT CHANGE has taken place in American industry. The use of most metals ordinarily employed in electroplating is prohibited except for ordnance work. No longer can we apply on ordinary articles a copper-nickel-chromium plate to protect steel against corrosion.

What metals can be used to replace electrodeposits of nickel, chromium, copper, tin, cobalt, zinc, cadmium, etc., is the question asked by many manufacturers today. The answer will be found in the electromotive series shown in Table I.

Lithium, rubidium and potassium are too active, too expensive and have very little mechanical strength. The same comment applies to strontium, barium, calcium and so-

to lead, being somewhat softer and more active. It will tarnish in the air and its salts are poisonous. Cobalt, nickel and tin are all on strict priorities. Lead is generally too soft for protective coatings, its salts are poisonous and the metal readily oxidizes in the atmosphere. The material is hard to clean and has a tendency to aid in the production of poorly adherent deposits. However, this material does have possibilities for some uses.

Hydrogen is a gas. Antimony, bismuth and arsenic all are brittle in the pure state. Antimony and arsenic are also very poisonous. Copper, again, cannot be considered because of priorities. Polonium or radium F is just a laboratory curi-

ciated. The metal can be deposited from both acid and cyanide baths comparatively easily. Since the production of silver is ahead of consumption, its price of \$0.37 an ounce may be lowered still further.

The total silver produced in the Western hemisphere in 1941 was over 200,000,000 fine ounces. (1) From these statistics it can be seen that here is one metal which shows a surplus. To be sure, it is not very much when considered in tons, but a pound of silver will cover a large area when used as an electrodeposited coating.

From this information it would appear safe to say that silver is going to take the place of commercial nickel, cadmium, zinc, tin and perhaps other electrodeposited coatings. With this in view, a resume of silver plating will be given which, it is hoped, will act as a guide to those hoping for substitutes for metals which have enlisted in the war effort.

Silver has an atomic weight of 107.88, a melting point of 960.5 degrees Cent., a specific gravity of 10.5 and a valence of one. It is both malleable and ductile. The pure metal is the whitest metal known to man and possesses a beautiful soft luster which is exceptionally pleasing. The electrical and heat conductivities of this metal are above all others. The material is unaffected by oxygen but is readily attacked by sulphur compounds which produce the well known silver tarnish, Ag₂S.

This metal can be deposited from aqueous solutions with ease as one would expect from its position in the electromotive series.

Type of Bath: Silver can be deposited from several baths, but only two are of commercial importance, and one of these is used in almost all instances. The cyanide bath is preferred by most platers as the best all around bath and so merits most attention. The iodide bath finds some special application and will be mentioned.

The cyanide bath contains silver cyanide, free cyanide and carbonate in the solution. In some cases a brightener is added. The materials in a silver bath can be used over wide ranges. In other words, it is easy to deposit silver. A look at the electromotive series will show this to be true if one bears in mind that the lower in the series a metal appears, the easier it is to deposit that element. A good formula which can be used for general plating is as follows: Silver cyanide (AgCN), 5 ounces per gallon (avoirdupois); potassium cyanide (KCN), 7.5 ounces per gallon; potassium carbonate (K₂CO₃), 4 ounces per gallon.

This bath should be used with 999 fine rolled annealed silver anodes at 65 to 85 degrees Cent. The current (Please turn to Page 107)

SILVER PLATING

... as a substitute coating in the present emergency

dium. The next three (magnesium, aluminum and beryllium) are very interesting because they are comparatively strong and light. However, they cannot be plated from aqueous solutions. Therefore, they cannot be considered from the point of view of plating.

Uranium is too expensive, is heavy and white colored. Deposition of this element is rather difficult also. Manganese can be deposited from aqueous solutions. It is being done commercially today. However, the material tarnishes quickly in the atmosphere. This alone would eliminate the metal from the plating plant.

Zinc and chromium are both platable elements but it is difficult to obtain these materials in large quantities without top priority ratings today. Chromium can be used in extremely thin deposits, but an intermediate plate is desired. Gallium is a rare metal belonging to the aluminum group which is expensive and limited in amounts available. Also it has a low melting point of 29.75 degrees Cent. Iron comes next, but it is the one material which we are desirous of protecting.

Cadmium can be used for plating many base materials, but it cannot be considered due to priorities. Indium is a soft rare metal of the zinc group selling for \$7 per ounce. It can be cut with the finger nail. It does have some industrial application when used in conjunction with silver. However, this use involves a heat-treating operation which is not desired. This material does have possibilities, however.

Thallium, a rare metal, is related

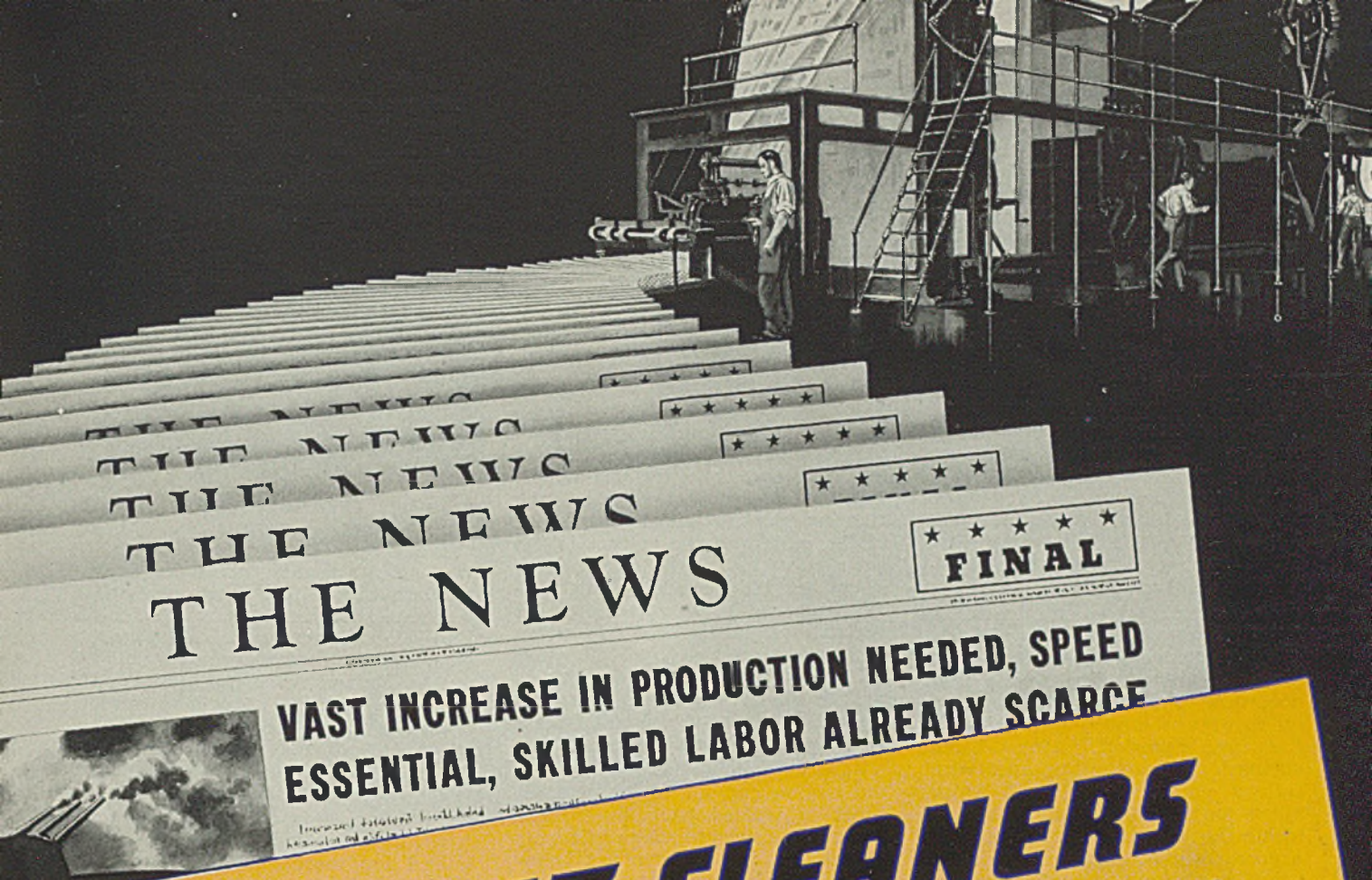
By DR. C. B. F. YOUNG
Consultant
And
Adjunct Professor
Brooklyn Polytechnic Institute

osity and cannot be considered as a commercial possibility.

Silver is an interesting metal that is available in appreciable quantities. Too, it can be deposited from several types of solutions. It is selling for approximately \$0.37 an ounce. This material is being produced in increasing quantities because it is a by-product of the copper, zinc and lead industries. Silver definitely offers important possibilities. Palladium, platinum and gold can be deposited, but they are entirely too expensive for commercial consideration.

Looking over the series it will be seen that there are only two metals which can be seriously considered. These are lead and silver. Lead is under some restrictions and possibly will become harder to obtain for commercial use. It is also rather soft and has a tendency to drag when being buffed. The salts are poisonous and the plate must be used with discretion. Too, the plated coating itself is rather dark and marks almost everything that contacts it. Such properties make lead a poor possibility for general application.

Silver coatings, on the other hand, have a most attractive appearance either polished or unbuffed. This element has intrigued man for centuries. The warmth of sterling silver is universally known and appre-



**VAST INCREASE IN PRODUCTION NEEDED, SPEED
ESSENTIAL, SKILLED LABOR ALREADY SCARCE**

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help speed defense production . . . SAVE MEN

A prominent automobile manufacturer, now engaged in war production, has achieved these four striking advantages in cleaning metal parts by switching from hand cleaning with tools, brushes and a solvent to the use of a special cleaning machine containing a solution of a Pennsalt Cleaner:

- 1.** A substantial saving in man hours of cleaning time . . . 8 men, with a Pennsalt Cleaner solution in a special cleaning machine, accomplish what 75 men did manually before.
- 2.** Elimination of fire hazard of previous cleaner . . . an opportunity for reducing fire insurance costs.
- 3.** Savings in the total space occupied by the cleaning department.
- 4.** Removal of hard carbon deposits, grease and other foreign matter rapidly and efficiently from metal parts.

In many manufacturing plants all over the country, production is being speeded by the use of Pennsalt Cleaners . . . in some cases, to shorten each step in the metal cleaning cycle . . . in others, to eliminate whole operations by cleaning several metals with one Pennsalt Cleaner.

To meet widely varying problems of metal cleaning, we offer a complete series of Pennsalt Cleaners . . . each with exceptional dissolving and emulsifying action, lasting power, and cleansing qualities. Let our technical representative discuss with you the proper Pennsalt Cleaners to save you men and money. Write today for full details to our Pennsalt Cleaner Division, Dept. S.



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RECONDITIONING OIL TANKS

... by simplified arc welding method

WAR has made it imperative to place all storage or working tanks used in the petroleum industry back into active service immediately. An effective method has been devised by E. G. Woolman, welding foreman, Cities Service Oil Co., Ponca City, Okla., for reconstructing tank bottoms by arc welding.

These tanks—used for gasoline, naphtha, kerosene, gas oil, and crude oil—had leaky and corroded bottoms. Steaming, of course, is first necessary to remove all vapors and oil to prevent any possibility of a fire or explosion. After being steamed, old bottom is cleaned with fuller's earth. The $\frac{1}{4}$ -inch thick plates for the new bottom are moved inside the tank without taking out a door sheet by cutting a 6-foot by 6-inch section out of the side of the tank near the bottom.

Accompanying diagrams show method of reconstruction. Details of the bottom in Fig. 3 illustrate how each plate overlaps—except by 3 inches at each end where the notch is butt welded to the adjoining sheet to form a smooth and flat surface around the edge. Only one pass with a $\frac{1}{8}$ -inch mild steel rod is necessary for joining these $\frac{1}{4}$ -inch plates.

After new bottom is placed, the

This story won a prize in the arc welding news contest sponsored by Hobart Brothers Co., Troy, O.

12-inch slanting plate, shown resting on the flat outside surface in Figs. 1 and 2, is welded to it. Two beads are run at the top and bottom of the slanting plate. Top of the slanting plate is joined to the side of the tank, and the bottom to the new bottom as shown.

At each rivet seam, a notch $\frac{3}{4}$ -inch high and 3 inches long was cut out so that the inside of the notch could be welded. See Fig. 2. This prevents any liquid from seeping in back of the rivets, running down the seams in back of the slanting plate or underneath the new bottom.

After the new bottom is installed, the section cut out to act as door sheet is welded back into place. There is no need to make this weld tight since it has been cut below where the slanting plate on the inside has been welded liquid tight.

Cost for reconditioning a 52,000-gallon tank by this method was \$576.68. This amount is some \$230

under cost of installing a new bottom by a conventional method. Cost figures include labor and material in both instances.

Corrosion has always been most severe around the bottom angle iron and old rivets—even extending sometimes 3 or 4 inches up on the sides of the tank. This method of reconstruction tends to prevent such corrosion and forms a new bottom that will not pull or break away from the sides since the liquid is free to work around due to the slanting plates.

Aluminum Cleaner Cleans Without Etching

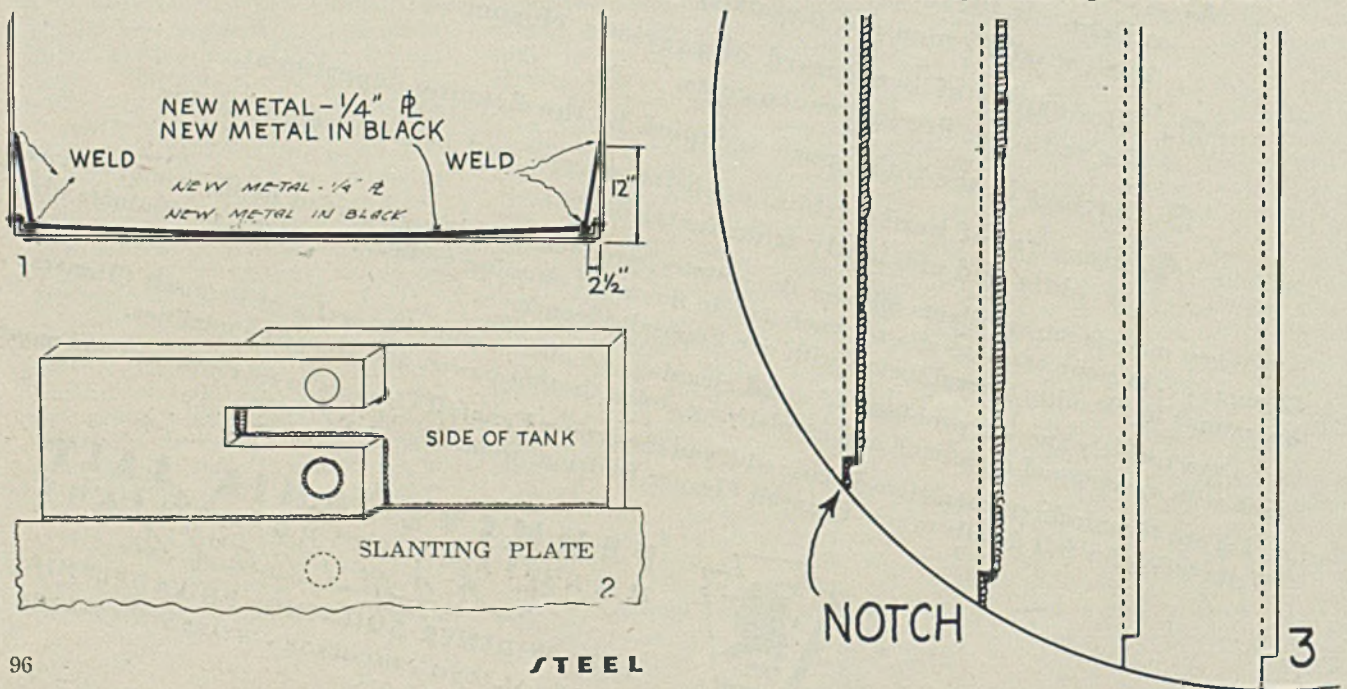
A new soak cleaner, called Mattawan A1, for cleaning aluminum and magnesium in either sheets or castings is being offered by Hanson-Van Winkle-Munning Co., Matawan, N. J. It does not produce any weight or etch loss of the metal after two hours' immersion providing the temperature of the bath does not exceed 160 degrees Fahr., and the concentration of the cleaner is not more than 4 ounces per gallon.

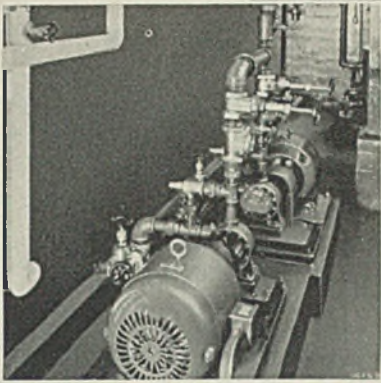
In a number of tests on greasy production castings, the time required for thorough cleaning was $\frac{1}{2}$ to 4 minutes. At 175 degrees Fahr. the cleaner will etch slowly, rate of etch increasing as the temperature is increased thereafter, according to the company.

Fig. 1—Cross section of tank bottom showing how new plates are applied to replace old bottom

Fig. 2—Inside view showing how tank rivet seam has been cut and sealed with weld metal. Rivet head also is seal welded. This precaution prevents liquid from seeping in back of the rivets or running down the seams in back of the new slanting floor plates

Fig. 3—In laying the new bottom, a notch is cut at each end of overlap so that surface around edge of floor will be smooth and flat when plates are welded, the plates being bent down for butt welding around edge of floor as shown





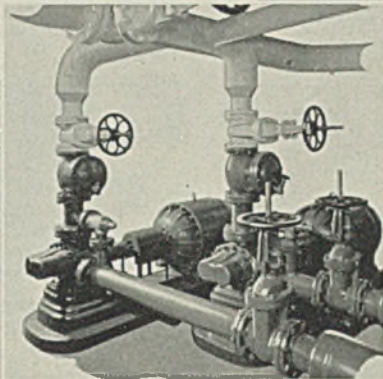
GO RIGHT DOWN THE LINE OF STEEL MILLS

and you'll find

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ROTARY PUMPS

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Mechanisms and
Lubricating Systems

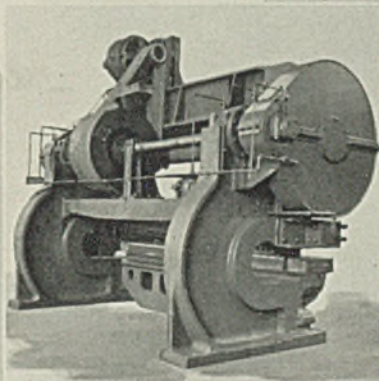


this seal

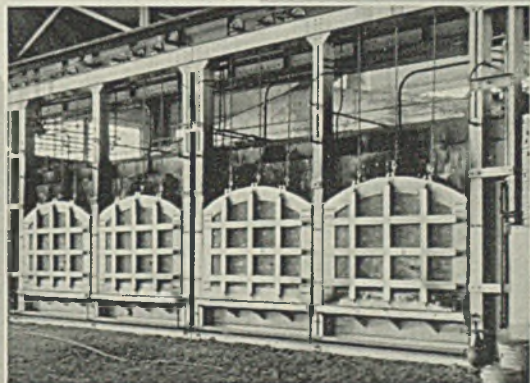
appears on every Roper Hydraulically Balanced Pump. It assures higher efficiency, quieter operation, greater dependability and longer life.

WRITE FOR CATALOG 948

with illustrations, cut-away views, drawings, dimensions and pumping capacity tables and complete information on Roper Pumps. The Roper line offers 7548 installation possibilities giving users what practically amounts to custom-built performance at standard model prices.



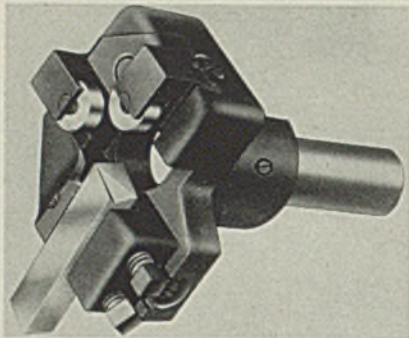
*They didn't
leave the
selection
of pumps
to guesswork*



GEO. D. ROPER CORP., ROCKFORD, ILLINOIS
PITTSBURGH OFFICE, 207-209 BLVD. OF THE ALLIES

Screw Machine Box Tool

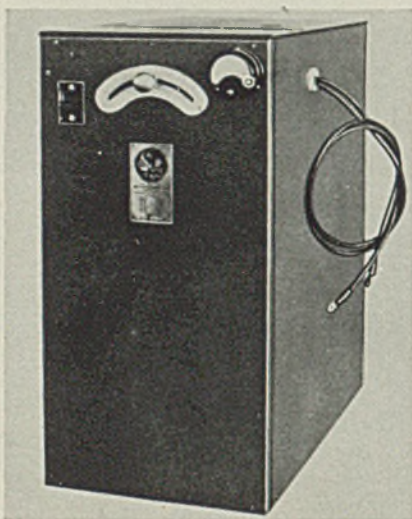
Boyar-Schultz Corp., 2110 Walnut street, Chicago, has placed on the market a new automatic screw machine box tool designed for faster production. Offered in three sizes, 00, 0 and 2, it is easy to set up. Body of the tool is forged alloy steel. Its roller blocks are made in two differ-



ent heights—individually adjusted. The tool bit holder holds the bit so it is always tangent to the work. A positive screw feed adjustment permits quick set ups. A roller block wedge serves to both tighten and release both roller blocks with a single movement. Tools are being offered for either hand or automatic screw machines.

Brazing Unit

Ajax Electrothermic Corp., Trenton, N. J., has placed on the market a new 6-kilowatt frequency self-contained brazing unit for brazing 2-pound bombs. To do this work, it is said to take about one-third of the time required by other methods. After the surfaces of the bomb are prepared, a ring of compound is placed in position. Next,

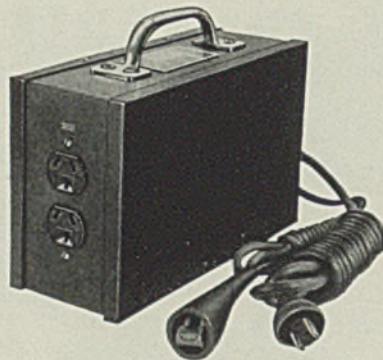


the assembly is heated by placing it inside the induction ring, and then the parts are brazed, with no residue to clean up. The heat is localized and the joint produced is always the same. The equipment uses high frequency generators

and is convertible to other forms of brazing, to melting alloys or sintering carbide tools.

Safety Transformer

Acme Electric & Mfg. Co., Cuba, N. Y., recently developed a safety transformer which is suitable to service two 32-volt alternating-cur-



rent extension lines providing light for workmen who perform under conditions in which explosive gases or vapors exist. It also is said to be particularly adapted for inspection work where workmen must come in contact with moist surfaces or conditions, for the lower voltage prevents severe shock due to defective wires or wiring. Compact and portable, the instrument may be plugged into any ordinary 110-volt alternating-current circuit. It is heavily insulated throughout.

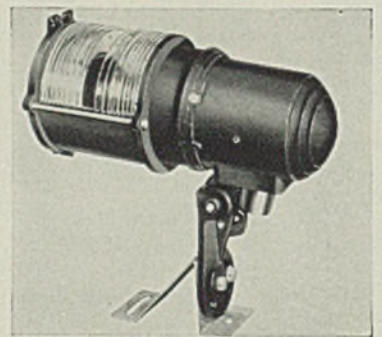
Inspection Device

Designers for Industry Inc., Terminal Tower, Cleveland, has introduced a new, improved machine for inspection of parts. It checks parts by comparison—by superimposing images or composite images of objects or gages. Called the Inspectograph, the device can be equipped with an automatic conveyor and photoelectric cells for inspecting parts quickly to keep up with the pace of some of the war industries. It employs a pair of lenses surrounded by spiral coils of gaseous discharge tubes, and means for successively energizing these tubes in alternate relation with respect

to each other rapidly enough to cause the image projected by each lens to persist as a continuous image. Any differences in width, length or depth of the part as against the gage or perfect part is measured by graduations on the adjustment knobs.

Protective Lighting

Westinghouse Lighting Division, Westinghouse Electric & Mfg. Co., Cleveland, announces new Fresnel luminaries for lighting industrial fences and areas for protection against sabotage. These are offered in two types, the SF-180 and the MF-180 for series and multiple circuits respectively. Units can be mounted on poles and building walls and consist basically of a hood with socket and receptacle, mounting bracket, a reflector and lens assembly. The hood is of cast iron. The lower part of the casting has a flange for watershed and breather to avoid creation of a vacuum due to sudden cooling of the luminaire by rain.



Moisture-proof felt gaskets form a weather-proof and bug-proof seal between the hood and the reflector. Units with side mounting plates are gasketed with graphitized asbestos.

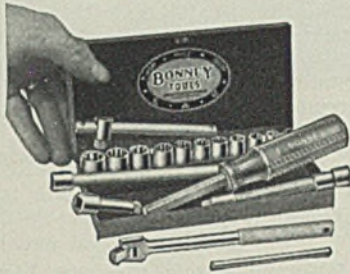
Sockets and Attachments

Bonney Forge & Tool Works, Allentown, Pa., has placed on the market a new No. V51 18-piece set consisting of extra small sockets and attachments designed especially for adjustments to small nuts and bolts. Its contents include eight sockets with openings from 3/16 to 7/16-inch for adjustments

Industrial

Equipment

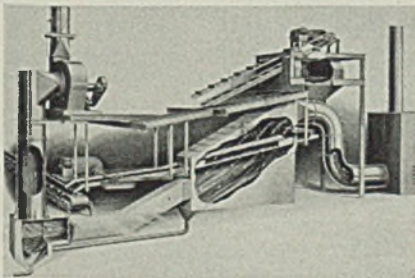
to hexagon nuts and bolts; three sockets with openings from $\frac{1}{4}$ to $\frac{3}{8}$ -inch for square nuts and bolts; $\frac{1}{2}$ -inch sliding T handles; 2 and 6-inch extensions; 4-inch flexible



extension; 6-inch spinner handle; $5\frac{1}{2}$ -inch hinge handle and $3\frac{1}{2}$ -inch cross handle. Socket walls are thin for getting into close quarters. All attachments are slender for same reason. The entire set is furnished in a pocket-size metal case which measures only $6\frac{1}{4}$ x 3 x 1 inch.

Coal Dryer

Link-Belt Co., 307 North Michigan avenue, Chicago, announces a new SS dryer for removing surface moisture from sized coal. It combines mechanical dehydration with heat drying, and is available for drying sized coal of No. 10 mesh and up. The new unit comprises a drying chamber with perforated reciprocating-plate drying surface; coal inlet and outlet; hot air inlet from a coal-

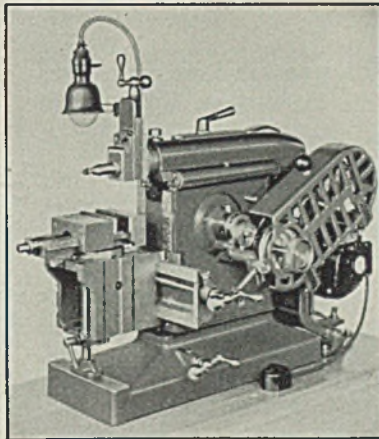


fired furnace; and an exhaust fan for drawing the hot air into chamber, over and through the thin bed of coals, down through perforations in reciprocating plate to exhaust stack. Operation of the moving element is analogous to that of a shaker screen excepting that in the case

of the dryer the perforations are very small and are intended only for passage of the drying air.

Precision Shaper

Automotive Maintenance Machinery Co., 2100 Commonwealth avenue, North Chicago, Ill., has placed on the market a new 7-inch precision shaper which is available for stationary installation or mounted on a portable cabinet. It features quick adjustments of stroke, feeds, ram position, tool head, speeds, table height and table support. Ways of the ram, tool head and front face

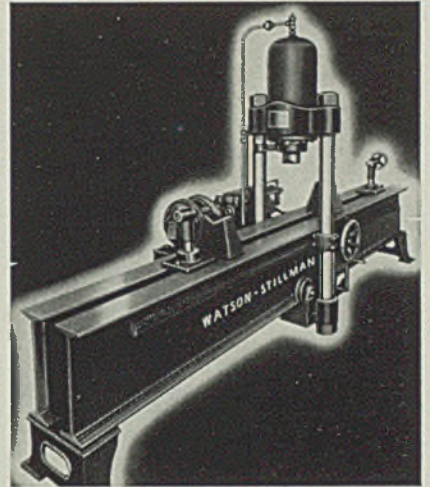


of the main frame are of V type. The shaper's tool head is adjustable and graduated from 0 to 90 degrees for angle work. Its vise is mounted on the table with a single bolt and is held in position with a key. The vise base is provided with slots for three working positions of the table, and it is graduated for any angle from 0 to 90 degrees on either side of center. Feed mechanism is of the reversible and adjustable type, the feeds varying from 0.003 to 0.018-inch. The machine's countershaft has a 4-step V-pulley with separate adjustment for V-belt and motor belt.

Straightening Press

Watson-Stillman Co., Roselle, N. J., has introduced an improved 125-ton straightening press for straightening gun barrels. It also is suitable for straightening shafting, forgings, etc., being controlled by

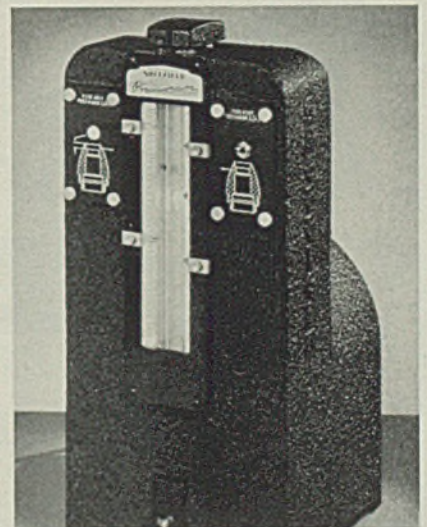
only one hand lever. Space between columns of the press is 18 inches, vertical opening $17\frac{1}{2}$ inches. Its stroke is 10 inches. The unit is of the manually movable press type, a handwheel controlling movement of the press along the table, which is 14 feet long, 17 inches wide and equipped with bending blocks, cen-



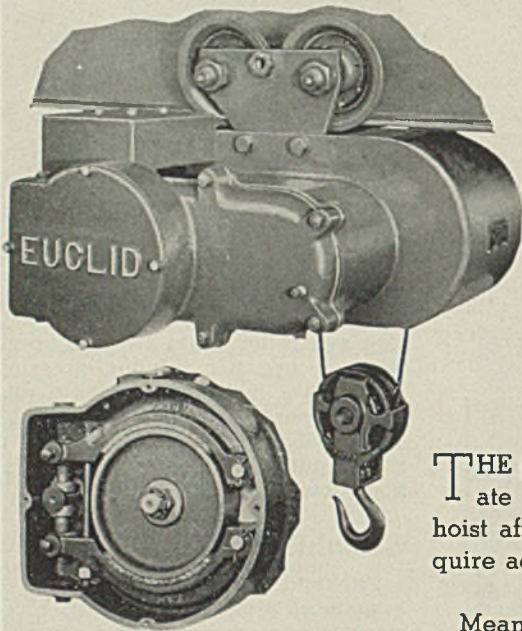
ters and rollers. Its advance speed is 87 inches per minute, pressing speed $13\frac{1}{2}$ inches per minute and return speed 78 inches per minute. The machine is powered by a radial pump and driven by a $7\frac{1}{2}$ -horsepower motor.

Checking Gage

Sheffield Corp., Dayton, O., has announced a new Precisionaire-Electrichek gage for checking external or internal diameters and depths simultaneously. It combines in one housing the features of the company's Precisionaire and Multichek, greatly increasing the speed of inspection. One section of the gage measures the rate of flow of air passing between the gaging spindle and the internal diameter. The other section operates on the same principle as the Multichek with its independent reed mechanism gag-



Typical OF ADVANCED EUCLID HOIST DESIGN

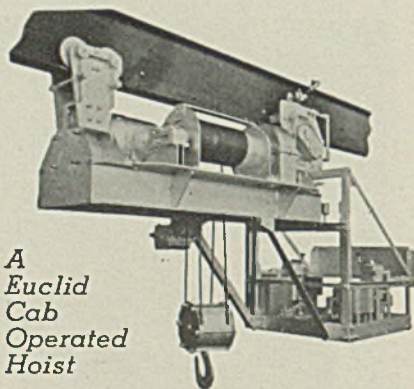


*is this
easily
adjusted*
**MOTOR
BRAKE**

THE poorest hoist will operate for a time. The best hoist after long service will require adjustments.

Means are provided in Euclid Hoists for making every needed adjustment accurately and quickly. Liberal dimensions of all parts lengthens the periods between adjustments. High quality materials permit making necessary adjustments repeatedly. This assures an unusually long period of efficient service.

Newest Euclid feature is the quickly accessible, easily adjusted motor brake. In operation, the liberally proportioned shoes, equipped with metal impregnated linings, respond instantly to the movement of a cam. Close adjustment can be made to stop the motor almost instantly or allow a more gradual stop.



*A
Euclid
Cab
Operated
Hoist*

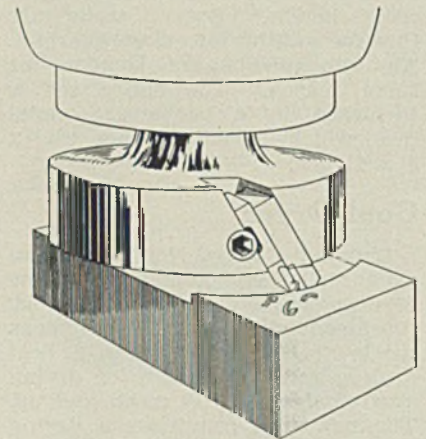
Write for the Hoist Catalog No. 838 or the Euclid Crane Catalog if interested in this larger type of material handling equipment.

THE EUCLID CRANE & HOIST CO.
EUCLID, OHIO, *Suburb of Cleveland*

ing unit. Although both sections are independent of each other, they work simultaneously. The two indicating tubes are in the center of the gage. Each tube has two markers. They are set at the high and low limits representing the tolerances of the diameters that are being checked. The position of the floats in the tube indicates whether or not the tolerances have been violated. The light center circle at the upper lefthand corner of the gage is the signal light for the Multichek section of the gage. Gaging spindles of both parts of this gage are located at the base, and so placed that the inspector contacts both in one pass. The Precisionaire spindle of the gage shown in the photograph has two orifices, one for each of the internal diameters being checked. Immediately to the left of this spindle is the Multichek gaging spindle. The reed mechanism gaging unit of the Multichek section protrudes from the rear of the housing. The gage is able to check to fifty millionths of an inch instantaneously.

Milling Cutter

McKenna Metals Co., 200 Lloyd avenue, Latrobe, Pa., announces a single-bladed Kennamill by means of

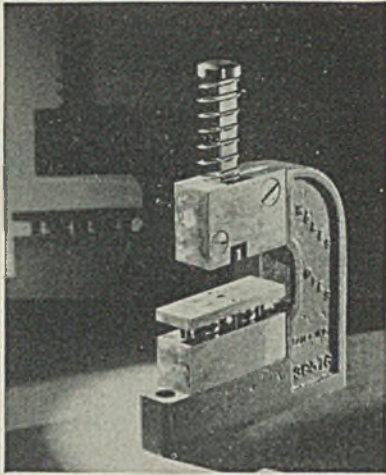


which simple facing cutter heads may be made in almost any shop. Designed with a large negative spiral angle of 35 to 55 degrees and positive hook of 15 to 25 degrees, it is said to mill steel efficiently. For roughing, with cuts up to $\frac{3}{8}$ -inch deep, a 35-degree negative helical angle and 15-degree positive hook on a 12-inch diameter cutter head works efficiently. For light finishing cuts a negative helix of 55 degrees with 20-degree positive hook angle is suitable.

Punch and Die Holder

Strippit Corp., Buffalo, announces a new model self-contained Wales punch and die holder that punches 3 holes per unit. It provides exact holes for riveting small parts to channeled or flat material. With

individual holders the series of 3 holes can be punched in a straight line or at any angle according to the setup of holders on rails or T-slotted plates. Nothing is attached to the



ram of the press. Die-setting time is a matter of minutes—all that is necessary is to lock holder in position and start punching. Holders can be reset or removed quickly to provide many patterns.

Splint Dressing

B. F. McDonald Co., 1248 South Hope street, Los Angeles, is offering a new Insta-Splint splint dressing for leg and hip fractures. So quickly is it set in position that any trained first aider may complete a dressing for a hip fracture in less than two minutes, it is said. The device is completely self-contained, including all necessary accessories, even to pads, traction strap and traction pin. No other materials, such as cravat bandages, are required. Feature of the development is its adjustability to the stature of the patient. The framework consists of three sections hinged side by side. The center section fits

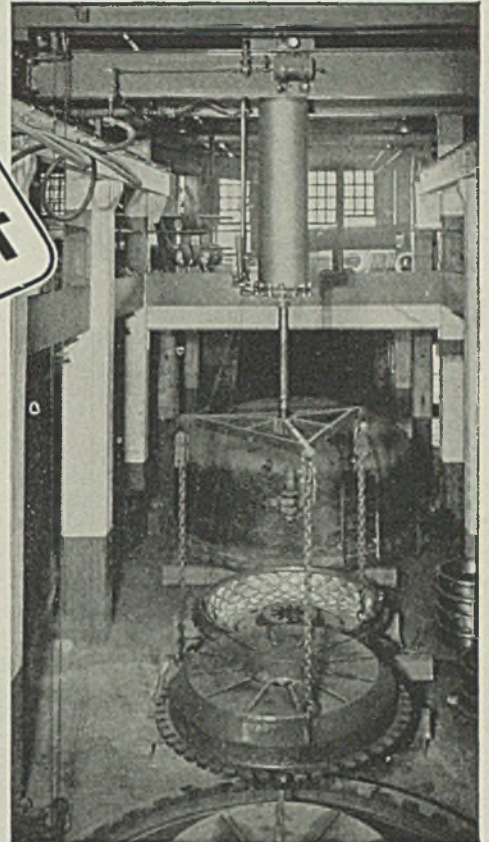


under the patient's leg; the inner section folds up to fit the inside of the patient's leg and the outer section has a sliding panel which enables the first aider to adjust this

GOOD YEAR

Solves a Production Problem With a

CURTIS Air Hoist



★ As illustrated above, the Goodyear Tire and Rubber Company last year solved the problem of handling the movement of heavy tire molds and heater lids with a Curtis Air Hoist. Loads average 30,000 pounds with a maximum of 40,000 pounds per operation. Since the installation of this Curtis Air Hoist in 1940, no maintenance whatever has been necessary.

As in hundreds of industrial plants throughout America, Goodyear recognized the advantages of Curtis Air Hoists:

- Low first cost—low operating expense
- Smooth, fast, accurate control of loads
- Light weight—available in pendant, bracketed, and rope compounded types
- Immunity to abuse or overloading
- Fewer production interruptions for servicing
- One man operation—by ordinary labor

If production in your plant includes the hoisting of equipment or materials, it is more than likely that Curtis Air Hoists will speed up your work, release labor for other jobs, and lower production costs at the same time.

For complete information on Curtis Air Hoists and air powered equipment, send the coupon below for free booklet on "How Air Is Being Used in Your Industry."

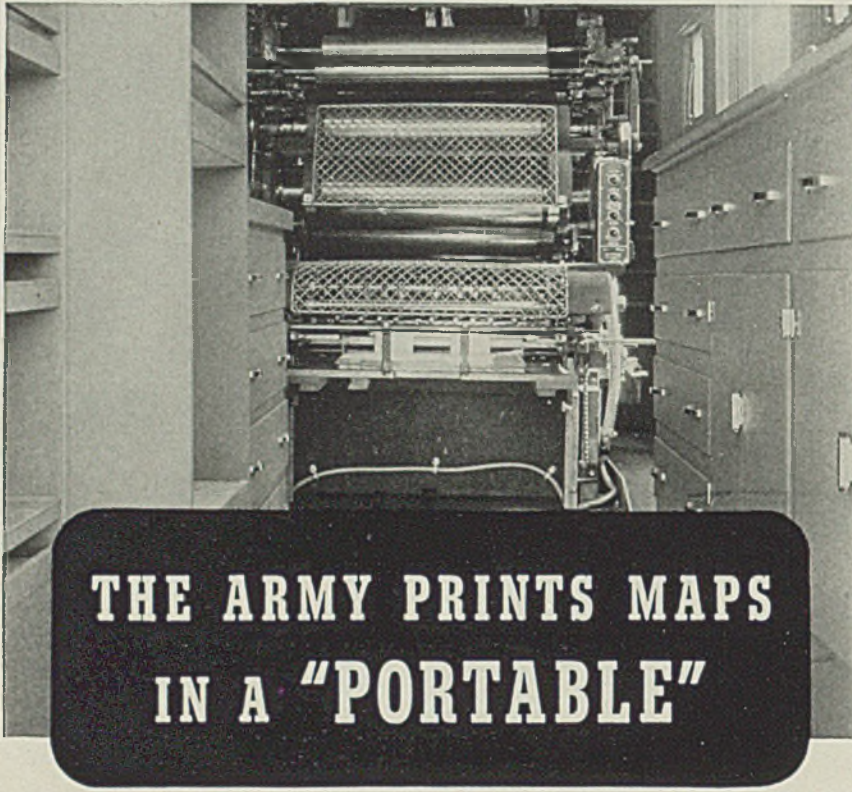
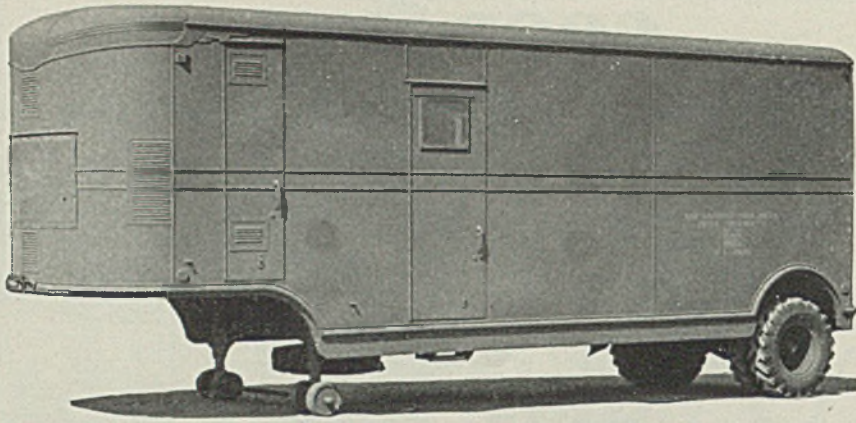
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An order comes through—maps are needed now! There's no time to wait while a printing press goes into action miles away. So the Army "rolls its own" right up to the battlefronts.

The photos show a press car ready for service with the field forces. Inside is a complete printing set-up. Outside, ARMCO PAINTGRIP sheets cover the top and other parts of this print shop on wheels.

ARMCO PAINTGRIP is used because this special zinc-coated metal *takes and preserves* paint. Since any color combination may be used, ARMCO PAINTGRIP can be camouflaged effectively. Paint goes on fast because no pre-treatment is needed. The bonderized film insulates paint from the zinc, greatly retarding peeling and flaking.

Would this paint gripping metal do a better job in *your* war products? If you would like fabricating information about ARMCO PAINTGRIP write The American Rolling Mill Co., 1581 Curtis St., Middletown, O.

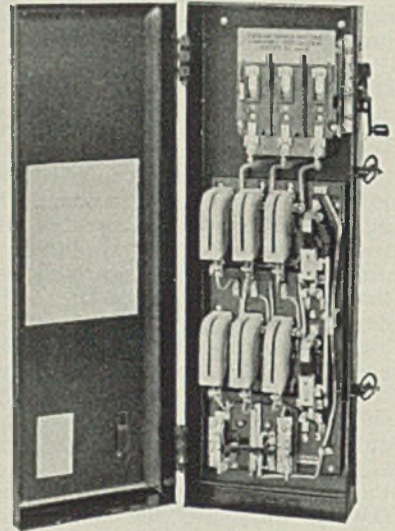


TO KEY MEN: Can You Use Sheet Metal
Working Data for War Products—and Post-War Plans?

side of the splint to the middle thigh for leg fractures, or to the armpit for femur and hip fractures. Pads protect the patient and straps attached to the inner and outer sections of the split enable the operator to buckle the splint securely in place in a few seconds. In cases where traction is advisable, the traction strap and pin is used. Notches at the end of the device hold the pin in place while applying traction. The Insta-Splint was developed by Paul MacWilliams, director of first aid and accident prevention at Warner Bros. Studio, Hollywood, Calif.

Reversing Starters

General Electric Co., Schenectady, N. Y., has introduced a new line of alternating-current combination magnetic reversing starters for full-voltage starting and reversing of squirrel-cage induction motors. Units in the line consist of two mechanically interlocked reversing contactors, a 2-pole overload relay, and either a circuit breaker or a fusible

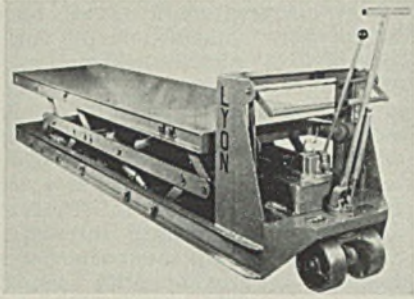


or nonfusible motor-circuit switch. Starters are designed to provide full-voltage reversing control and short-circuit protection in one unit. The line includes NEMA size 0 to 4, starters covering single-phase and 3-phase motors in sizes up to and including 100 horsepower at 440 or 550 volts. The fusible forms combine a manually-operated motor circuit switch with clips for cartridge-type fuses. The circuit breaker forms provide simultaneous tripping of all phases on short circuits, and have a trip-free mechanism which prevents holding the breaker closed under short-circuit conditions.

Industrial Truck

Lyon-Raymond Corp., 922 Madison street, Greene, N. Y., has introduced a heavy capacity, hand-operated hydraulic truck for handling long strips of sheet metal. It keeps

sheet metal at a convenient height for the operator while he is feeding the sheets to a punch press. The truck has a maximum capacity of 10,000 pounds. It is equipped with a 2-speed, hand-operated hydraulic

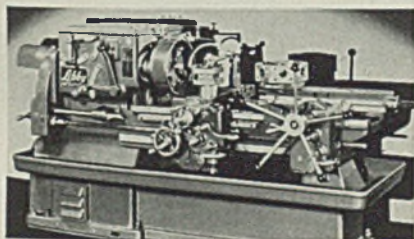


pump, and also with an attachment to accommodate a towing hitch on the front wheels so that the truck may be moved with aid of an industrial power tractor. The truck also is equipped with a brake, i.e., floor lock, so it may be locked into position when the operator is feeding the sheets into the punch press. It features a 36 x 120-inch table which can be elevated to a height of 36 inches.

Turret Lathe

Libby Division, International Machine Tool Corp., Indianapolis, announces a new No. 4 universal ram type turret lathe which has a collet chuck capacity of 2 inches in diameter, 22 inches in length, and 20 inch swing over ways. It is offered complete with tools for both bar work and chucking work, and will accommodate 8, 10 and 12-inch diameter chucks. In addition, it may be equipped with special attachments.

Both base and pan of this machine is cast integral and comprise one heavy sturdy casting. Spindle control is provided by lever which operates a double multiple disk main drive clutch. The headstock features 12 spindle speeds. These



are controlled by 3 levers mounted on the front of the headstock. One divides the 12 spindle speeds into 2 groups of 6 high and 6 low. The second lever divides the speeds in these groups into two groups of 3 speeds each. The third has 3 positions and is used to select from these groups the particular speed desired.

The motor of the machine is mounted in the base which is

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Production for Offense involves many a problem, not the least of which may be your requirements of special round, flat or shaped wires to exacting standards of steel analysis, dimensions and finish. Gain time by letting Roebling solve these problems for you . . . delivering the right wire . . . to the right standards . . . on schedule.

Well equipped by experience, skill and facilities to tackle the tasks involved, Roebling has built a reputation solving difficult problems in specialty wires.



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hinged to provide a means for tightening the V-belts. The universal carriage has 6 reversible cross and longitudinal feeds which operate independent of the hexagon turret carriage. Adjustable feed trip dogs are provided for the cross slide, and a 6-screw stop roll is provided for the longitudinal travel of the carriage. The cross slide holds the quick indexing square turret at the front and is provided with three cross T slots at the rear for holding the rear tool post. The rear tool post is used for cutoff and forming operations. Six power feeds to the

ram slide in the forward direction are embodied in the hexagon turret ram slide carriage. Feeds are engaged by a quick acting lever on the turret apron. Lubrication is automatically applied to various parts of the machine.

Cutting Machine

Andrew C. Campbell, American Chain & Cable Co. Inc., Bridgeport, Conn., has developed a new wet abrasive cutting machine, the No. 425 Cutalator, specially designed for fast cuts on practically all types of materials up to 3½-

inch diameter solid stock and 4½-inch diameter tubing. It is an oscillating type machine effecting a shorter arc of contact through the combination oscillating and rotating movement of the hydraulically fed abrasive cutting wheel. Hydraulically operated work clamps and V-type work holders hold the work securely. A micrometer work stop assures rapid set-up—the machine is fully equipped with a hydraulic stop remover, work clasper and wheel feed. A separate coolant tank, mounted on castors is a big feature of the new unit. The coolant pump feeds water through a shut-off valve to the coolant distributor in any quantity desired.

Gear Generator

Fellows Gear Shaper Co., Springfield, Vt., is offering a straight-line gear generator especially adapted for cutting of fine-pitch gears. It has a capacity up to 1½ inches pitch diameter for spur, and 1 inch for helical gears. Two features of the machine are: The rack-type cutter can be easily made and applied to the cutting of non-involute shapes; it also can be made for "topping"—trimming the outer ends of the teeth to the desired outside diameter. The unit differs from other machines employing rack-type cutters in that there is no intermittent displacement of the rack cutter to complete the gear, cutter travel being continuous. The cutter is held in an adjustable holder which is mounted on the reciprocating and relieving cutter-slide. This cutter-slide is carried in a swivel head, permitting angular adjustment, so that the machine can be used for cutting both spur and helical gears. Reciprocating members are of light weight, and the cutter-slide can be reciprocated at speeds as high as 1500 strokes per minute.



IN CLEANING CARTRIDGE BELT LINKS

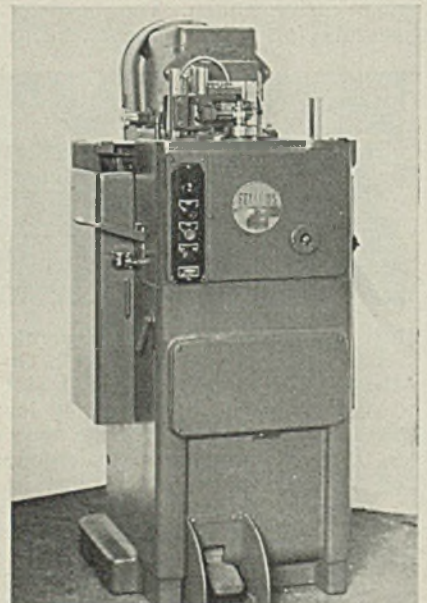
SEVERAL years ago when one of the arsenals was developing machine gun cartridge belt links we were asked to recommend the equipment for cleaning them.

These were the requirements: (1) The equipment must remove the heat-treat scale, and any burrs remaining after the punching operations; (2) The surface of the links must be thoroughly roughened to anchor the zinc or Parkerized coating (necessary to prevent corrosion); (3) It must be capable of maintaining a high production schedule; (4) no breakage or damaging of links would be tolerated.

The 27" x 36" WHEELABRATOR Tumbblast with rubber apron conveyor, was found to fulfill all requirements, and two machines were installed. They proved so successful in all respects that this equipment has become the standard for more than 95% of all cartridge belt link cleaning jobs.



509 S. BYRKIT ST., MISHAWAKA, IND.



Conserves Materials

(Concluded from Page 73)

the Sentinel breakers, has always been anchored by two little pieces of nickel wire not more than $\frac{1}{16}$ -inch long and about the size of the lead in a pencil. This does not involve a very large tonnage of nickel, but its scarcity has resulted in redesigning to employ spot welding. This will probably give a somewhat better job than before, and it is hoped that the cost will be a little less.

At the Meter Works in Newark, N. J., the outstanding economy as regards critical material is in connection with sockets for outdoor watt-hour meters. These were originally aluminum diecastings, and the large quantities used made a quick changeover imperative. A drawn steel shell is now zinc plated, bond-erized by an improved method, and then given an organic finish. This is expected to give reasonably satisfactory service although it probably will not be as good over a long period of time as the aluminum-base diecasting. It again is one of the things which can be seen, and the gradual failure of the finish can be seen and protection renewed by re-painting as required.

At the East Pittsburgh, Pa., plant, nearly all of the chromium-nickel steel has been or is being replaced by chromium-molybdenum. Tungsten high-speed steel is also partially replaced by carbon-molybdenum steel. It is not adaptable to blanking dies, so for these a high chromium carbon steel is being used. This marks rather badly, so it is necessary to make dies for stator and rotor punchings out of many small pieces, hardened, assembled and then ground to final shape and size. When cost is greatly increased, it provides a die that does the work.

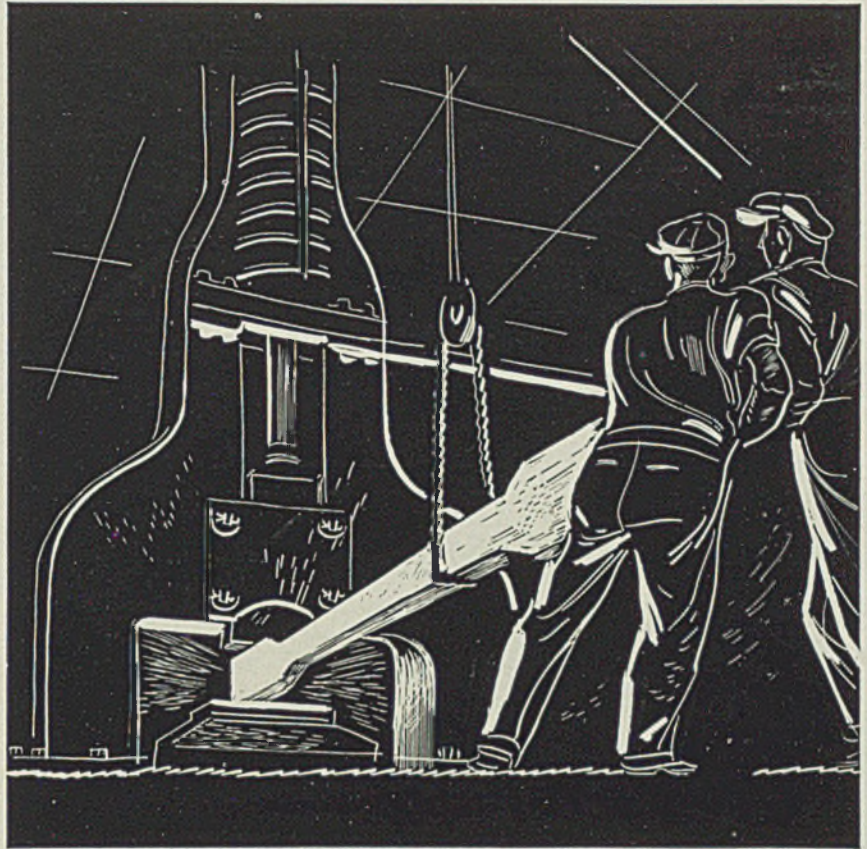
A domestic substitute made of old rope is now being used instead of Japanese paper (mulberry fiber) for insulating copper wire. Fig. 1 shows paper 0.00085-inch thick being wound around the wire as it passes through the spindles. Spun glass is also being used in place of asbestos to insulate copper wire. The operator in Fig. 2 is inspecting the glass strands before they are machine-woven around the wire.

Welding Oil Furnaces

(Continued from Page 86)

seams requiring air tightness.

The two main subassemblies consist of a combustion chamber and a secondary chamber, or chambers, for heat transfer. The material used is $\frac{1}{8}$ -inch copper bearing steel, pickled and oiled to prevent corrosion during processing and also to permit resistance welding without further cleaning. The combustion



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and modern manufacturing equipment. It is this complete design for production that so favorably affects the service life of forgings and castings by Standard and the operating costs of your equipment.

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DIVISION OF
THE BALDWIN LOCOMOTIVE WORKS
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chamber consists essentially of a rolled cylinder with one arc welded longitudinal seam and two heads which are slightly larger in diameter than the cylinder, thereby providing room for readily accessible, external fillet welds.

The individual secondary chambers are fabricated from two preformed sheets to which studs for properly locating an internal baffle plate have been added by resistance projection welding. The outer seams of the secondary chambers, in common with all the arc welding of these furnaces, including the flues joining the combustion chamber and

secondary chambers, are welded with $\frac{3}{8}$ -inch electrode at approximately 180 amperes, forming a $\frac{3}{8}$ -inch fillet weld.

The heating capacity of the warm air furnaces is dependent on the number of secondary chambers and the radiating surface of the combustion chamber. In the larger capacities, preformed fins are resistance seam welded to the outer surface of the combustion chamber, as shown in Fig. 4. These fins are welded at the rate of 30 inches per minute on a 400-kilovolt-ampere seam welder having a throat depth of 30 inches. The length of the weld-

ing cycle is accurately controlled by a GE thyatron unit.

Alternating-current arc welding equipment is used throughout for all boiler and furnace work. The almost complete elimination of the troublesome magnetic disturbances sometimes encountered with direct-current welding results in higher quality welding, particularly at the numerous corner intersections. Because of its higher electrical efficiency, the power cost with alternating-current equipment also is approximately half that of a single-operator direct-current motor-generator set.

SAVE PRODUCTION TIME *with a* **SHOPLIFTER**

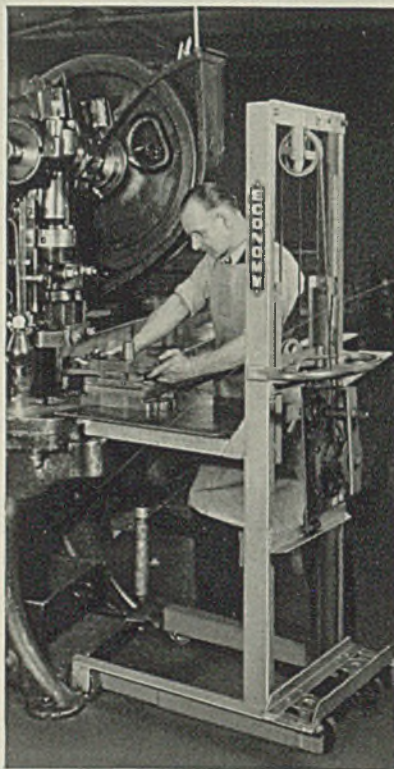
One man can handle heavy dies alone. Not necessary to stop other machines to get help.

MORE production per day from your machines if a Shoplifter is handy to do the heavy job of moving dies from storage racks to the press. In these times when maximum production of machines is of vital importance, much time and labor can be saved if the operator can handle the heavy work of changing dies without calling for help from other operators.

The Shoplifter is built for this job. Dependable and safe with a rated capacity of 500 lbs. (heavier machines up to 5000 lbs. can be furnished). Entire machine built of structural steel. Electrically welded throughout. Platform lifts 57" above floor and lowers to within 8 $\frac{1}{4}$ " of floor. Overall height 72". Size of platform 24"x24" steel plate. Crank, up and down, hoist unit.

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\$147⁵⁰
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IMMEDIATE DELIVERY

on priority of A-10 or better.

Plastic Coating Now Arrests Corrosion

Due to a recent improvement in formula, the builders' plastic coating, Wet-X-Hale, now can be applied directly to rusty steel surfaces without a primer, killing any further corrosive action, according to its manufacturer, Rogear Co., 11 Water street, New York. Application of the product can be made without even cleaning off the rust.

When it hardens, the coating is said to make a seal which prevents the penetration of air or moisture—the elements that promote rust. Nonpeeling, nonchalking, noncracking and fire resistant, the product becomes harder with age, retaining its flexibility, according to the company.

Rotary Press Feed

(Concluded from Page 93)

The output of this press depends upon the number of small pieces that are formed at one time. The type of work shown in Fig. 2 is made from a blank 30 inches long by 10 $\frac{1}{4}$ inches wide, and usually one piece is formed at a time. On this particular work the largest size piece that can be handled is determined by the size of the 30 x 40-inch rubber pressure pad fitted on the bottom surface of the press ram and acting as a universal female die. This rubber pad and the high tonnage exerted combine to give high quality of work at a high rate of production.

The working face of the bottom platen is 64 inches from right to left by 36 inches from front to back. The area of the die space is 45 inches from right to left and 42 inches from front to back. Daylight opening with ram up is 36 inches. Stroke is 24 inches. A stripping pressure of 30 tons can be exerted.

When table is set to index 180 degrees, one operator handles loading and unloading at one station while pressing is done at the other.

Silver Plating

(Continued from Page 94)

rent density should be from 2 to 15 amperes per square foot, depending upon the type work being plated and whether or not agitation is used. The silver cyanide is used to furnish the metallic ions while the cyanide produces a soluble silver salt and at the same time a fine grained deposit. It also reduces the number of silver ions in solution, which prevents the material from being plated out by immersion, which in turn produces deposits adhering poorly.

Some engineers use sodium salts instead of potassium salts and claim that there is little difference in the deposits produced. The former are the cheaper. But from the writer's experience the potassium salts are preferred because of better conducting properties of the bath, higher solubility of the salts, better buffing qualities of the plate produced, and higher current densities permissible.

To obtain some of the better qualities of the potassium and yet produce a cheaper bath, Wood (2) has proposed a bath containing the following: Silver nitrate (AgNO_3), 4 ounces per gallon (avoirdupois);

tain. It can be purchased on the open market, however.

The second type bath contains no cyanide. It is composed of iodides as shown below: Silver nitrate (AgNO_3), 3 ounces per gallon; sodium iodide (NaI), 70 ounces per gallon; citric acid ($\text{C}_6\text{H}_8\text{O}_7$), 8 ounces per gallon. This bath is operated at 70 to 80 degrees Fahr., 3 to 10 amperes per square foot. The anodes are 999 fine rolled annealed silver.

Agitation can be used, and sulphuric acid can be substituted for citric acid. It will be recalled that silver iodide is insoluble in aqueous solutions. However, this material

is soluble if an excess of sodium or potassium iodide is present, which explains the large amount of iodide. One should keep in mind that when the plated work is removed, it should be rinsed in a concentrated iodide bath; otherwise a precipitate of silver iodide will result. This bath is very expensive but does produce a characteristic deposit which has found special application on watch dials and the like.

Since silver is low in the electromotive series, it has a tendency to deposit out of solution whenever a metal higher up in the series is immersed in a bath containing silver

TABLE I—Electromotive Series

Lithium	Indium
Rubidium	Thallium
Potassium	Cobalt
Strontium	Nickel
Barium	Tin
Calcium	Lead
Sodium	Iron
Magnesium	Hydrogen
Aluminum	Antimony
Beryllium	Bismuth
Uranium	Arsenic
Manganese	Copper (cupric)
Zinc	Copper (cuprous)
Tellurium	Polonium
Chromium	Silver
Sulphur	Mercury
Gallium	Paladium
Iron	Platinum
Cadmium	Gold (auric)
	Gold (aurous)

sodium cyanide (NaCN), 4 ounces per gallon; potassium nitrate (KNO_3), 16 ounces per gallon. The cost of these materials at the time these comments were prepared was about half the cost of the first formula given. Operating conditions are the same as for the first bath. The solution has many advantages and has proved to be commercially successful.

The priority situation should be mentioned. Silver is not on the priority list. Sodium cyanide can be obtained in appreciable quantity. Sodium nitrate was placed under a complete allocation system on Feb. 1, 1942, and allocations are carried out under the general preference order M62. Potassium nitrate is not on priorities but is hard to ob-

ANOTHER WAY PRODUCTION IS PROTECTED

When fire swept out of control in the building at left, flames leaped from its windows. But the building at right was saved by Kinnear Rolling Fire Shutters — even though the heat was so intense it blistered the window sash clear through the steel curtains!

Kinnear "Akbar" Rolling Fire Doors and Shutters block fires that start inside buildings, too! When fire breaks out, they close automatically. They cut off flame-spreading drafts, confine fire to smaller areas, and help keep it under control. These rugged, all-steel doors coil out of the way above the opening when not in use (often out of sight in new construction). Exclusive safety features make them positive in action, and guard against injury to persons who may be passing underneath. They're approved and labeled by the Underwriters' Laboratories. And doors can be equipped for efficient, daily service use, with motor or manual control! Built any size, for any opening. Write today for details. The Kinnear Manufacturing Company, 1780-1800 Fields Ave., Columbus, Ohio.

**SAVING WAYS
IN DOORWAYS**

KINNEAR
ROLLING DOORS

ions. Iron immersed in a silver bath has silver plated out on the iron surface by this action. But the deposit produced is a poorly adhering coat. As more silver is deposited the entire plate lifts or peels, so such a reaction must be prevented. One good way to do this is to decrease the silver ions in solution. This is done by decreasing the silver present and increasing the free cyanide. Such a bath is used only until the surface of the base metal is covered, the work then being transferred to the ordinary bath.

Such a preplating solution is called a strike and is very inefficient as a depositor of metal. In some

cases two strikes are used. The formulas are given: Silver as cyanide (AgCN), 0.12 ounces per gallon (avoirdupois), with potassium cyanide (KCN), 9 ounces per gallon; or silver as cyanide (AgCN), 0.4 ounces per gallon (avoirdupois), with potassium cyanide (KCN), 9 ounces per gallon. Carbon anodes are employed, a small area of silver being used to replenish that deposited. Temperature of the bath should be 70 to 80 degrees Cent. Current density is 15 to 25 amperes per square foot, using a 6-volt drop across the bath.

It is possible to deposit a thin film of mercury on the base metal in-

stead of using a strike. Such a solution contains: Mercuric chloride (HgCl₂), 1 ounce per gallon, with ammonium chloride (NH₄Cl), 5 ounces per gallon. Work, especially brass, dipped in this bath is covered with a layer of mercury which is lower in the electromotive series than the base metal.

There is some criticism to using mercury because of the possibility of poor adhesion. The author has in his files correspondence from Norman Plank of the General Electric Co., Pittsfield, Mass., which shows that mercury used as a flash prior to silver plating had not penetrated far enough into the structure to have any noticeable effect. An amalgamation of the mercury at the silver and brass interface took place but it was so slight as to be harmless. This was due to the affinity of silver for mercury and the small amount of mercury present.

A general paper on silver plating has been given by F. C. Mesle (3).

The question of adhesion will come up time and again in silver plating. The use of strikes is to prevent poor adhesion. A splendid article on this subject has been written by F. C. Mesle (4). On page 157 of this reference he points out that the best method on cold rolled steel consisted of using a copper strike on the steel and then following with a silver strike on the copper. Fair to good adhesion was obtained if a silver strike was used without any copper flash. Highly polished steel surfaces appeared to provide better adherence for deposits than did rough finished steel. Peeling of the deposit appeared arrested in poorly adherent silver strike deposits by heating to 350 degrees Fahr. for 10 minutes.

(Concluded in May 4 Issue)

References

- (1) "Defense Highlights", *Metal Finishing*, 40, No. 2, February, 1942, p. 68.
- (2) "Something New in Silver Plating", by Donald Wood, *Monthly Review*, American Electroplaters' Society, March, 1938, pp. 171-179.
- (3) "A Resume of Silver Plating", *Monthly Review*, American Electrical Society, October, 1937, pp. 739-759.
- (4) "The Adhesion of Electro-Deposits", *Proceedings of the American Electrical Society*, June, 1939, pp. 152-170.

Develops Two New Hard-Facing Alloys

To serve companies unable to furnish high priority ratings for chromium alloys, Stoody Co., Whittier, Calif., is marketing under the trade names of Stoodite K and Self-Hardening K, two newly developed hard-facing alloys. These are said to contain no chromium and can be purchased under the regular A-10 P-100 rating.

Extensive field tests, according to the manufacturer, proved the rods comparable to regular alloys in application and wear resistance.

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TUBULAR PARTS AND
WELDED ASSEMBLIES.

★ FORGED AND UP-
SET PARTS FROM 2",
3", 4", 5" upsetters.



High-Iron Charges

(Continued from Page 90)

denly blow, and chill, and then require a "pick-up" to get them out.

The reaction between pig iron and cold ore is endothermic, sufficiently so to sometimes freeze up the bath, regardless of the silicon in the iron. If the ore is heated, the reaction is exothermic, thus helping to melt the scrap and speed the time of heats.

In Australia the ore is a red hematite, containing about 50 per cent lumps over 1 inch and 3 per cent moisture. The fines, if charged, are sufficient to cause frequent blows. In wet weather it is unusable for a satisfactory or safe operation. The open-hearth ore, therefore, is screened over a grizzly to remove the fines under 1 inch.

Hard Sinter the Answer

The logical solution to the problem in the United States, where the ores are both fine and wet, is obviously to make a hard sinter for open-hearth charging. Nodules also should be satisfactory where available. The porosity of sinter, however, would allow it to heat more readily and so shorten the necessary interval between charging the cold material and adding the hot metal.

The necessity is for a pile of ore which can be heated through rapidly. Whether this is lump ore, sinter, nodules, or some other form, does not make any difference as long as this condition is met. That form of ore which can be heated most rapidly is the most satisfactory.

The average run-off slags in Australia analyze:

SiO ₂ — 23.3	Al ₂ O ₃ — 3.9	MgO — 3.3
FeO — 25.2	MnO — 20.8	P ₂ O ₅ — 0.8
Fe ₂ O ₃ — 7.8	CaO — 15.7	

About eight years ago, in England, steelmakers were confronted with the problem of charging 70 per cent hot metal containing 1.70 per cent phosphorus. The stationary furnaces were 65 and 125 gross tons capacity. The established practice was to try to keep the silicon in the iron about 0.40 per cent and then, in an "active" mixer, reduce it to 0.20 per cent. No run-off slags were used in the open hearth and a slag volume of about 35 per cent was necessary for removing the phosphorus.

An "active" mixer is a large tilting open-hearth furnace with insufficient checkers. Ore and lime are added to reduce the silicon and phosphorus. Little, if any, phosphorus is removed, and the silicon can be reduced to 0.20 per cent if time is allowed between the charging of hot metal and taking metal out for the furnaces. As this interval is not controllable, the effect-

iveness of the mixer is variable.

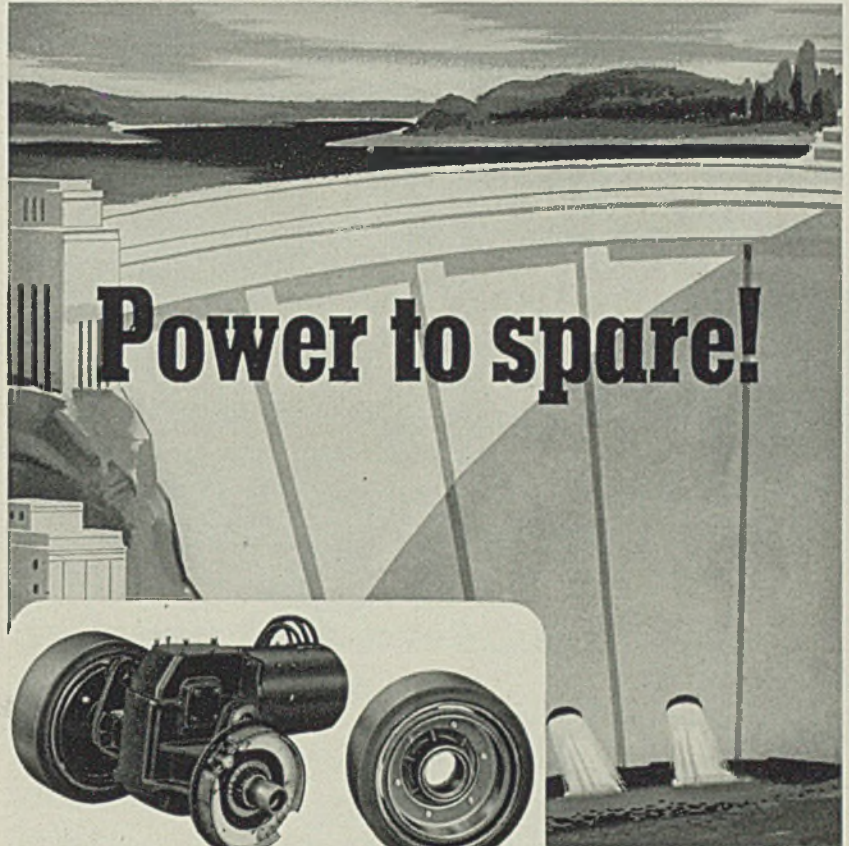
A typical slag from an active mixer shows how little phosphorus is removed:

SiO ₂ — 36.21	CaO — 32.08
FeO — 5.12	MgO — 18.12
Fe ₂ O ₃ — 0.28	P ₂ O ₅ — 0.18
MnO — 5.12	Al ₂ O ₃ — 0.88
S — 0.10	TiO ₂ — 1.65

To try to operate the blast furnaces on 0.40 per cent silicon iron causes frequent disturbances of the furnaces and a considerable number of cold casts. In these cases no additions can be made to the mixer until the iron temperature is raised. This is a slow proceeding with dead metal.

A "run-off" slag procedure was started along the lines developed in Australia. Good lump ore was not regularly available. Swedish ore was tried. This ore, while dry, contained about 75 per cent fines and was unsatisfactory as it could not be heated, and caused "blows". The best ore was from occasional cargoes from Brazil. While Brazilian ore is excellent for open-hearth operations the supply cannot be depended upon.

Finally, sinter made from Swedish ore, mill scale, and some local ore was charged and this gave excellent results. The "run-off" slags



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contained 18 to 25 per cent P_2O_5 and removed over 90 per cent of the phosphorus and all of the silicon.

After having found a satisfactory substitute for natural ores, the active mixer was no longer operated as an "active" mixer and the silicon in the iron was allowed to go to 0.90 to 1.10 per cent and at times went as high as 1.70 per cent silicon. At about 1.00 per cent silicon the blast furnaces produced their maximum tonnage.

As a matter of interest only, it is customary to sell these high P_2O_5 slags for fertilizer. Unless the CaO content of the slags is at least 1.57

times the P_2O_5 , the phosphate in the slag is insoluble in citric acid and therefore is unsalable.

In these run-off slags, the ratio of CaO to P_2O_5 is normally less than this. In order to try to remedy it, sinter made from Lincolnshire ore which contains about 25 per cent lime, was tried. By sandwiching this sinter in the scrap charge, a salable slag was produced. However, it slowed up the heats, made the run-off slags less complete by thickening them and therefore removed less of the phosphorus, and did not become a regular proceeding.

Typical run-off slag analyses are presented in Table I. Iron analyses are as follows:

	Si	P	Mn
H-591	0.84	1.73	1.45
H-469	0.92	1.61	1.54
G-345	1.07	1.65	1.42
G-275	1.14	1.80	1.37

The best silicon to have in the iron is that which permits the blast furnaces to turn out the greatest tonnage. The open hearth can handle equally well any reasonable silicon provided it is known before the ore is charged. As a higher silicon in the iron requires more ore in the charge, more metallic silicon can be secured from the same weight of iron and scrap with the higher silicons.

The method of arriving at a basis for calculating the amount of ore to charge is a little involved, but after a number of factors have been determined, a simple table will do very well for the daily operations.

Example: Determine the percentage of hot metal of 1.00 per cent silicon necessary to melt down the various grades of scrap without any ore charge. Suppose this turned out to be:

Heavy melting scrap	60—Hot-metal	40
Light clean scrap	50—Hot-metal	50
Light rusty scrap	40—Hot-metal	60

Assume the scrap charge is 10 tons of each grade for a 100-ton heat, using 70 tons of hot metal of 1.00 per cent silicon.

10 tons heavy melting	require 6.7 hot-metal
10 tons medium	require 10.0 hot-metal
10 tons light rusty	require 15.0 hot-metal
30 tons scrap	require 31.7 hot-metal

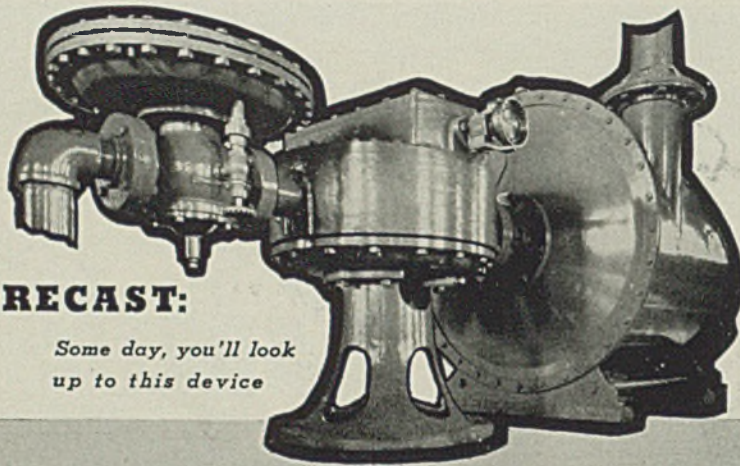
The 70 tons of hot metal gives an excess of hot-metal of 38.3 tons. It has been determined that it takes 0.30-ton of ore for an excess ton of 1.00 per cent silicon iron, so the ore requirement is 11.5 tons.

Another factor to determine is the melting down value of irons of different silicon contents. The equivalent melting value of different silicon irons compared to 1.00 per cent silicon is:

Silicon	Required for 1%	Silicon	Required for 1%
.40	1.30	.90	1.05
.50	1.25	1.00	1.00
.60	1.20	1.10	.95
.70	1.15	1.20	.90
.80	1.10	1.30	.85

Going back to the assumed charge with the silicon in the iron 0.80, the iron required to melt the 30 tons of scrap would be 31.7×1.10 or 34.9. The excess iron of 0.80 silicon would be 35.1. To reduce this excess to the equivalent of 1 per cent silicon, divide by 1.10 = 31.9. The ore required is 0.30×31.9 or 9.6 tons.

Assume the silicon in the iron is



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KEMP of BALTIMORE

1.30 per cent. The 31.7 tons of hot metal necessary for the 30 tons of scrap using a factor of .85 would be 26.9. The excess of 1.30 per cent silicon iron would be 43.1 tons. The equivalent in terms of 1.00 per cent silicon would be 50.7, and the ore required 15.2 tons.

The summary for the silicon variation is:

0.80 Si—9.6 tons ore
1.00 Si—11.5 tons ore
1.30 Si—15.2 tons ore

Allowances must be made, and ore reduced arbitrarily for slow furnaces, and after "gas-off" delays, high-carbon melts, etc.

Limestone percentage must be as low as possible. The reaction between the heated ore and the hot metal puts all of the silicon and phosphorus into the slag in a short time. This will flow from the furnace in the run-off slag. Regardless of the percentage of silicon in the hot metal, the resulting silica is removed from the furnace. After the run-off slag there is left only that part of the silica which is in the slag remaining in the furnace. This is nearly a constant. The amount of limestone to charge is only the amount necessary to take care of this remaining silica. As stated before, the Australian practice has averaged for years 5.5 per cent. It was for several months as low as 4 per cent, but there seemed to be an increase in bank trouble so that it was finally settled at the 5.5 per cent. This permits some variation in the time of adding hot metal.

If more limestone is used than necessary, the finishing slag is thick and slows the heat until the slag can be adjusted.

Burnt lime instead of limestone in the charge will, in part, combine with the run-off slag. This thickens the run-off and makes the flush less complete, and therefore more silica is left in the furnace than otherwise. As part of the lime has been used in the run-off slag, there is not sufficient left for the remaining silica, and banks are cut.

The limestone to charge is determined largely by the silica in the charge ore and not by the silicon or phosphorus or percentage of hot metal.

The analysis of the run-off slag varies considerably between heats, but there is a much greater variation in analysis between the beginning and the end of the run-off from any one heat.

Australian slags would not be comparable here because the hot metal averages 2.25 per cent manganese, and the charge ore contains 5 to 7 per cent manganese.

Finishing slags are consistent in analysis. We have worked out a method of making high phosphorus

sheet bar and skelp using phosphate rock instead of ferrophosphorus. There is no ferrophosphorus manufactured there, and the war stopped its importation. Phosphate rock is charged, then 2 per cent of limestone, then the ore and scrap as usual. The reduction of phosphorus to the bath depends upon slag control, but in less than 10 per cent of the heats is any adjustment of the slag necessary to meet the specifications for phosphorus. Heats made in this manner constitute about 15 per cent of the total product.

Residual manganese also is regu-

lated by slag control and half of the heats require no manganese addition.

To sum up, the essentials are:

1. Lump ore, or its equivalent, for charging.
2. The sequence of charging and the time factor.
3. Low limestone charge.
4. No burned lime charge.
5. Run-off slag completed before limestone enters reactions.

In plants of sufficiently large production the surplus iron could be duplexed, but the ingot production from the same tonnage of scrap and hot metal would be appreciably less. Table II shows as



Murex engineers are generally able to help manufacturers solve perplexing welding problems because of their wide and varied experience in many industries with the welding of many products under all kinds of actual working conditions.

Take, for instance, the case of the manufacturer of power boilers. In automatic welding, rejects were high and the chipping and rewelding excessive. The Murex representative made a few seemingly minor alterations in welding procedure, including changing the direction of the slot in the electrode coating to get better slag action.

The result? X-rays from then on showed defective portions to be less than 1%.

It is the obligation of the Metal & Thermit Corporation, through its engineering department, to help manufacturers engaged in war production speed up their welding—whether or not they are Murex users.

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an example how much metallic charge is gained from the iron in the ore, when high-iron charges are used, and also what weights of ingots is obtained for 1 ton of pig and scrap. The tonnage will be less when scrap lighter than heavy melting is used.

While at this time production cost is secondary to output, it is a consideration that iron from the ore is the cheapest source of open-hearth charging material.

The accompanying graph shows the amount of ore to be charged for varying percentages of hot-metal in the charge, the silicon content of

the hot metal, and for different grades of scrap.

These are the actual operating figures for the Newcastle, Australia, open-hearth furnaces. They do not necessarily apply to any other plant. Furnace design, fuel, depth of bath, and especially the nature of the ore and hot metal alter the quantities. They could, however, be used as a guide where the procedure is substantially the same.

Canadian Trade Directory

Canadian Trade Index, 1942; cloth, 842 pages, 6½ x 10 inches; published by Canadian Manufac-

turers Association, Toronto, Ont., for \$6.

This is an authoritative source of reference on what is made in Canada and who makes it. Under war conditions this information is of more value than ever, as much material formerly imported has been cut off and sources in Canada are sought. As a matter of policy, arsenals and government-owned plants are not listed.

Names, addresses and specifications have been thoroughly revised. Hon. James A. MacKinnon, minister of trade and commerce, has supplied a foreword to the export section.

The usual five sections have been included, the first being a special export section; Part II is an alphabetical list of manufacturers, with addresses, branches, export representatives, trade marks, brands, etc.; Part III is a directory of Canadian manufacturers classified according to products, with a guide to the classified index; Part IV is a directory of producers, shippers and exporters of agricultural products and allied lines; Part V is an alphabetical list in French of the headings in Part III, with parallel English.

Canadian manufacturers are listed without regard to membership in the association.

Motor "Selector" Aids Plant Electricians

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., is offering through its district offices and distributors a pocket size "slide rule" selector to guide electricians, plant maintenance men and others in the selection of the proper type motor for each of 44 industrial applications. It also features a convenient table that lists the various uses and indicates which of the four principle types of alternating-current motor should be selected.

Specifications, performance ratings and control classes for the required type is readily determined by making the corresponding setting on the slide. The reverse side of the "rule" shows which of the various magnetic and manual controls are available for each motor and lists the proper control number.

Don't Abuse Rubber

Mimeographed reprints of the text of an article on the subject "Don't Abuse Rubber—How To Prolong Its Life" are now available upon request from B. F. Goodrich Co., Akron, O. The article, which appeared in several trade journals, was written to aid industrial managers in their efforts to save rubber products in view of the present shortage.



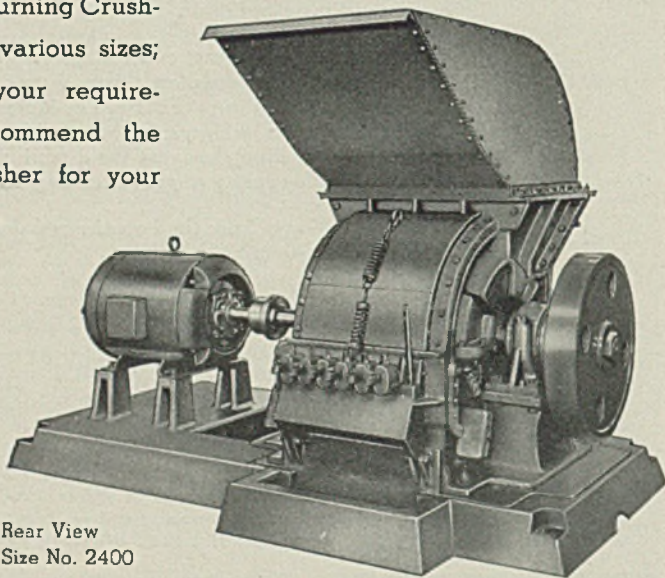
then it's time to investigate the

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American Ring Turning Crushers are built in various sizes; we will study your requirements, and recommend the proper size crusher for your particular needs.

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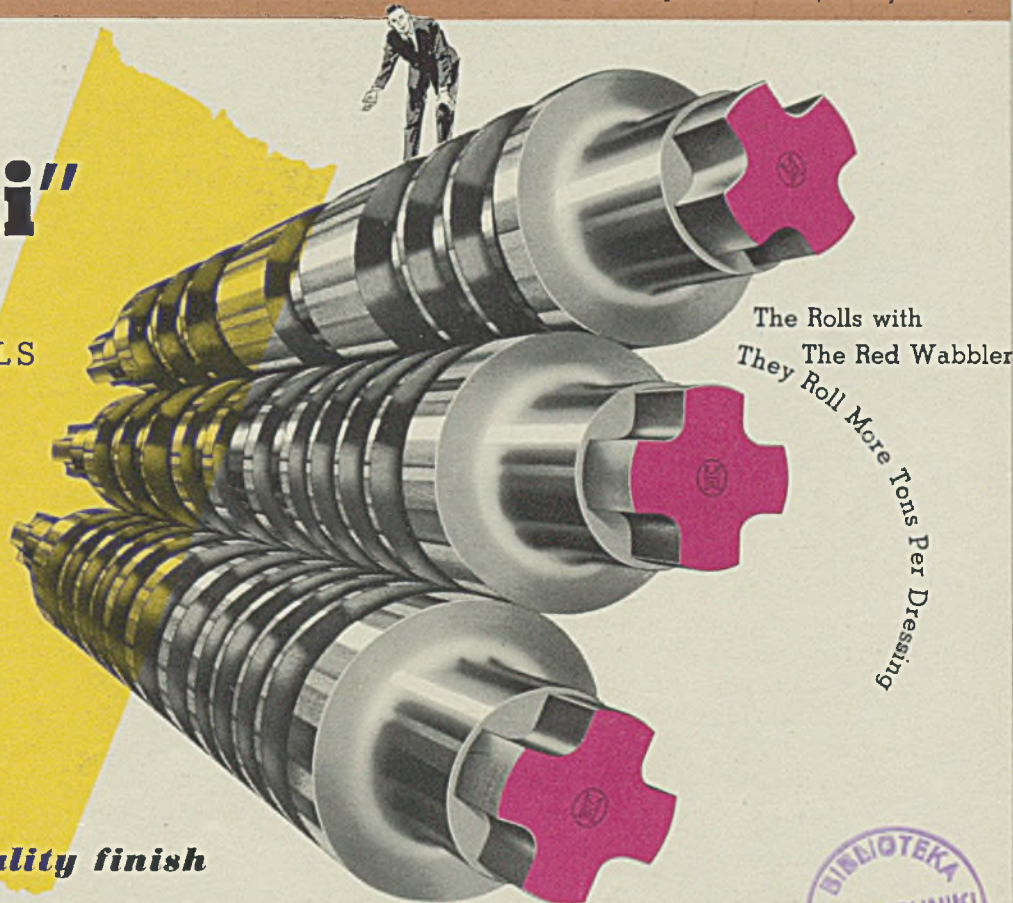
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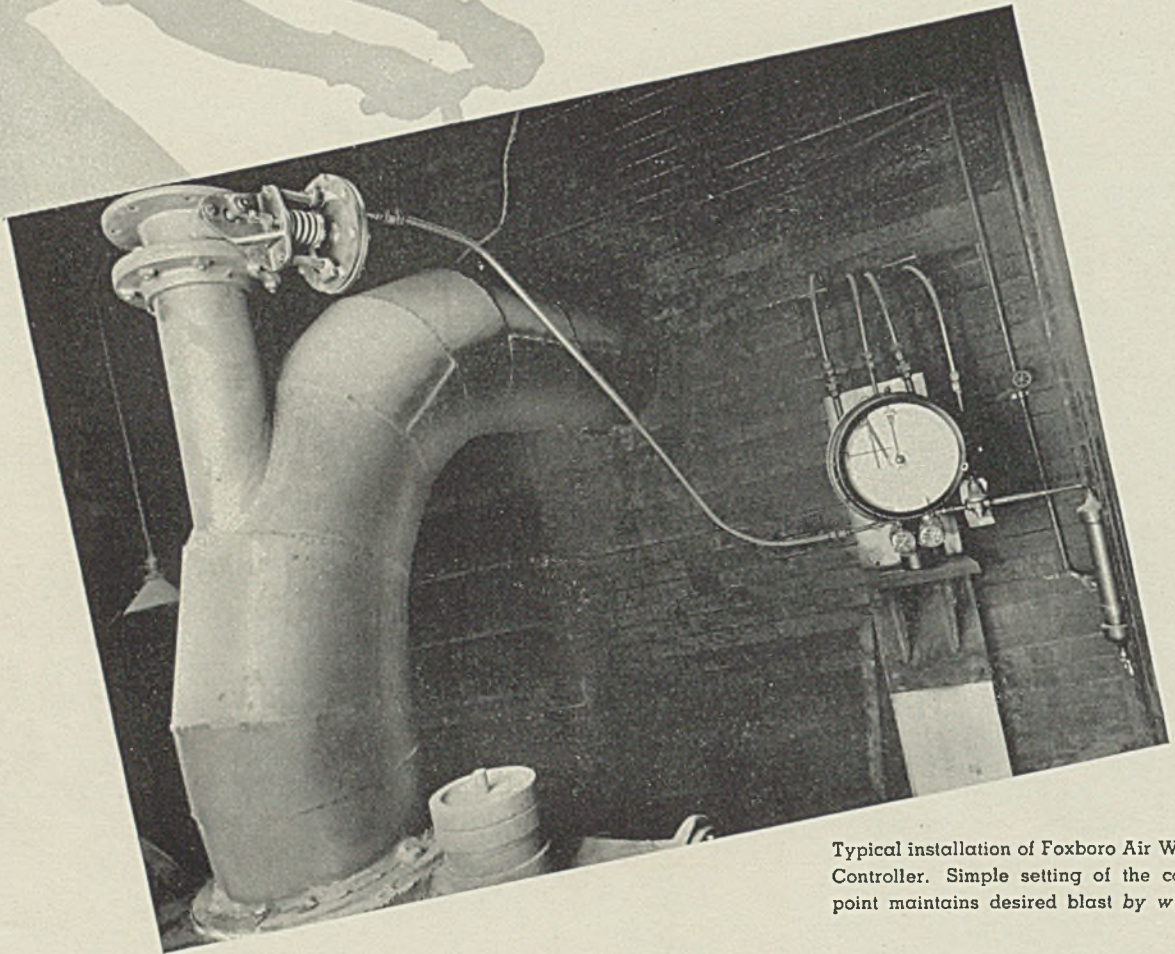
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Write for Bulletin B-268 on Foxboro Air Weight Controllers, or detailed information on other Foxboro Instruments for metal industries. The "Phantom Foundryman" is only one example of Foxboro's Creative Instrumentation that can boost output, cut costs and save maintenance in wartime plants. The Foxboro Company, 118 Neponset Ave., Foxboro, Massachusetts, U. S. A. Branch offices in principal cities of the United States and Canada.

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Fin-Tube Development Saving Much Metal

Development of fin-tubes in heat exchanger equipment saves an appreciable amount of metals originally required for tube construction, declared A. Y. Gunter, development director, Alco Products Division, American Locomotive Co., New York, in a paper delivered before the midyear meeting of the American Society of Mechanical Engineers, at the Rice hotel, Houston, Texas, recently.

Gunter estimated the saving effected by this type of equipment in many cases may be as much as 40 per cent.

Use of fin-tubes, where applicable, in place of bare tubes in heat exchangers makes a saving of from 65 to 75 per cent in the number of tubes required, he pointed out. Oil exchangers containing the fin-tube construction are being used importantly in Navy shore bases and on destroyers, cruisers and other warships, as well as in the oil industry throughout the country, according to Gunter.

Develops Blackening Process for Copper

A new process called Ebonol C for direct, low temperature, chemical blackening of copper and copper alloys is reported by Enthone Co., 442 Elm street, New Haven, Conn. It involves immersion of products in a solution of blackening salts operated near the boiling point.

Besides regular copper, the process is stated to be suitable for blackening beryllium copper, bronze, phosphor bronze and brasses with zinc contents of 35 per cent or less. The coating imparted is essentially cupric oxide, and being integral with the base metal, it cannot chip or flake. It also is suitable for parts that must withstand close dimensional tolerances, parts that will be handled to a large extent and for parts that must be deformed without the coating flaking.

Unusual feature of the finish produced is it can be heated to almost dull red without flaking. Finishes can be applied in about 2 to 10 minutes, according to the company.

Proposed Practice for Boilers To Save Metals

Elimination of 112 varieties of range boilers and 6 varieties of expansion tanks is proposed in a simplification program recently submitted to industry by the Division of Simplified Practice, National Bureau of Standards, Washington, at the request of the War Production Board.

The 24 varieties of range boilers

and 5 varieties of expansion tanks recommended for retention are considered adequate for consumer needs during the emergency, it is said.

Recommendation's purpose is to conserve material and release facilities needed for war production. Following any adjustment deemed necessary, the recommendation will be issued as an emergency revision of simplified practice R8-29, "Range Boilers and Expansion Tanks".

In view of the fact that WPB may decide to issue a limitation order covering this recommendation, manufacturers who have not already received a copy of the proposed ac-

tion are urged to write immediately for a copy.

Develops Substitute

Sublan, a lanolin substitute recently introduced by Glyco Products Co. Inc., 230 King street, Brooklyn, N. Y., because of its water insolubility, can be used for a number of industrial purposes. It can be utilized as a seal in lines carrying water and as a protective coating for metals and as a lubricant.

The product is a light colored paste with a melting point of 55 to 60 degrees Cent.

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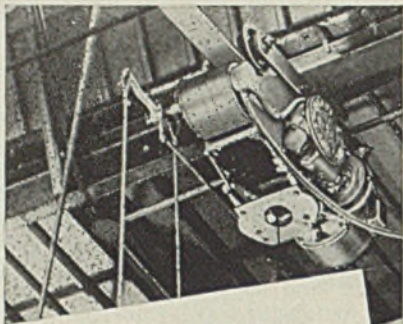
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APPLIED PSYCHOLOGY

... increases war output 20 times, using same operators, same equipment

OUTPUT of shell fuze cases in a British munitions factory increased 20-fold after the improvements suggested by industrial psychologists had been adopted. The work involved careful hand-soldering of seams. As the plant had lost most of its experienced solderers, the weekly output was only 1000 good cases, with several thousand rejects. But various changes were made, the most important of which was a systematic training scheme based on careful study of hand and body movements. The result was to raise the output to 20,000 cases a week, all passed by the inspectors.

This is only one of the cases in which trained psychologists from Britain's National Institute of Industrial Psychology have helped to speed up production in Britain's war factories. Although the results are sometimes startling, there is no particular magic about their job for it is based on a careful study of the physical movements entailed, on proper methods of instruction,

and above all on interesting the trainee in the work.

Hours of wasted time have been saved merely by getting the trainees into the habit of arranging their tools around them in an orderly way and replacing them in that position after each use. More subtle are devices whereby both hands can be used instead of one. For example, suppose a screw has to be placed on either end of an article. Instead of holding it in one hand and then transferring it to the other, it is held in a vise so both screws can be put on simultaneously. Then to save the trouble of picking up the completed piece, a foot pedal may come into operation and drop it into a box.

Training is made interesting by interspersing handwork with general instruction so that trainees understand how their work fits into the general scheme. In weaving, for example, they are told about the types of thread employed, the use of the cloth which is being woven,

Fourteen-Foot Hand Lift Truck



ALTHOUGH LOADED with seventeen men, the vehicle shown above is not a new scooter type truck for intraplant commuters. It is a special adaptation of the Load King hydraulic hand lift truck made by Yale & Towne Mfg. Co., Philadelphia, for handling long objects such as wall board and roofing. The truck is 168 inches long

and so on. In tank factories they not only see their particular part assembled into the completed job, but are shown the tank in action.

Coil winding operatives trained by these methods were found to reach a standard of proficiency in only 5 days which previously had taken 5 weeks. Moreover, this was not achieved at the expense of output, for a 65 per cent increase in the average output of good pieces was obtained, while the scrap rate fell from 5 to 2 per cent.

Apart from this, the psychologists have increased production by suggesting improvement in working conditions, amenities and by investigating and smoothing grievances.

Offers Engineers Time-Saving Device

Alco Products Division, American Locomotive Co., 30 Church street, New York, is offering a limited number of mean temperature difference calculators devised to aid engineers in the approximation of heat transfer surfaces when preparing estimates or specifications for heat exchanger equipment.

Available for 25 cents, the calculator includes scales for the calculation of the logarithmic M. T. D., as well as the M. T. D. correction factors for 1, 2, 3, 4 and 6 shell passes, and also C and D scales which permit multiplication and division operations.

Watt-hour Meter Controls Electroplating Current

A new use for the ordinary watt-hour meter is reported by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. It has been found to provide an accurate and refined control of current used in electroplating permanent magnets.

The meter in this application is connected to the alternating current side of a rectifier such as used to supply direct current for electroplating. The register for the meter includes a switch device adapted for closure after a predetermined amount of energy has passed through the meter. This switch operates a circuit breaker to open the energizing current circuit thereby interrupting the plating or charging circuit when desired plating thickness is attained. The meter also may be placed on a switchboard some distance away from the plating tank, according to the company.

Textbook on Gaging Is Announced by Sheffield

Recognizing the urgent need for technical literature dealing authoritatively with factors of vital im-

portance in the war production program, Sheffield Corp., Dayton, O., has brought out a basic textbook on gaging.

This 7 $\frac{3}{4}$ x 10 $\frac{5}{8}$ -inch volume has 64 pages with 82 illustrations and is durably bound in cloth with still covers. Entitled "Dimensional Control," it deals in a clear, to-the-point manner with various types of modern precision gages and their practical application in manufacture and inspection.

Review of chapter headings indicates clearly the scope of this book. They are: History of Stand-

ards and Gaging; Science of Measurement in Modern Industry; Fixed Size Gages; Tolerances; Go and No Go Gages; Thread Snap Gages; Assembly Practices and Non-Perishable Gages; Visual Gages; Electric Gages; Multiple Gages; Air Gages; Thread Lead Measurement; External Measurement; Internal Measurement; Future of Precision Manufacture; Fits and Tolerances.

"Dimensional Control" is being sold in the open market at \$1.50 per copy, or can be obtained at that price by writing direct to the company.



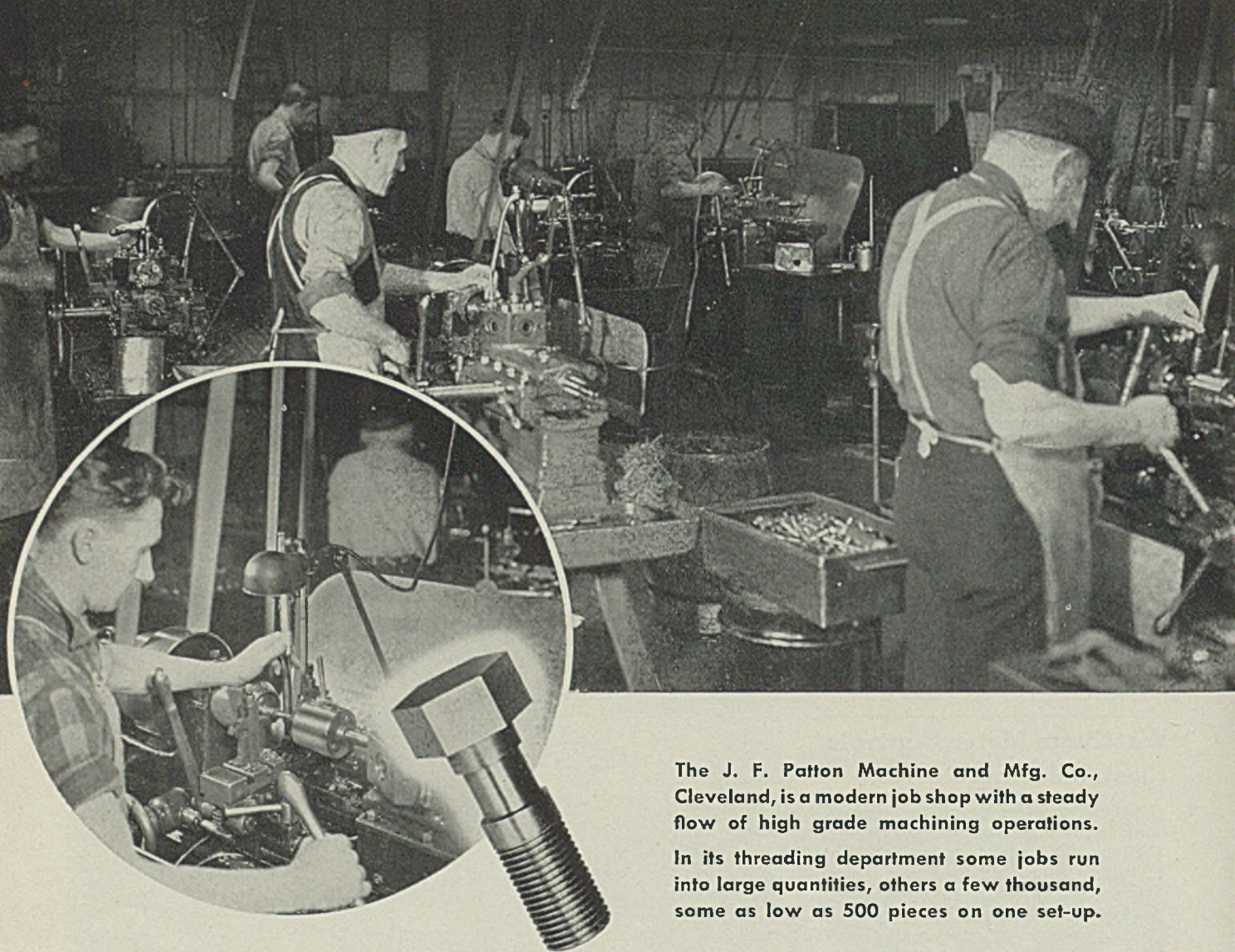
DEARBORN GAGE COMPANY

Originators of Chromium Plated Gage Blocks

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NAMCO CIRCULAR CHASER DIES

"PAY OUT ON SHORT RUNS TOO"



The J. F. Patton Machine and Mfg. Co., Cleveland, is a modern job shop with a steady flow of high grade machining operations.

In its threading department some jobs run into large quantities, others a few thousand, some as low as 500 pieces on one set-up.

Mr. J. F. Patton, President, says, "Namco Circular Chaser Dies pay out on the short runs too."

This Company, like many others, is equipped with a complete range of Namco die heads and carries extra sets of circular chasers in diameters and pitches needed for a wide variety of threading.

By the use of the micrometer gage, they check and regrind the extra chasers in the tool room. One adjustment of the head brings all chasers to exact cutting size.

So, on new set-ups for short runs as well as regrinds for production jobs, circular chasers are ready to go without fussing. Down time is saved and scrap avoided.

And don't forget—circular chasers give 20 times more life than old types—you can grind to 270° of their circumference.

Whether your threading jobs run to millions, thousands or hundreds of pieces of a kind, it will pay you to find out how much time and cost Namco Circular Chaser Dies will save and earn.

THE NATIONAL ACME CO.

170 EAST 131ST STREET • CLEVELAND, OHIO

ACME-GRIDLEY 4-6 AND 8 SPINDLE BAR AND CHUCKING AUTOMATICS • SINGLE SPINDLE AUTOMATICS • AUTOMATIC THREADING DIES AND TAPS • SCREW MACHINE PRODUCTS • THE CHRONOLOG • LIMIT SWITCHES • SOLENOIDS • POSITIVE CENTRIFUGE • CONTRACT MANUFACTURING

War and Lease-Lend

Steel Crowd Mills

Latter given preference over priorities.

Delivery promises now only on A ratings.

Scrap gain holds. Ice delays ore vessels

DELIVERY promise on steel below A-1 priority is virtually impossible to obtain under present circumstances and early delivery requires priority well up in this classification.

A large producer reports ratings necessary for reasonable delivery range about as follows: Plates, A-1-a; structurals, A-1-b; sheets, A-1-f; reinforcing bars, A-1-k; piling, A-1-b; carbon bars, A-1-a to A-1-k; all alloy steels, A-1-a; semifinished steel, A-1-j; railroad items, completely directive.

With this congestion in the upper brackets a large lease-lend tonnage has been distributed widely among producers of a large variety of products, with instructions to place it ahead of all previous priority ratings. This has resulted in disruption of rolling schedules and delay in rolling orders already scheduled. Some of the new tonnage is in highly finished products, thus carrying through many processes.

Concentration of steel consumption in war work, reflecting conversion of civilian facilities to essential production, is largely responsible for the large proportion of orders bearing high rating. Practically no requests now are received by mills for material on low priority, cessation of manufacture of a large number of durable consumer goods cutting them to a minimum.

Steelworks operations remained steady at 98½ per cent last week. Chicago advanced 1 point to 105 per cent of rated capacity, an all-time record, ½-point above the previous mark set in December and reached again the first week in April. Eastern Pennsylvania mills received better scrap supply and advanced 2 points to 94 per cent. New England producers completed open-hearth repair and all furnaces were in production, with a rate of 100 per cent. Pittsburgh declined 1 point to 95½ per cent, Detroit 2 points to 90 per cent, St. Louis 2½ points to 90½, Cincinnati 4½ points to 91½, Buffalo 3 points to 90½ and Cleveland 1 point to 89½. Youngstown held at 92 per cent, unchanged, with a rise to 94 per cent predicted for this week. Birmingham was unchanged at 95 per cent and Wheeling at 82½ per cent.

Difficulty in obtaining structural steel without long delay is causing numerous projects to be redesigned for reinforced concrete and timber construction. The latter offers best results as reinforcing bars also are

MARKET IN TABLOID ★

Demand

War needs absorb output.

Prices

Slight adjustments by OPA.

Production

Unchanged at 98½ per cent.

difficult to obtain without considerable delay and require a high priority rating. Some projects for which timber construction is not feasible are being abandoned or deferred until conditions are better.

Scrap supply is keeping up the improvement of the past few weeks but increased consumption is preventing accumulation in reserves. Not all areas are receiving sufficient material and some open hearths continue idle. Efforts to bring out dormant material are continued without slackening, adding much to the normal output. Some observers hold the hope that collections during the summer will be sufficient to build some stocks for next winter. Movement from the head of the lakes has started in a small way and promises to increase.

Iron ore movement is hampered by ice in Lake Superior at the entrance to the Soo locks, a large number of loaded vessels being held back many hours before they can be locked through. At one time last week 80 ships were waiting their turn. That so large a number had been loaded and had started their trips indicates the volume that will be moved when ice difficulties cease.

Pig iron producers have been given relief by OPA from the necessity of absorbing increased transportation costs involved in shipments under allocation to points outside their usual market areas. A new ruling permits producers in case of such shipments, due to emergency conditions, to charge the basing point price, plus differentials established in the schedules and freight charge from basing to delivery point, with deduction of \$1 per gross ton.

Requests for pig iron allocations under priorities below the A classifications have practically disappeared, consumers being increasingly engaged in production of war work.

Office of Price Administration has opened the door for applications for relief from the \$6 ceiling on beehive fuel. The producer must show that net realization is insufficient to support continued operation at the maximum price.

Composite prices continue unchanged under ceiling regulations, finished steel at \$56.73, semifinished steel at \$36.00, steelmaking pig iron \$23.05 and steelmaking scrap \$19.17.

COMPOSITE MARKET AVERAGES

	Apr. 18	Apr. 11	Apr. 4	One Month Ago Mar., 1942	Three Months Ago Jan., 1942	One Year Ago Apr., 1941	Five Years Ago Apr., 1937
Finished Steel	\$56.73	\$56.73	\$56.73	\$56.73	\$56.73	\$56.73	\$61.95
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	40.00
Steelmaking Pig Iron.	23.05	23.05	23.05	23.05	23.05	23.05	22.84
Steelmaking Scrap....	19.17	19.17	19.17	19.17	19.17	19.17	21.27

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	April 18,	Mar.	Jan.	Apr.	Pig Iron	April 18,	Mar.	Jan.	Apr.
	1942	1942	1942	1941		1942	1942	1942	1941
Steel bars, Pittsburgh.....	2.15c	2.15c	2.15c	2.15c	Bessemer, del. Pittsburgh.....	\$25.34	\$25.34	\$25.34	\$25.34
Steel bars, Chicago.....	2.15	2.15	2.15	2.15	Basic, Valley.....	23.50	23.50	23.50	23.50
Steel bars, Philadelphia.....	2.47	2.48	2.47	2.47	Basic, eastern, del. Philadelphia.	25.34	25.365	25.34	25.34
Shapes, Pittsburgh.....	2.10	2.10	2.10	2.10	No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	24.69
Shapes, Philadelphia.....	2.215	2.217	2.215	2.215	No. 2 foundry, Chicago.....	24.00	24.22	24.22	24.22
Shapes, Chicago.....	2.10	2.10	2.10	2.10	Southern No. 2, Birmingham.....	20.38	20.38	20.38	20.38
Plates, Pittsburgh.....	2.10	2.10	2.10	2.10	Southern No. 2, del. Cincinnati...	24.06	24.06	24.06	24.06
Plates, Philadelphia.....	2.15	2.215	2.15	2.21	No. 2X, del. Phila. (differ. av.)...	26.215	26.24	26.215	26.215
Plates, Chicago.....	2.10	2.10	2.10	2.10	Malleable, Valley.....	24.00	24.00	24.00	24.00
Sheets, hot-rolled, Pittsburgh...	2.10	2.10	2.10	2.10	Malleable, Chicago.....	24.00	24.00	24.00	24.00
Sheets, cold-rolled, Pittsburgh...	3.05	3.05	3.05	3.05	Lake Sup., charcoal, del. Chicago	31.54	31.44	31.34	30.34
Sheets, No. 24 galv., Pittsburgh...	3.50	3.50	3.50	3.50	Gray forge, del. Pittsburgh.....	24.19	24.19	24.19	24.19
Sheets, hot-rolled, Gary.....	2.10	2.10	2.10	2.10	Ferromanganese, del. Pittsburgh	125.63	125.39	125.33	125.33
Sheets, cold-rolled, Gary.....	3.05	3.05	3.05	3.05					
Sheets, No. 24 galv., Gary.....	3.50	3.50	3.50	3.50					
Bright bess., basic wire, Pitts...	2.60	2.60	2.60	2.60					
Tin plate, per base box, Pitts...	\$5.00	\$5.00	\$5.00	\$5.00					
Wire nails, Pittsburgh.....	2.55	2.55	2.55	2.55					

Semifinished Material

Sheet bars, Pittsburgh, Chicago.	\$34.00	\$34.00	\$34.00	\$34.00
Slabs, Pittsburgh, Chicago.....	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh....	34.00	34.00	34.00	34.00
Wire rods No. 5 to 3/4-inch, Pitts.	2.00	2.00	2.00	2.00

Scrap

Heavy melting steel, Pitts.....	\$20.00	\$20.00	\$20.00	\$20.20
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.00
Heavy melting steel, Chicago...	18.75	18.75	18.75	18.80
Rails for rolling, Chicago.....	22.25	22.25	22.25	22.65
No. 1 cast, Chicago.....	20.00	20.00	20.00	22.31

Coke

Connellsville, furnace, ovens....	\$6.25	\$6.25	\$6.25	\$5.50
Connellsville, foundry, ovens....	7.25	7.25	7.25	6.00
Chicago, by-product fdry., del....	12.25	12.25	12.25	11.85

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. All seconds and off-grade products also are covered. Exceptions applying to individual companies are noted in the table.

Semifinished Steel

Gross ton basis except wire rods, skelp
Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, \$31.00

(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at \$33 gross ton, f.o.b. mill.)

Alloy Steel Ingots: Pittsburgh base, uncropped, \$45.00.

Rerolling Billets, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, \$34.00; Detroit, del. \$36.00; Duluth (bil.) \$36.00.

(Wheeling Steel Corp. allocated 21,000 tons 2" square, base grade rerolling billets under leasehold during first quarter 1942 at \$37, f.o.b. Portsmouth, O.; Andrews Steel Co. may quote carbon steel slabs \$41 gross ton at established basing points.)

Forging Quality Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, \$40.00; Detroit, del. \$42.00; Duluth, \$42.00.

(Andrews Steel Co. may quote carbon forging billets \$50 gross ton at established basing points.)

Open Hearth Shell Steel: Pittsburgh, Chicago, base 1000 tons one size and section: 3-12 in., \$52.00; 12-18 in., \$54.00; 18 in. and over, \$56.00.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, \$54.00.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, \$34.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel sheet bars at \$39 gross ton, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., \$1.90.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—9/32 in., inclusive, per 100 lbs., \$2.00.

Do., over 9/32—47/64-in., incl., \$2.15. Wor-

cester add \$0.10 Galveston, \$0.25. Pacific Coast \$0.50 on water shipment.

Bars

Hot-Rolled Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base, 2.25c; Detroit, del. 2.25c; New York del. 2.51c; Phila. del. 2.49c; Gulf Ports, dock 2.50c, all-rail 2.59c; Pac. ports, dock 2.50c; all rail 3.25c. (Phoenix Iron Co., Phoenixville, Pa., may quote 2.35c at established basing points.) Joslyn Mfg. Co. may quote 2.35c, Chicago base.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.

(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c Detroit 2.80c.

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000.....	0.35	5100 Spr. flats	0.15
2100.....	0.75	5100 80-110 Cr.	0.45
2300.....	1.70	6100 Bars	1.20
2500.....	2.55	6100 Spr. flats	0.85
3100.....	0.70	Carb., Van.	0.85
3200.....	1.35	9200 Spr. flats	0.15
3300.....	3.80	9200 Spr. rounds,	
3400.....	3.20	squares	0.40
4100 15-25 Mo.	0.53	T 1300, Mn, mean	
46.00 20-30 Mo.		1.51-2.00	0.10
1.50-2.00; Ni.	1.20	Do., carbon under	
		0.20 max.	0.35

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit 3.45c; Galveston, add \$0.25, Pacific Coast \$0.50.

Turned, Ground Shafting: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c; Detroit 2.70c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.25c; Gulf ports, dock 2.50c, all-rail 2.59c; Pacific ports, dock 2.80c, all-rail 3.25c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, base 2.15c; Detroit, del. 2.25c; Gulf ports, dock 2.50c, all-rail 2.59c; Pacific ports, dock 2.80c, all-rail 3.25c.

(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.)

Iron Bars: Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.20c; Phila. del. 2.28c; New York del., 2.35c Pacific ports 2.65c.

(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.15c; New York del. 3.41c; Phila. del. 3.39c; Pacific ports, 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.74c Phila. del. 3.68c; Pacific ports 4.05c.

(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; copper iron 3.90c. pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c.

Enameling Sheets: Pittsburgh, Chicago, Gary,

Cleveland, Youngstown, Middletown, 10 gage, base 2.75c; Granite City, base 2.85c; Pacific ports 3.40c.
 Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c; Granite City, base 3.45c; Pacific ports 4.00c.
Electrical Sheets, No. 24:

	Pittsburgh	Pacific	Granite
	Base	Ports	City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c

Transformer

72	6.15c	6.90c	
65	7.15c	7.90c	
58	7.65c	8.40c	
52	8.45c	9.20c	

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.20c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)
Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.90c; Worcester base 3.00c.
Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Worcester base 3.35c.
Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; 26-50 Carb., 2.80c; 51-75 Carb., 4.30c; 76-100 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, \$5.00; Granite City \$5.10.
Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.
Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c.
Manufacturing Ternes: Pittsburgh, Chicago, Gary, 100-base box \$4.30; Granite City \$4.40.
Roofing Ternes: Pittsburgh base per package 112 sheets, 20 x 28 in., coating I.C., 8-lb. \$12.00; 15-lb. \$14.00; 20-lb. \$15.00; 25-lb. \$16.00; 30-lb. \$17.25; 40-lb. \$19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.30-2.55c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.45c. (Central Iron & Steel Co. may quote carbon steel plates at 2.35c at established basing points; Granite City Steel Co. may quote ship plates 2.25c, f.o.b. mill.)
Floor Plates: Pittsburgh, Chicago, 3.35c; Gulf ports, 3.70c; Pacific ports, 4.00c.
Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c.
Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.28c Phila., del., 2.22c; Gulf ports, 2.45c; Pacific ports, 2.75c. (Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.30c at established basing points.)
Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add \$2 for Worcester):
 Bright basic, bessemer wire 2.60c
 Galvanized wire 2.60c
 Spring wire 3.20c
Wire Products to the Trade:
 Standard and cement-coated wire nails, polished and staples, 100-lb. keg \$2.55
 Annealed fence wire, 100 lb. 3.05
 Galvanized fence wire, 100 lb. 3.40
 Woven fence, 12 1/2 gage and lighter, per base column 67
 Do., 11 gage and heavier 70
 Barbed wire, 80-rod spool, col. 70
 Twisted barless wire, col. 70
 Single loop bale ties, col. 59
 Fence posts, carloads, col. 69
 Cut nails, Pittsburgh, carloads \$3.85

Pipe, Tubes

Welded Pipe: Base price in carloads to consumers about \$200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Steel		Iron	
In.	Blk. Galv.	In.	Blk. Galv.
1/2	56	33	24
3/4	59	40 1/2	30

1/2	63 1/2	51	1-1/4	34	16
3/4	66 1/2	55	1 1/2	38	18 1/2
1-3	68 1/2	57 1/2	2	37 1/2	18

Lap Weld

Steel		Iron			
In.	Blk. Galv.	In.	Blk. Galv.		
2	61	49 1/2	1 1/4	23	3 1/2
2 1/2-3	64	52 1/2	1 1/2	28 1/2	10
3 1/2-6	66	54 1/2	2	30 1/2	12
7-8	65	52 1/2	2 1/2, 3 1/2	31 1/2	14 1/2
9-10	64 1/2	52	4	33 1/2	18
11-12	63 1/2	51	4 1/2-8	32 1/2	17
			9-12	28 1/2	12

Boiler Tubes: Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O. D. Sizes	—Seamless—		—Lap Weld—	
	B.W.G.	Hot Rolled	Cold Drawn	Steel Charcoal Iron
1"	13	\$ 7.82	\$ 9.01	
1 1/4"	13	9.26	10.67	
1 1/2"	13	10.23	11.72	\$ 9.72
1 3/4"	13	11.64	13.42	11.06
2"	13	13.04	15.03	12.38
2 1/4"	13	14.54	16.76	13.79
2 1/2"	12	16.01	18.45	15.16
2 3/4"	12	17.54	20.21	16.58
3"	12	18.59	21.42	17.54
3 1/4"	11	24.63	28.37	23.15
4"	10	30.54	35.20	28.66
4 1/2"	10	37.35	43.04	35.22
5"	9	46.87	54.01	44.25
6"	7	71.96	82.93	68.14

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, \$40.00.
Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, \$40.00.
 *Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, \$28-\$30.
Supplies: Angle bars, 2.70c; tie plates, 2.15c; track spikes, 3.00c; track bolts, 4.75c; do. heat treated, 5.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

High Speed Tool Steels:

Tung.	Chr.	Van.	Moly.	Pitts. base per lb.
18.00	4	1		67.00c
18.00	4	2	1	77.00c
18.00	4	3	1	87.00c
1.5	4	1	8.5	54.00c
	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

CHROMIUM NICKEL STEEL

Type	Bars	Plates	Sheets	H. R.	C. R.
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
311	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00		
*316	40.00	44.00	48.00	40.00	48.00
*317	50.00	54.00	58.00	50.00	58.00
†321	29.00	34.00	41.00	29.25	38.00
†347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50

STRAIGHT CHROMIUM STEEL

403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
†420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
†430F	19.50	22.50	29.50	18.75	24.50
442	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00

STAINLESS CLAD STEEL (20%)

304	†\$18.00	19.00
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*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. ‡‡‡Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extras mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are

deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price. **Emergency basing point** is the basing point at or near the place of production or origin of shipment.

Dislocated tonnage: Producers shipping material outside their usual marketing areas because of the war emergency may charge the basing point price nearest place of production plus actual cost of transportation to destination.

Seconds or off-grade iron or steel products cannot be sold at delivered prices exceeding those applying to material of prime quality.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941. Domestic or export extras may be used in case of Lease-Lend tonnage.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine		
1/2 x 6 and smaller		65 1/2 off
Do., 5/8 and 3/4 x 6-in. and shorter		63 1/2 off
Do., 3/4 to 1 x 6-in. and shorter		61 off
1 1/4 and larger, all lengths		59 off
All diameters, over 6-in. long		59 off
Tire bolts		50 off

Stove Bolts
 In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	54 off
Plow bolts	65 off

Nuts		
Semifinished hex.	U.S.S.	S.A.E.
1/4-inch and less	62	84
3/8-1-inch	59	80
1 1/4-1 1/2-inch	57	58
1 1/2 and larger	56	

Hexagon Cap Screws		
Upset 1-in., smaller		60 off
Square Head Set Screws		
Upset, 1-in., smaller		62 off
Headless, 3/4-in., larger		58 off
No. 10, smaller		60 off

Piling

Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham
Structural 7-inch and under 65-5 off
Wrought washers, Pittsburgh, Chicago
 Philadelphia, to jobbers and large nut, bolt manufacturers i.c.l. \$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton		
Beehive Ovens		
Connellsville, furnace		\$6.00
Connellsville, foundry	7.00	7.50
Connellsville prem. fdry.	7.25	7.60
New River, foundry	8.00	8.25
Wise county, foundry		7.50
Wise county, furnace		6.50
By-Product Foundry		
Kearny, N. J., ovens		12.15
Chicago, outside delivered		11.50
Chicago, delivered		12.25
Terre Haute, delivered		12.00
Milwaukee, ovens		12.25
New England, delivered		13.75
St. Louis, delivered		12.25
Birmingham, ovens		8.50
Indianapolis, delivered		12.00
Cincinnati, delivered		11.75
Cleveland, delivered		12.30
Buffalo, delivered		12.50
Detroit, delivered		12.25
Philadelphia, delivered		12.38

Coke By-Products

Spot, gal., freight allowed east of Omaha		
Pure and 90% benzol		15.00c
Toluol, two degree		28.00c
Solvent naphtha		27.00c
Industrial xylol		27.00c
Per lb. f.o.b. works		
Phenol (car lots, returnable drums)		12.50c
Do. less than car lots		13.25c
Do. tank cars		11.50c
Eastern Plants, per lb.		
Naphthalene flakes, balls, bbls. to jobbers		8.00c
Per ton, bulk, f.o.b. port		
Sulphate of ammonia		\$29.00

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials. As of April 16, 1941

	Soft Bars	Hot-rolled Strip		Plates 1/4-in. & Over	Structural Shapes	Floor Plates	Sheets			Cold Rolled Strip	Cold Drawn Bars		
		Bands	Hoops				Hot Rolled	Cold Rolled	Galv. No. 24		Carbon	S.A.E. 2300	S.A.E. 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.68	5.11	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.95	4.45	3.55	3.55	5.25	3.55	4.05	4.65	3.31	4.06	8.56	7.16
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	...	5.05	...	4.04	...	...
Norfolk, Va.	4.00	4.10	...	4.05	4.05	5.45	3.85	...	5.40	...	4.15	...	...
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.25	4.30	4.75	3.52	3.75	8.40	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	...	4.65	...	3.65	8.40	6.75
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.62	3.20	3.75	8.40	6.75
Detroit	3.42	3.43	3.68	3.60	3.65	5.27	3.43	4.30	4.84	3.40	3.80	8.70	7.05
Omaha	4.10	4.20	4.20	4.15	4.15	5.75	3.85	5.32	5.50	...	4.42	...	...
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.37	4.92	3.45	4.00	8.75	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.25	4.10	4.85	3.50	3.75	8.40	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.50	4.35	5.00	3.83	4.34	9.09	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.38	4.23	4.98	3.54	3.88	8.38	6.98
St. Louis	3.64	3.74	3.74	3.69	3.69	5.29	3.39	4.24	4.99	3.61	4.02	8.77	7.12
Indianapolis	3.60	3.75	3.75	3.70	3.70	5.30	3.45	...	5.01	...	3.97	...	...
Chattanooga*	3.80	4.00	4.00	3.85	3.85	5.80	3.75	...	4.50	...	4.39	...	...
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	...	5.25	...	4.31	...	...
Birmingham	3.50	3.70	3.70	3.55	3.55	5.93	3.45	...	4.75	...	4.43	...	...
New Orleans	4.00	4.10	4.10	3.80	3.80	5.78	3.85	...	5.25	5.00	4.60	...	...
Houston, Tex.	3.75	4.30	4.30	4.05	4.05	5.50	4.00	...	5.25	...	6.90	...	...
Seattle	4.20	4.25	5.45	4.75	4.45	6.50	4.65	7.00	5.70	...	5.75	...	...
Los Angeles	4.50	4.95	6.80	4.50	4.50	6.75	4.65	6.50	5.85	...	6.10	10.55	9.55
San Francisco	3.95	4.50	6.25	4.65	4.35	6.35	4.55	6.40	6.10	...	6.80	10.80	9.80

*Not named in OPA price order.

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland; 300-9999 Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in B'ham., Memphis.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Omaha, Kansas City, St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 750-4999 in San Francisco; 300-4999 in Portland, Seattle; any quantity in Twin Cities, New Orleans; 300-1999 Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-10,000 in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 3500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; 25 to 49 bundles in Philadelphia; 750-4999 in San Francisco.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 500-999, Los Angeles, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

S.A.E. Hot-rolled Bars (Unannealed)

	S.A.E. Hot-rolled Bars (Unannealed)				
	1035-1050 Series	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	...
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	...	...	...	...
Norfolk, Va.	...	...	...	...	...
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	6.02	5.77	7.87
Seattle	6.25	...	8.00	7.85	8.65
Los Angeles	4.80	9.55	8.55	8.40	8.80
San Francisco	5.45	9.80	8.80	8.65	9.05

EUROPEAN IRON, STEEL PRICES

Dollars at \$4.02 1/2 per Pound Sterling

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	BRITISH	
	Gross Tons f.o.b. U.K. Ports	£ s d
Merchant bars, 3-inch and over	\$66.50	16 10 0
Merchant bars, small, under 3-inch, re-rolled	3.60c	20 0 0
Structural shapes	2.95c	15 10 0
Ship plates	2.90c	16 2 6
Boiler plates	3.17c	17 12 6
Sheets, black, 24 gage	4.00c	22 5 0
Sheets, galvanized, corrugated, 24 gage	4.61c	25 12 6
Tin plate, base box, 20 x 14, 108 pounds	\$ 6.20	1 10 9

British ferromanganese \$120.00 delivered Atlantic seaboard duty-paid.

Domestic Prices Delivered at Works or Furnace—

	£ s d	
	£ s d	Rebate
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	\$25.79	6 8 0(a)
Basic pig iron	24.28	6 0 6(a)
Furnace coke, f.o.t. ovens	7.56	1 17 6
Billets, basic soft, 100-ton lots and over	49.37	12 5 0
Standard rails, 60 lbs. per yard, 500-ton lots & over	2.61c	14 10 6
Merchant bars, rounds and squares, under 3-inch	3.17c	17 12 0††
Shapes	2.77c	15 8 0††
Ship plates	2.91c	16 3 0††
Boiler plates	3.06c	17 0 6††
Sheets, black, 24 gage, 4-ton lots and over	4.10c	22 15 0
Sheets, galvanized 24 gage, corrugated, 4-ton lots & over	4.70c	26 2 6
Plain wire, mild drawn, catch weight coils, 2-ton lots and over	4.28c	25 15 0
Bands and strips, hot-rolled	3.30c	18 7 0
(a) del. Middlesbrough 5% rebate to approved customers.		††Rebate 15% on certain conditions.

Ores

Lake Superior Iron Ore	
Gross ton, 51 1/2%	
Lower Lake Ports	
Old range bessemer	\$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60
Eastern Local Ore	
Cents. unit, del. E. Pa.	
Foundry and basic 56-63%, contract	12.00
Foreign Ore	
Cents per unit, c.i.f. Atlantic ports	
Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro.	8.00c
Tungsten Ore	
Chinese wolframite, per short ton unit, duty paid	\$24.00

Chrome Ore	
Gross ton c.i.f. Baltimore; dry basis; subject to penalties for guarantees	
Indian and African, 2.8:1 lump, 48%	\$39.00
South African (excluding war risk)	
No ratio lump, 44%	28.00
Do. 45%	29.00
Do. 48%	34.00
Do. concentrates, 48%	33.00
Do. 50%	34.00
Brazilian (nominal)	
2.5:1 lump, 44%	31.00
2.8:1 lump, 44%	32 5/8
3:1 lump, 48%	41.00
No ratio lump, 48%	35.00-35.50
Do. concentrate, 48%	33.00-33.50
Manganese Ore	
Including war risk but not duty, cents per unit cargo lots	
Caucasian, 50-52%	...
S. African, 48%	65.00
Indian, 50%	68.00-70.00
Brazilian, 48%	...
Chilean, 48%	68.00-69.00
Cuban, 51%, duty free	83.00-85.00
Molybdenum	
Sulphide conc., lb., Mo. cont., mines	\$0.75

MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

PRICES FOR OTHER THAN RAILROAD SCRAP

	ELECTRIC FURNACE AND FOUNDRY GRADES									
	Low Phos. Grades	Machine Shop Turnings	OPEN HEARTH GRADES*	BLAST FURNACE GRADES*	Low Phos. Grades	Heavy Structural, Plate	Cut Auto Scrap	Alloy-Free	First Cut	
	Billet, Crops and Punchings, Plate	Turnings, Turnings, Turnings	GRADES*	GRADES*	3 ft. and less	3 ft. and less	1 ft. and less	Low Phos. & Sulphur Turnings	Heavy Axle & Forge Turnings	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren, Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville	\$25.00	16.00	16.00	16.00	\$21.00	\$21.50	\$21.00	\$18.00	\$19.50	\$21.00
Bethlehem	23.75	14.75	14.75	14.75	19.75	20.25	19.75	16.75	18.25	19.75
Buffalo	24.25	14.25	14.25	14.25	19.25	20.75	19.25	16.25	17.75	19.25
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	24.50	15.50	15.50	15.50	20.50	21.50	20.00	17.50	19.00	20.50
Detroit	22.85	13.85	13.85	13.85	18.85	19.35	17.85	15.85	17.35	18.85
Toledo	23.75	14.75	14.75	14.75	19.75	20.75	18.75	16.75	18.25	19.75
Chicago	23.25	14.25	14.25	14.25	19.25	20.25	18.25	16.25	17.75	19.25
Kokomo	23.00	14.00	14.00	14.00	19.00	20.00	18.00	16.00	17.50	19.00
Duluth	22.50	13.50	13.50	13.50	18.50	19.50	17.50	15.50	17.00	18.50
St. Louis	22.00	13.00	13.00	13.00	18.00	19.00	17.00	15.00	16.50	18.00
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburgh, Calif.	19.50	12.50	12.50	12.50	17.50	18.50	16.50	14.50	16.00	17.50
Minneapolis, Colo.	19.50	12.50	12.50	12.50	17.50	18.50	16.50	14.50	16.00	17.50
Seattle	19.50	12.50	12.50	12.50	17.50	18.50	16.50	14.50	16.00	17.50
Portland, Ore.	15.50	10.50	10.50	10.50	14.00	15.00	13.00	11.00	12.50	14.00

RAILROAD SCRAP

	Heavy Melting Steel	Scrap Rails	Rails for Rolling	18 in. and under
Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton, Philadelphia, Wilmington, Sparrows Point	21.00	22.00	23.50	24.50
Cleveland, Cincinnati, Middletown, Ashland, Portsmouth	19.75	20.75	22.25	23.25
Chicago	20.50	21.50	23.00	24.00
Buffalo	20.25	21.25	22.75	23.75
Detroit	18.85	19.85	21.35	22.35
Kokomo	19.25	20.25	21.75	22.75
Duluth	19.00	20.00	21.50	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.50
St. Louis	18.50	19.50	21.00	22.00
Birmingham	18.00	19.00	20.50	21.50
Los Angeles, San Francisco	18.00	19.00	20.50	21.50
Seattle	15.50	16.50	18.00	19.00

CAST IRON SCRAP OTHER THAN RAILROAD

	Group A	Group B	Group C
No. 1 Cupola Cast	\$18.00	\$19.00	\$20.00
No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under	18.00	19.00	20.00
Clean Auto Cast	17.00	18.00	19.00
Stove Plate Cast	17.50	18.50	19.50
Unstripped Motor Blocks	15.50	16.50	17.50
Heavy Breakable Cast	17.00	18.00	19.00
Charging Box Size Cast	17.00	18.00	19.00
Miscellaneous Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico. Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida. Group C includes states to be named in groups A and B plus Kansas City, Kans.-Mo. Open Hearth Grades refer to No. 1 hydraulic compressed black sheet scrap. No. 2 heavy melting steel, dealers' No. 1 bundles and No. 1 bushelling. Blast Furnace Grades refer to mixed borings and turnings, shoveling turnings, No. 2 bushelling and cast iron borings. Add \$5 per ton for chemical borings containing not over 0.5 per cent oil content. A basing point includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Hartsfield, Duquesne, Munhall and McKeesport. Pa. Cincinnati basing point includes the switching district of Newport, Ky. St. Louis basing point includes the switching districts of Granite City, East St. Louis and Madison, Ill. San Francisco basing point

includes the switching districts of South San Francisco, Niles and Oakland, Calif. Interior Grades: Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer. Commission: No commission is payable except by a consumer to a broker for services rendered. The commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. Commissions must be shown as separate items on invoice. Maximum Shipping Point Price: Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, \$1 at Great Lakes ports, \$1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, \$6.65 per ton. Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum \$1.00 per ton. Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed more than \$1 (plus freight rate increase March 18, 1940) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4. (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to war shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than \$1, provided most economical transportation is used. Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are \$2.50 less (railroad grades \$3.50 less) than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the "conresponding grade or grades of prepared scrap." Graveyard autos not considered unprepared scrap. Remote Scrap: Consists of all grades, except railroad scrap, located in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington and Utah. Delivered price may exceed by no more than \$5 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than \$5 the nearest basing point price. Colorado scrap is remote scrap for Colorado consumers only.

Sheets, Strip

Sheet & Strip Prices, Page 120

Expansion in orders for steel sheets for essential purposes is displacing from rolling schedules practically all tonnage below A-1-a priority. Some mills recently were able to ship some tonnage under A-2 and A-3 preferences where need was urgent, but this no longer is possible for most mills.

Except in galvanized, sheet producers are booking some fair tonnages of hot and cold-rolled sheets in the A-1 group with deliveries around six weeks. What competition remains for sheet tonnage is confined to top ratings as semi-finished is available only against such ratings. Conversion to war production is radically revising specifications for various shops, stampers in many instances taking entirely different finishes from their normal use.

Galvanized sheet sellers are feeling somewhat easier over the outlook for use of zinc with tin content. A fortnight ago they were advised by Washington that they would no longer be allowed to use such zinc but later they were advised they could use it through this month. It now appears its use will be allowed on all government specifications, where bending to 180 degrees without flaking is required.

On hot and cold-rolled sheets deliveries in the A-1 rating can be made by some producers in five to eight weeks. In stainless steel rolling schedules are easier as producers are not allowed to accept tonnage below A-1-k and are limited in the purposes for which it is to be used. Nickel seems to be the limiting factor in stainless. Deliveries in this grade are better than for some time.

Heavy orders are being booked for hot and cold-rolled sheets for bomb components, ammunition boxes, airplane landing mesh and other war purposes, with volume offsetting decline in requirements for civilian products.

Plates

Plate Prices, Page 121

Plate producers generally are unable to accept tonnage below A-1 priority and sheared plate mills unable to do much below A-1-a, many consumers with preference ratings are receiving little tonnage. Certain groups, such as railway equipment builders, with A-3 rating, have been given special consideration by Washington in some car programs but even their limited quotas have been further restricted.

Plate shipments to jobbers have been curtailed by diversion to other purposes and some distributors have received practically no tonnage this month. Miscellaneous industrial demand is entirely tied in with war contracts and fabricating shops are actively quoting on inquiries for finished products outside their regular lines of production.

Allocations to eastern shipyards are lower in April but an increase

is expected in May when deliveries start to a yard beginning work on a second lot of vessels.

Bars

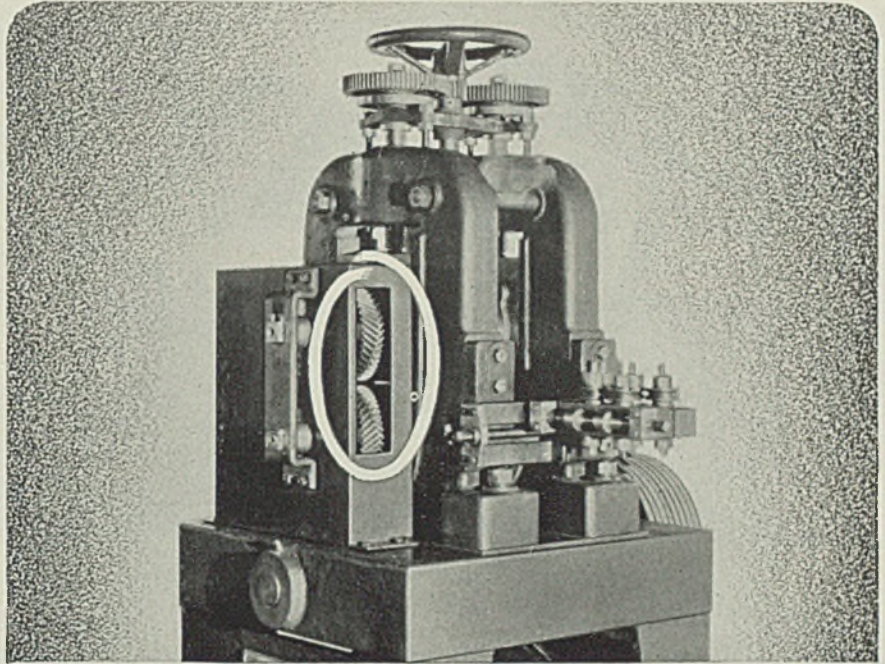
Bar Prices, Page 120

Strong and growing demand for alloy steel bars is accompanied by considerable revision of specifications. To ease the tightness in nickel-steel alloys, efforts are being made to substitute other grades where possible, even for aircraft; use of nickel-steel in jigs and fixtures is being discouraged. In high-speed steels and certain types of hot work, the tendency is toward

lowering tungsten content with more molybdenum or vanadium, revising heat-treatments for new alloy combinations. In most instances these revised specifications meet requirements satisfactorily.

Forward orders for bars are heavy, contracts being frequently extended indefinitely on top ratings, with releases each month tending upward. Substitution of steel for aluminum is also being made in some ordnance products, including fuze parts. Cold-finished, open hearth and bessemer, are required in large quantities for increasing screw machine work.

The forging industry is heavily



*Here's 13 TIMES THE LIFE
... and Still Going Strong!*

☆ "HARD-DUR" STEEL GEARS replaced ordinary steel gears in the Wire Flattening Mill illustrated above. Ordinary gears lasted three months. "HARD-DUR" Gears have been in operation now for 3 years - 5 months and are still going strong. That's 13 times the life of the ordinary gears and at only a cost of one-half more . . . a tremendous saving in money and labor.

☆ "HARD-DUR" Gears are available in Spur, Spiral, Helical, Herringbone, Bevel and Mitre types.

Send note on Company Letterhead for 488-Page Catalog 41

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVENUE • CLEVELAND, OHIO, U. S. A.

engaged on aircraft. For forged chain-making approximately 1065 tons of nickel-molybdenum-vanadium hot-rolled steel round bars have been placed on a delivery basis, rather than to the low bidder, Carnegie-Illinois Steel Corp., Pittsburgh, getting the award. Much of this type of tonnage, for better shearing ability, has to be slow-cooled after rolling.

Rails, Cars

Track Material Prices, Page 121

Freight car builders apparently have a program for 37,000 cars for the remainder of this year under the recent control instituted by War

Production Board. It is understood allocations of steel will be provided for about 19,000 cars remaining in the original SPAB program for 36,000 cars for the first four months, and for 18,000 additional. Wood will be used wherever possible with regard to safety, thus saving considerable steel.

Under the circumstances some programs have been dropped and probably a portion of cars now on books will not be built. Ore and tank cars seem likely to be given preference in view of requirements for expanded ore production and movement of oil and gasoline, for which tankers are not now available.

Pipe

Pipe Prices, Page 121

Buying of lap weld steel pipe, largely six-inch, on high ratings for installation in connection with war requirements continues brisk. Buttweld demand from the plumbing and heating trade is slackening. A midwest mill recently took a \$100,000 order for lapweld, delivery at two points. Indications are second quarter quotas for lapweld will be much harder to fill than for butt pipe, there being some price shading on the latter. Wrought pipe sales are substantially ahead of last year. Tubing producers are heavily booked with direct-mill volume, notably for aircraft, and jobbers are able to get little aircraft tubing grades below A-1-c.

Wire

Wire Prices, Page 121

Wire production continues to be hampered by inadequate supply of wire rods. Orders for specialties are heavier, with schedules complicated by large lend-lease commitments for Russia, including specialties as well as coarser materials, which have been ordered processed ahead of everything else.

Specialty tonnage, such as valve and other spring wires for aircraft, is at a high ratio. Demand for high-carbon rounds is materially higher than for flats and most bookings are at A-1. Wire rope mills are engaged at capacity and pressure for strand wire is heavy and as a rule being met satisfactorily.

Pig Iron

Pig Iron Prices, Page 122

Relief has been afforded by Office of Price Administration to pig iron producers in cases of dislocated tonnage, material shipped out of the normal area they supply. The added freight charge formerly was absorbed by the seller. The new ruling provides that in cases where OPA rules the shipment is outside the producer's usual area, due to war emergency, the seller is permitted to charge the basing point at the nearest point of origin for the shipment, plus the differential in the schedule, plus freight from basing to delivery point, less \$1 gross ton.

Producers received relatively few applications for pig iron on B priorities for May delivery, continuing the trend of several months. Such as were received were seldom for more than a single carload.

Allocation plan continues to work smoothly for the most part, most difficulty arising from consumers failing to get their applications in on time. Distribution is being based largely on inventory and investigators for WPB are surveying foundries as to inventory, consumption and rating of castings users, with a view to further refining distribution as among shops operating on most important war work.

Mystic Iron Works, Everett, Mass.,

**INLAND
ALWAY
FLOOR PLATE**

ASSURES—

- Safe traction for feet and wheels in all four directions.
- Structural strength and stiffness of rolled steel plate.
- Lowest maintenance cost during years of hard usage.
- Washing and rapid drainage in whatever direction most convenient.

INLAND STEEL CO.

38 S. Dearborn St., Chicago

Sales Offices: Milwaukee, Detroit,
St. Paul, St. Louis, Kansas City,
Cincinnati, New York

whose furnace is down for relining, has been given permission by OPA to increase prices \$1 per ton, based on its application citing higher costs, including ore transportation from the lakes.

In granting Mystic Iron Works, Everett, Mass., authority to sell pig iron at \$1 a gross ton over the maximum ceiling prices, OPA cited severe competitive disadvantages caused by the furnace being cut off from source of foreign ores and being forced to pay high freight charges for Lake Superior ores; increased costs of limestone and coal have also added to the burden. Expenditures for furnace relining and depreciation charges could not be met under ceiling prices established in the pig iron schedule, OPA found. The company could, however, cover direct costs in the opinion of OPA, based on the data studied.

Structural Shapes

Structural Shape Prices, Page 121

Fabricating shops are crowded with high-priority work and deliveries are slower. In some cases no better than 10 to 13 weeks can be done on A-1-c ratings and 8 to 12 weeks on the two higher priorities. Under these conditions many projects originally designed for steel are being revised to use concrete or wood, especially the latter, as reinforcing bars also are scarce. The trend to timber construction is gaining as inability to obtain shapes becomes more apparent.

Reinforcing Bars

Reinforcing Bar Prices, Page 121

Orders for reinforcing bars bearing high priorities are heavy and new tonnage is frequently allocated. Most sellers are not considering inquiries below A-1-j. Deliveries on orders with low ratings are delayed and some work is threatened with abandonment unless ratings are revised upward. Wood is being utilized in place of concrete in many instances. Small lots from warehouses require high priority as replacements are limited.

Scrap

Scrap Prices, Page 124

Freer supply of scrap is coming out, allowing many producers to increase their steelmaking operations and in a few instances giving hope that through the summer some reserves may be accumulated for winter. Occasional shortages occur and in some areas it has not been possible to relight open hearths made idle by lack of supply. The improvement has not been allowed to cause scrap collection programs to lose force and efforts are continued to get all possible tonnage from hiding places.

Mining of steel and iron from slag dumps accumulated for years at steel plants is being enlarged and considerable metal is being reclaimed in this way. In older slag

deposits the yield is large as more metal was allowed to be wasted in early days than recently.

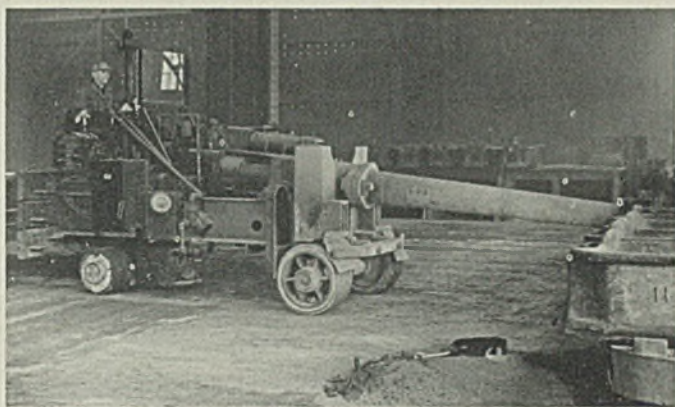
A survey of the entire situation is getting under way in New England, checking production, collection, consumption and flow, under direction of OPA. Borings and turnings production there is heavy but much is not segregated and contains more than the maximum of oil for applying the \$5 per ton extra for borings.

Detroit shops working on aircraft are expected to supply a large tonnage of alloy scrap borings and turnings when production reaches a maximum, as machining for planes frequently amounts to 60 to 80 per cent of the rough steel.

Receipts at St. Louis have been reduced recently by a period of heavy rains. One effect was to prevent addition of an open hearth planned for production and to cause another to be taken off. Allocation of 25,000 tons for the Granite City Steel Co. has been completed. An allocation to aid Laclede Steel Co. is expected.

Buffalo police, fire and health departments have been enlisted in the drive to uncover dormant scrap. Members of these organizations report accumulations they encounter on their regular inspections. A number of substantial lots have been reported. Various drives in the Buffalo district are estimated to have found more than 60,000 tons

BROSIUS CHARGERS



The Brosius Auto Floor Charging Machine in above cut is arranged to handle a 7'0" charging box with a load of 5000 lbs. It is self contained, requires no tracks or expensive runways, and its movement is not restricted to any definite path. It is driven by an electric motor, while its steering, tilting of the peel, and rotation of the box are actuated through hydraulic cylinders.

The Brosius Auto Floor Charger is also arranged with tongs for serving heating furnaces, mills, hammers, presses, etc., and are designed as manipulators for manipulating pieces while being forged.

Capacities: 2,000 lbs. to 20,000 lbs.

Edgar E. BROSIUS Company

**MANUFACTURERS AND DESIGNERS OF SPECIAL EQUIPMENT
FOR BLAST FURNACES AND STEEL MILLS**

PITTSBURGH, SHARPSBURG BRANCH, PA.

Brosius Equipment is covered by patents allowed and pending in the United States and Foreign Countries

which otherwise would not have been made available.

Melters in the Cincinnati district find supplies the best in several months, but are consuming practically all that is available. Some rejections have been made by foundries in that area, involving sub-standard grades formerly accepted as better than nothing.

Pacific Coast

San Francisco—Featuring the market was the recent award of 56 tankers for the Maritime Commission to Kaiser Co. Inc. These ships will require 231,168 tons of plates and 22,904 tons of shapes, and the award replaces the award of 70 Liberty ships, EC-2 type, in-

volving 153,250 tons of plates and 54,600 tons of shapes, reported in March.

While demand for reinforcing steel bars continues unusually strong, only government awards were reported. Identical bids were submitted by Carnegie-Illinois Steel Corp. and Sheffield Steel Corp. on 925 tons for the Bureau of Reclamation for delivery at Corma, Calif. Pending business for this branch of the government involves over 4500 tons. Bookings to date total 14,526 tons, compared with 22,174 tons for the corresponding period in 1941.

Cast iron pipe interests are receiving more inquiries from the government than they can produce. Few inquiries are current for mu-

nicipalities. Bookings totaled only 512 tons and brought the aggregate to date to 3475 tons, compared with 13,980 tons for the same period last year.

Seattle—Industrial activity is occupied solely with defense and military work, many smaller shops reporting subcontracts. There is a noticeable increase in A-1-a ratings, particularly for reinforcing and merchant bars.

Mayor Fred Hume, New Westminster, B. C., announces that an American shipbuilding firm is seeking permission to establish a yard near New Westminster, to construct steel freighters up to 10,000 tons.

Northwest Steel Rolling Mills, Seattle, established a production record in March and has increased output about 40 per cent. An additional transformer will be installed this month and a third crane has been ordered. Construction of a new foundry, which will be the largest on the west coast, for the Pacific Car & Foundry Co., Seattle, is under way, 1000 tons of shapes being placed with Judson Pacific Co., Seattle. This plant is scheduled for completion by Dec. 31.

Tacoma has awarded contracts for the second Nisqually power project to L. E. Dixon Co., Los Angeles, \$4,258,535 for the Adler dam, powerhouse and spillway and \$1,705,849 for the LaGrande dam and spillway. A bid of \$1,783,055 for the tunnel is pending. This job involves unstated tonnages of reinforcing, shapes and plates. Seattle has applied for 30 per cent federal aid for proposed \$8,000,000 expansion of Ross dam, Skagit project, raising spillway 150 feet. At Grand Coulee the third generator is in production, increasing capacity to 344,000 kilowatts. Orders for six additional generators, to be installed by 1944, have been placed.

Scrap has been arriving in such volume that a 90-day supply is said to be on hand here. Receipts have increased due to improved weather conditions and stabilization of prices. Surplus stocks here will probably be shipped to other coast cities where supplies are low. Mills are buying half of their needs direct, the balance from dealers, who complain price ceilings do not allow them sufficient margin to cover preparation costs.

Canada

Toronto, Ont.—Demand for steel in Canada is developing on an ever broadening scale and new restrictions on non-essential production are being introduced. Production of civilian automobiles was brought to a stop in Canada, April 1. There are now about 4000 passenger automobiles in reserve from which essential users will be supplied. In addition there are some 10,000 cars in hands of dealers, and a large number of used cars still available, which will be the only source of supply until the end of the war. A special order prohibits manufacture of about 65 per cent of the former sizes of bolts and screws. Of Canada's total steel production al-



Pulley Hub

IT'S MADE OUT OF
SPEED CASE STEEL
A LOW CARBON OPEN HEARTH PRODUCT

—because . . .

- It increased production 67%!**
- It saved \$60.08 per ton of steel used**
- It riveted without fracture**
- It increased tool life 25%**

Ductility
Plus
Machinability
(230 SFPM)

*In this "all-out" war effort Monarch Steel is co-operating 100%.
We're helping to "keep 'em rolling" with Speed Case Steel.*

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MANUFACTURERS OF COLD FINISHED CARBON AND ALLOY STEEL BARS

most 95 per cent now is being directed into channels associated with war materials production and new restrictions have been placed on sales of steel products which practically shuts out all but the most essential consumers. Under a ruling of the past week all new orders for steel, no matter what the product may be, must be approved by the Steel Controller before delivery can be made.

Orders for merchant bars are increasing. Mills are booked through the year. Business continues at a steady level in merchant pig iron. Production of foundry and malleable grades is holding at about 8000 tons per week and shipments to melters also are at this level with the result that blast furnaces are not building yard piles. Basic iron sales held at about 1500 tons for the week.

Special efforts are underway to create larger supply of iron and steel scrap in Canada and with this object in view new price regulations were issued during the week from the Canadian Steel Controller, which place a minimum price on scrap in Western Canada and new ceiling prices in the Maritime and British Columbia.

Metallurgical Coke

Coke Prices, Page 121

Rulings by OPA on price schedules applying to beehive and by-product coke, providing for applications by producers for permission to charge higher than present ceiling prices may result in some exceptions. Some cokemakers have submitted data on their costs but have not yet received replies.

OPA has ruled that producers asking permission to charge above ceiling prices must show that production costs are above oven net realization at ceiling prices or that oven net realization is inadequate for continued operation at maximum prices.

Steel in Europe

Foreign Steel Prices, Page 123

London—(By Cable)—Steel market in Great Britain is active on second quarter contracts. Demand is mainly centered on plates, alloy steels, engineering castings and forgings, colliery material and small sections of bars and wire rods. Sheets are quiet and demand for galvanized sheets is practically negligible.

Iron Ore

Iron Ore Prices, Page 123

Ice last week in upper St. Mary's river delayed downbound ore carriers, at one time 80 laden ships being held above the locks. Ice slowed operation of lock gates materially.

Additional companies engaged in ore carrying on the Great Lakes have announced rates for this season at 80 cents per gross ton from the head of lakes, 72 cents from Marquette and 60 cents from Escanaba, to Lake Erie ports. Rates

on coal have been set at 45 cents per net ton from Lake Erie ports to Lake Superior destinations, 50 cents to west shore ports on Lake Michigan north of Milwaukee and 55 cents to Milwaukee and ports further south. The new ore rates are the same as in 1939 and are 3 cents higher than in 1941 from the head of the lakes, 2½ cents higher from Marquette and 2 cents from Escanaba.

Up to April 7, 41,469 railroad carloads of coal had been dumped into colliers at Lake Erie ports, compared with 16,676 carloads up to the same date last year, according to Howard A. Gray, acting director of solid fuels co-ordination.

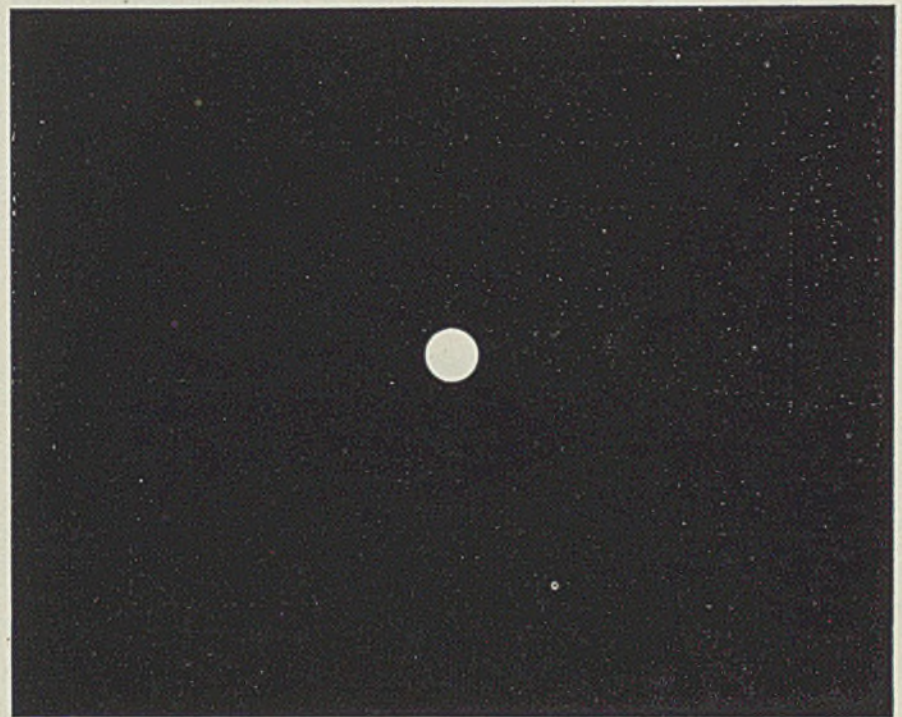
Ferroalloys

Ferroalloy Prices, Page 122

April 15 has come and gone without ferromanganese producers having been advised by OPA as to what action will be taken on their appeals for higher prices. Consequently, producers are still sitting tight, shipping tonnage as heretofore on the basis of \$120, duty paid, seaboard, and, in the case of certain southern furnaces, on the basis of \$140, f.o.b. furnace.

What action will finally be taken is still a matter of speculation, not only with respect to the prices themselves, but to the effective date of changes.

WHEN LIGHT GLOWS IN THE DARKNESS



If you are concerned with bearings and bearing metals, but have never taken time to brush up on pertinent and intimate information regarding them, the entire subject may remain shrouded in darkness. A little light puts you on the right track, and helps your constructive thinking. The A. W. Cadman Manufacturing Co. turned the spotlight on the subject with two booklets, "Bearings and Bearing Metals," and "Cadman Metals." Printed for free distribution to all who are concerned with the subject of bearings and fine bearing metals, the booklets may be had for the asking. When do you want yours?



A. W. Cadman MFG. CO. PITTSBURGH, PA.
CHICAGO: Manhattan Bldg. PHILADELPHIA: 1819 Chestnut St. NEW YORK: 270 Broadway

Nonferrous Metal Prices

Copper			Straits Tin, New York		Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Anti-mony Amer. smelter	Nickel Cathodes	
Electro. del. April	Lake, del. Midwest	Casting, refinery	Spot	Futures							
1-17	12.00	12.12½	11.75	52.00	52.00	6.50	6.35	8.25	15.00	14.50	35.00

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 12.00c Conn. copper

Sheets	
Yellow brass (high)	19.48
Copper, hot rolled	20.87
Lead, cut to jobbers	9.75
Zinc, 100 lb. base	13.15
Tubes	
High yellow brass	22.23
Seamless copper	21.37
Rods	
High yellow brass	15.01
Copper, hot rolled	17.37

Anodes	
Copper, untrimmed	18.12

Wire	
Yellow brass (high)	19.73

OLD METALS

Dealers' Buying Prices
(In cents per pound, carlots.)

Copper	
No. 1 heavy	9.50-10.00
Light	7.50-8.00

Brass	
No. 1 composition	9.00-9.50
Light	6.00-6.50
Heavy yellow	6.50-7.00
Auto radiators	7.25-7.75
Composition turnings	7.75-8.25

Zinc	
Old	5.25-5.75
New clippings	6.75-7.25

Aluminum	
Clippings	10.50-11.00
Cast	10.00-10.50
Pistons	10.00-10.50
Sheet	10.00-10.50

Lead	
Heavy	5.12½-5.62½
Mixed babbitt	6.00-7.00
Electrotype shells	5.00-5.75
Stereotype, Linotype	6.50-7.50

Tin and Alloys	
Block tin pipe	45.00-47.00
No. 1 pewter	37.00-39.00
Solder joints	9.50-10.00

SECONDARY METALS

Brass ingot, 85-5-5-5, l.c.l.	13.25
Standard No. 12 aluminum	14.50

Nonferrous Metals

New York — OPA has issued amendment No. 3 to the revised price schedule No. 20 establishing a maximum price for yellow brass scrap on the basis of the dry copper content times 9.25c where the assay is 60.01 per cent or more and at the dry copper content times 9.00c where the assay is 50.01 per cent to 60.00 per cent. In lots of less than 20 tons refinery brass may be bought and paid for on the copper content basis determined by an estimate rather than by an assay. Sales concluded before April 17 under previous provisions may be carried out in accordance with original terms until June 1.

Both OPA and WPB have taken action to assure full compliance with all orders. Need for metals by companies engaged in war work are increasing. Demand for brass by new mills producing shell casings is expected to rise sharply. Supply of lead still remains adequate for all military work while zinc sellers continue to accept orders freely for delivery through July. Full allocation of zinc is expected to be ordered June 1.

Coke Oven By-Products

Coke By-Product Prices, Page 121

Large percentage of coke oven by-products is going to war requirements, entire production on some, including toluol, being allocated. Substantial quantities of benzol will be required for synthetic rubber production and early prohibition of use of that product in blending of motor fuel is expected, with the hope of building up a substantial reserve for that purpose. Current output of benzol from coke oven operations is at record high, estimated at 160,000,000 gallons annually. Normally close to 75 per cent goes into blending of motor fuels and a large part of the remainder to industrial consumption.



HERE ARE TWO SERVICES TO HELP YOU
Quickly REACH Top-Speed Production!

1. Let SCAIFE make your cylinders, tanks and other containers for liquids, air or gases. You'll get an expert job, and release your own equipment for other work.
2. Sub-contract to Scaife the making of cylindrical or welded products, or manufacturing operations involving the following:

- Arc Welding—hand, automatic or semi-automatic
- Brazing—Spot Welding
- Drilling and Tapping
- Hot-dip galvanizing
- Pressure Testing
- Drawing and Stamping
- Hot or Cold Riveting

Send your blueprints for quotation. If you have the Priority Ratings necessary to get materials, we have the men and machines to do the work!



SCAIFE COMPANY

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Representatives in Principal Cities

Plant Expansion, Construction and Enterprise, Government Inquiries, Sub-Contract Opportunities, Contracts Placed and Pending

GOVERNMENT INQUIRIES . . .

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

BUREAU OF SUPPLIES AND ACCOUNTS, WASHINGTON

- 551—Portable submersible pumps and spare parts. Bids April 21.
- 734—Abrasive wheels. Bids June 2.
- 683—Ammunition boxes. Bids April 24.

GENERAL PURCHASING OFFICER, PANAMA CANAL, WASHINGTON

- 6127—Lead sleeving, copper splicing sleeves, tinned copper sleeve connectors and copper link fuzes. Bids April 20.
- 6122—Copper coated steel wire, phosphor bronze wire, magnet wire and flexible heater cord. Bids April 20.
- 6121—Electric wall clocks, ceiling type fans. Bids April 20.
- 6128—Deep bowl type reflectors. Bids April 20.

- 6117—Knife and snap switches, receptacles and plugs, lamp sockets, terminals, electric bells and pressboard insulation. Bids April 20.

VETERANS' ADMINISTRATION, WASHINGTON

- M-408—Hot water storage heater. Bids April 24.
- M-409—Alternating current arc welding unit. Bids April 24.
- M-387—Power-driven sickle-bar mower. Bids April 21.
- M-412—Half-horsepower portable electric spray painting outfit. Bids April 27.
- M-396—Hot water storage heaters. Bids April 22.
- M-401—Laundry trucks. Bids April 27.

SUB-CONTRACT OPPORTUNITIES . . .

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

Boston office, Contract Distribution Branch of WPB, 17 Court street, is seeking contractors for the following:

- SC-7: Engine lathe to 12-inch; horizontal boring mill to 3-inch bar with index head and oil grooving; horizontal millers to No. 2 and drilling to 1-inch capacity, horizontal boring to 2-inch bar; lathe to 12-inch, horizontal milling No. 2 boring, horizontal, with index head. Milling, horizontal No. 3, vertical, No. 2 drilling to 1-inch capacity, horizontal boring 2-inch bar.
- SC-8: Machines needed, watchmakers' automatic screw machines, lathes and kick presses.
- SC-9: Machines needed 2½-inch single or multiple-spindle automatic screw machines to make any portion of 100,000 units. Blueprints available at this office. Immediate work assured.

Cleveland office, Division of Contract Distribution, WPB, Union Commerce building, is seeking contractors for the following:

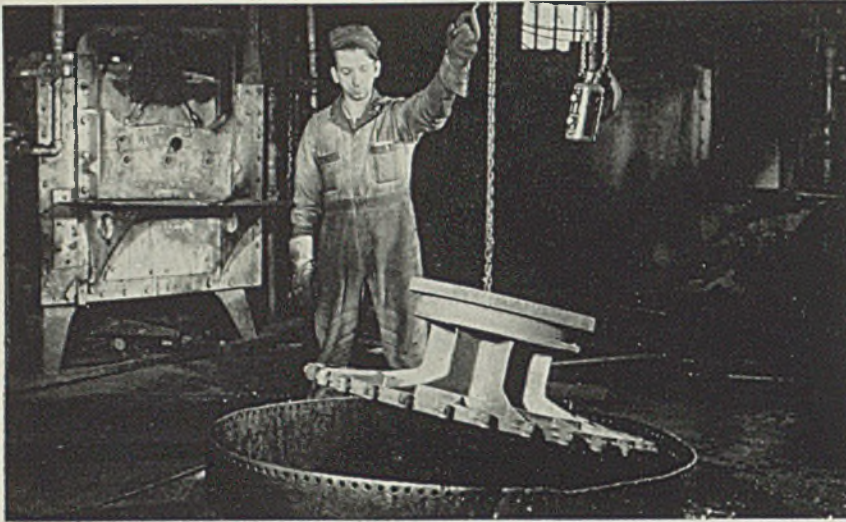
- S-132: Facilities for fabricating the following items: Worm wheel, WD 4140 steel, 2.75 O.D. x 1.2187 plus .0005/- .0000 x .812 plus .000/- .002; .375 pitch and lead worm; left-hand helix; 12 teeth on flat side. Pinion, WD 4140 steel, 5 23/32 long x 1.75 major diameter; six splines on end (ground); has 12 teeth, 1.75 O.D. gear; 3 diameters ground plus or minus .0002; two threads, one ¾—14 NF3, other ½—

Material, to be furnished by subcontractor, is steel forgings, but alternate of bar stock and tubing provided. Machine equipment governed by type of material furnished.

- S-138: Subcontractor to machine and thread large quantity of four items to be made from seamless steel tubing WD 1015, ranging in finished diameter Screw machines and chucking machines from approximately 2.775 to 6 inches, indicated. Blueprints on file in this office.
- S-139: Subcontractor to fabricate any part or all of six items. Materials made from bar stock ranging diameter from ¾ to 1.65 inches approximately. Stainless grade No. 6, WD-X1112 and WD-X1314; one item seamless steel tubing 1½-inch. Equipment indicated is automatic screw machines, drills, mills, etc. Quantities, large. Delivery, May, 1942. Blueprints on file at this office.

Chicago office, Contract Distribution Branch of WPB, 20 North Wacker Drive, is seeking contractors for the following:

- BAT-0-1209: Chicago prime contractor wishes to subcontract work on items of a recurring nature which will continue probably for the duration. Requires automatic screw machine for stock ¼, ⅜ and 1½-inch diameter. Also knurl blanks to be made from 1½-inch Ketos steel are needed immediately. Prime contractor has steel on hand for this work. Drawings at this office.
- CMC-1010: Urgent requirement for gear-cutting equipment capable of turning out 600 to 1200 bevel gears per month, for use in aircraft motors. Tolerances are close. Most gears will be integral with shaft and will be between 1½ to 2-inch P.D. All material to be furnished by prime contractor.
- YSLC-A-1202: An eastern manufacturer has work to sublet for a horizontal boring mill with a 4 or 5-inch bar. In addition to this requirement we have on our list several other concerns which require horizontal mills with bars up to 6-inch.
- 24-F-A-217: Prime contractor on tanks has subcontract work to let for 7-inch or larger vertical boring mills, large Keller machine or horizontal boring mills with 5-inch bar. Parts involved weigh approximately 3 tons each. This is urgent and carries a top priority number which supersedes much work at present on this type equipment.
- 29-F-A-220: Midwestern manufacturer wishes to sublet machine work requiring 6 or 8-spindle Gridley or Conemate 1½-inch automatic screw machines. As a substitute may consider 4-spindle machines of same make or National Acme automatic screw machines. This subcontract will require large daily production and continuous run. Initial order for 500,000 pieces. Material has been ordered by prime contractor and will be delivered to subcontractor at stated price f.o.b. Cleveland or Gary, Ind. Blueprints and sample at this office.
- 35-N-226: Prime contractor has immedi-



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Heat Treating • Pack or Gas Carburizing
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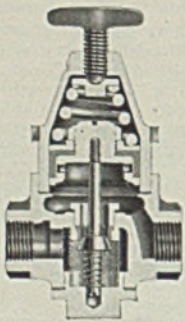


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Piston type construction with long valve stem travel gives large volumetric capacity—a most important feature. Construction throughout is simple and dependable for long life without maintenance.

Use these valves for efficient operation of arbor presses, air chucks, riveters, air vises, cylinders and other pneumatic equipment. Three standard sizes, $\frac{1}{8}$, $\frac{1}{2}$, and $\frac{3}{4}$ inch, for use on initial pressures up to 150 lbs. Furnished complete with pressure gauge. Write for Bulletin 56-S.

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ate work to subcontract for spur, pinion and bevel gear, eleven parts, reference drawings here: three sizes bevel gears, 4615 steel, 7 $\frac{1}{2}$, 10 and 10 $\frac{1}{2}$ -inch extreme diameters, 20 and 30 teeth, splined holes, broached 2 $\frac{1}{2}$ -3 $\frac{1}{2}$ inches; carburize and harden to Rockwell 58-63. Four sizes propeller and drive shafts, 27, 34, 20 and 24 inches long, 2 $\frac{1}{2}$, 2 $\frac{1}{2}$ and 3 $\frac{1}{2}$ -inch diameter with splined ends and threaded shoulders, 6140 and 2340 steel, heat treated to Rockwell C 35-28. Subcontractors can take any item. Quotations are to include separately, tools, jigs, gages, etc. Optional furnishing patterns and material. Initial quantity 500 pieces of each size. Delivery at once, production to continue indefinitely. Priority A-1-A.

2-A-404: 3000-pound board hammer, open capacity required for small forgings in Chicago area. Dies and materials to be furnished.

5-AN-403: Chicago firm needs several sizes of small accurately assembled and welded work holding fixtures and jigs. These consist of usual steel sections, positioning plates and will weigh up to 25 pounds. Quantities 1 to 40 pieces. Navy priority. Subcontractors furnish both labor and materials. Tools needed, shapers, drills and milling machines.

9-A-403: Expert rough and finish grinding on surgical operating knives is needed at once; 1000 forged steel blanks in three sizes are ready. Only individuals or firms with actual experience at this will be considered.

26-AN-328: Airplane landing gears are needed. This office has request to locate machine tool facilities capable of producing oleo strut cylinders and pistons. Cylinders are 28 inches long, 3-inch bore, 3 $\frac{1}{2}$ inches O.D. Tools needed are turret lathe, 8-foot bed or over, heat treating, Rockwell, sand blast, external grinding, internal grinding, polish, hone, Magnaflex, cadmium plate and dip. Piston 28 inches long, 2.358 bore, 2.874 O.D. AA and A-1-a priority. Any quantity from 20 per month up.

2-A-402: Machine work on aluminum castings. Critical machines include turret lathes for chucking, milling machines. Production of 1000 each of several pieces per month.

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

S-86: A New Jersey firm working on marine orders is seeking subcontractors to produce parts. Machine needed, 100-inch planer, 16-foot travel.

S-87: A New Jersey manufacturer wants subcontractors who can machine large steel castings. Machine needed is horizontal boring mill with 5-inch bar.

S-88: A New Jersey manufacturer needs subcontractors who can produce drop forging equipment for die forgings of steel parts. Approximate weight per piece, one pound. Quantity, large.

STRUCTURAL SHAPES .

SHAPE CONTRACTS PLACED

22,000 tons, new plant, Aluminum Co. of America, to American Bridge Co., Pittsburgh.

11,000 tons, nonferrous metals plant, Brooklyn, to Bethlehem Steel Co., Bethlehem, Pa.

4500 tons, two plant additions, Syming-

ton-Gould Co., New York state; 2000 tons to Lackawanna Steel Construction Co., Buffalo; 2500 tons to Leach Steel Corp., Rochester, N. Y.

4000 tons, Du Pont chemical plant, Alabama, to Virginia Bridge Co., Roanoke, Va.

3000 tons, plant addition, Curtiss-Wright Corp., to Bethlehem Steel Co., Bethlehem, Pa.

2500 tons, aluminum forge shop, Chevrolet Motor Division, General Motors Corp., to R. C. Mahon Co., Detroit.

2100 tons, floating dry dock, contract NOY-5269, Gulf port, Bureau of Yards & Docks, to Southern Steel Works Co., Birmingham, Ala.; Paul Doullot and J. P. Ewin, New Orleans, contractors.

1800 tons, transmission towers, Tacoma, Wash., power project, to Bethlehem Steel Co., Seattle.

1000 tons or more, two 250-ton bridge cranes, low bid \$601,510, for gun relining plant, to Alliance Machine Co., Alliance, O.; Morrison-Knudsen Co., Boise, Idaho, general contractor.

1000 tons, foundry plant for Pacific Car & Foundry Co., to Judson-Pacific Co., San Francisco.

1000 tons or more, nine substations for Bonneville Power Administration, to Bethlehem Steel Co., San Francisco.

750 tons, utility building, navy yard, to Harris Structural Steel Co., New York, through Sanders Engineering Corp., Portland, Me.

600 tons, defense project, to Pacific Car & Foundry Co., Seattle.

430 tons, sub-structures for Bonneville dam project, Oreg., at Bremerton, Longview, Napavine, Walla Walla, Covington and Spokane, Wash., and at Portland, Salem and Eugene, Oreg., to Bethlehem Steel Co., San Francisco.

350 tons, powerhouse at Seward, Pa., for Atlantic Utilities Co., to American Bridge Co., Pittsburgh.

300 tons or more, hangar doors for army project in western area, to unlisted Detroit fabricator.

300 tons, foundry addition, Sawbrook Steel Casting Co., Lockland, O., to Southern Ohio Iron Co.

247 tons, Proj. FAP-24-D (1) Job 2311, Chicot county, Ark., to Vincennes Steel Corp., Vincennes, Ind.

225 tons, furnace, Ridgewood Steel Co., Cincinnati, to Stacey Mfg. Co., Cincinnati.

205 tons, Proj. DA-WR-2-A (1), Oklahoma state highway department, Comanche county, Okla., to J. B. Klein Iron & Foundry Co., Oklahoma City, Okla.

200 tons, Peavy power house and dam, Wisconsin - Michigan Co., Mastoden, Mich., to Fox River Boiler Works, Appleton, Wis.

159 tons, addition, Caterpillar Tractor Co., Peoria, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.; Fred

Harbers Sons' Co., Peoria, Ill., contractor.

100 tons, army building, details not announced, to Truscon Steel Co., Seattle.

100 tons, transmission towers, Boulder City, Nev., to Emsco Derrick & Equipment Co., Los Angeles.

100 tons or more, hangar, lean-to and boiler house, southern airfield, to Wisconsin Bridge & Iron Co., Milwaukee; bars to Wilson, Weesner & Wilkinson; C. F. Rule and Wm. Murphy & Sons, St. Paul, Minn., contractors.

5000 tons, nonferrous metals plant, Boston.

1000 tons, addition, Otis Elevator Co., Harrison, N. J.

1000 tons, crane runways, naval supply depot; Bramm & Stuart, Philadelphia, general contractors.

1000 tons or more, power plants, Baton Rouge and New Orleans, La.; Stone & Webster Engineering Corp., Boston, contractor-engineer.

761 tons, also 118 tons plates for stack, Dresser power stations, Public Service Co. of Indiana, West Terre Haute, Ind.; Sargent & Lundy, Chicago, engineers; bids April 15.

600 tons, plant addition, Chambersburg

SHAPES CONTRACTS PENDING

10,000 tons, plant expansion, Curtiss-Wright Corp.



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O.K. Shear Blades



SHAPE AWARDS COMPARED

	Tons
Week ended April 18	57,966
Week ended April 11	24,194
Week ended April 4	44,693
This week, 1941	30,911
Weekly average, 1942	26,007
Weekly average, 1941	27,373
Weekly average, March, 1942	18,011
Total, 1941	490,564
Total, 1942	390,101

Includes awards of 100 tons or more.

MECHANICAL POWER PRESSES

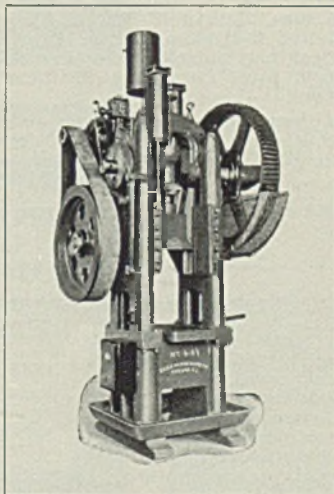
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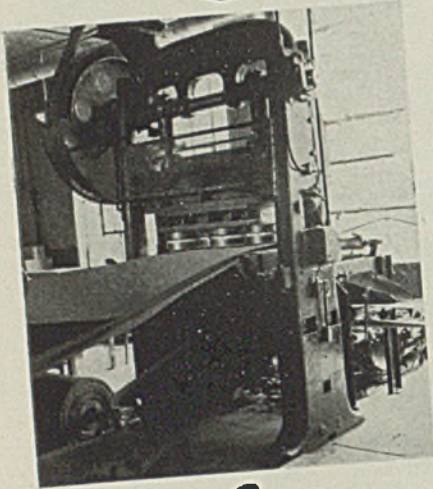


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- Engineering Co., Chambersburg, Pa.; Hughes-Foulkrod, Philadelphia, general contractor.
- 518 tons, bearing piles, improvement Los Angeles river between North Broadway and Alhambra avenue, Los Angeles; bids opened by United States engineer office, Los Angeles.
- 500 tons, state bridge, Saucon creek, Bethlehem, Pa.; bids April 20.
- 500 tons or more, transmission tower No. 3, Bonneville Power Administration; W. L. Ridge, Electric City, Wash., low at \$212,380.
- 400 tons, access bridge, eastern navy yard; Acchione Construction Co., Philadelphia, low on general contract; priority A-1-e.
- 150 tons, state bridge, Bayonne, N. J.; bids April 24; priority A-3.
- 120 tons, bridge for Alaska Road Commission; bids to J. R. Ummel, purchasing agent, Seattle, April 27; No. 09797.
- Unstated tonnage, \$2,000,000 project, Pennsylvania Salt Co., Cornwall, Pa.; Day & Zimmerman, Philadelphia, preparing plans.
- Unstated, revolving crane mounted on railroad truck, for Alaska Railroad; bids to J. R. Ummel, purchasing agent, Seattle, April 22; No. 09803.

REINFORCING BARS . .

- REINFORCING STEEL AWARDS**
- 1036 tons, mostly ½-inch squares, United States engineer, Norfolk, Va., to Carnegie-Illinois Steel Corp., Pittsburgh, Inv. 235.
 - 1000 tons, aluminum reduction plant in Eastern Washington, to Northwest Steel Rolling Mills, Seattle.
 - 1000 tons, miscellaneous defense projects in western area, to Northwest Steel Rolling Mills, Seattle.
 - 925 tons, bureau of reclamation, inquiry B-33, 105A, Coram, Calif., to Sheffield Steel Co., Kansas City, Mo.
 - 580 tons, drydock No. 4, Pacific coast area, to Bethlehem Steel Co., Bethlehem, Pa.
 - 200 tons, factory addition, Gliddings & Lewis Machine Tool Co., Fond du Lac, Wis., to Bethlehem Steel Co., Bethlehem, Pa.

- REINFORCING STEEL PENDING**
- 4000 tons, municipal filtration plant, Philadelphia; Robert and Joseph Somdari, low on general contract; priority A-4.
 - 925 tons, Bureau of Reclamation, Invitation B-33,105-a, Coram, Calif.; identical bids submitted by Carnegie-Illinois Steel Corp. and Sheffield Steel Corp.
 - 112 tons, underpass, Virginia avenue N.W., Washington; Colmar Construction Co., New York, low.
 - 110 tons, highway, Washington; bids in.
 - Unstated, dams and powerhouses, second

CONCRETE BARS COMPARED

	Tons
Week ended April 18	4,741
Week ended April 11	18,840
Week ended April 4	6,550
This week, 1941	14,596
Weekly average, 1942	8,464
Weekly average, 1941	13,609
Weekly average, March, 1942	9,201
Total, 1941	184,875
Total, 1942	126,966

Includes awards of 100 tons or more.

Nisqually power project, Tacoma, Wash.; L. E. Dixon Co., Los Angeles, contractor.

RAILS, CARS . . .

- LOCOMOTIVES PLACED**
- Alabama, Tennessee & Northern, one 80-ton diesel-electric switcher, to General Electric Co., Schenectady, N. Y.
 - Duluth, Missabe & Iron Range, ten 2-8-8-4 type steam locomotives, to Baldwin Locomotive Works, Eddystone, Pa.
- LOCOMOTIVES PENDING**
- Baltimore & Ohio, twenty-five 1000-horsepower diesel-electric locomotives, pending.
 - Bureau of Reclamation, Denver, one 40-50 ton diesel-electric for yard use; bids in.
- CAR ORDERS PLACED**
- Canadian Pacific, 500 forty-ton steel box cars, to Canadian Car & Foundry Co.; 200 fifty-ton steel box cars and 150 seventy-ton ore cars, to National Steel Car Co. Ltd.; 50 fifty-ton box cars, to Eastern Car Co. Ltd.
 - Pittsburgh & Shawmut, 100 fifty-ton steel twin hoppers, to Pressed Steel Car Co., Pittsburgh.

CAR ORDERS PENDING
Seaboard Airline, 500 fifty-ton box cars; reported under negotiation.

PIPE . . .

- CAST PIPE PENDING**
- 580 tons, 18-inch water line near Syracuse, N. Y.; bids April 21.
 - 383 tons, 8-inch, class 130, San Francisco; United States Pipe & Foundry Co., Burlington, N. J., low.
 - 320 tons, 12-inch, class 150, east bay municipal utility district, Oakland, Calif.; United States Pipe & Foundry Co., Burlington, N. J., low.
 - 200 tons or more, water system extension and disposal plant, Hermiston, Oregon; J. M. DeBlasio, Yakima, Wash., recommended for award.
 - 125 tons, 16-inch, Seneca Falls, N. Y.; bids April 23.
- STEEL PIPE PLACED**
- Unstated tonnage, air field fueling system, Ohio, to Pollak Steel Co., Cincinnati; Cotter Plumbing & Heating Co., Memphis, Tenn., contractor.

PLATES . . .

- PLATE CONTRACTS PLACED**
- 100 tons, 300,000-gallon tank and tower, Vallejo, Calif., to Pittsburgh-Des Moines Steel Co., Pittsburgh.
 - 100 tons, 100,000 and 200,000-gallon tank and tower, Vallejo, Calif., to Chicago Bridge & Iron Co., Chicago.
- PLATE CONTRACTS PENDING**
- Unstated tonnage, fifty-seven 515-gallon tanks, Civil Aeronautics Administration, Washington, Inv. 1404; bids April 15.
 - Unstated tonnage, 300 16 ½-foot lengths, ⅝ and ¾-inch high carbon steel plate pipe, United States engineer, Philadelphia; Lancaster Iron Works, Lancaster, Pa., low, \$40.89 per length, Inv. 433.

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In these critical times it is difficult to serve all of those whom we would like to serve, but our Government's needs must be supplied as quickly as possible. Here at Graver this will be done, and we hope that peace will soon return that we can again serve Industry with steel plate equipment as needed — and when needed.

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CONSTRUCTION and ENTERPRISE

Michigan

ANN ARBOR, MICH.—Douglas D. Loree, Ann Arbor architect, is preparing plans for factory addition here.

BENTON HARBOR, MICH.—Harbor Machine Co., 1091 Territorial road, has been organized to manufacture metal products. Ernest J. Trimble, 207 Hampton road, is correspondent.

DETROIT—Continental Aviation & Engineering Corp. will erect a 228 x 332-foot L-shaped addition to its plant on East Jefferson avenue. Giffels & Val-

let Inc., 1000 Marquette building, architects. (Noted March 2).

DETROIT—Radius Tool & Die Co., 11363 Lumpkin, is having plans prepared by McGrath & Dohmen, architects, for factory addition.

DETROIT—Haberhorn-Barry Co. has been awarded general contract for construction of factory for Michigan Die Casting Co., 11831 Charlevoix.

DETROIT—City Pattern Works, 1161 Harper, has let contract for an addition to its factory to Atkin-Fordon Co., 13103 Monte Vista.

DETROIT—Barton-Malow Co., 1900 East Jefferson, has contract for alterations to factory of Copper & Brass Inc.

DETROIT—Star Cutter Co., 10040 Freeland, has been incorporated with \$50,000 capital to manufacture tools

and metal products. Howard B. Lawton, 16745 Edinborough avenue, is correspondent.

DETROIT—John B. Ebert has contract for alterations to Detroit plant of Rolls-Royce Inc.

DETROIT—Industrial Sheet Metal Co. has let contract to Klem Bros. for addition to factory.

FLINT, MICH.—Bids are being advertised for Flint's \$280,000 water facilities improvement project. Work is expected to be started in June.

GRAND RAPIDS, MICH.—W. B. Jarvis Co. has been granted building permit for a \$100,000 factory addition.

GRAND RAPIDS, MICH.—Grand Rapids Dowel Works plans erection of addition to its plant. Lenger Construction Co., Grand Rapids, has contract.

GRAND RAPIDS, MICH.—Robinson, Campau & Crowe, architects, are taking figures for factory addition here.

LANSING, MICH.—Renlger Construction Co., Lansing, has contract for construction of \$20,000 addition to shop of Duplex Truck Co., Lansing.

LINCOLN PARK, MICH.—Lincoln Park Drop Forge Tool & Die Co. has been incorporated to manufacture tools and dies. Leo Garber, 1376 Grant avenue, is correspondent.

PONTIAC, MICH.—Wilson Foundry & Machine Co. has awarded contract to J. A. Fredman, Pontiac, for alterations to factory. L. J. Heenan, Pontiac, architect. (Noted April 6).

PORT HURON, MICH.—United Brass & Aluminum Co. has awarded contract to Ketels & Fell, Port Huron, for construction of foundry. Walter H. Wyeth, Port Huron, architect.

ROCHESTER, MICH.—Construction has been started here on an addition to plant of National Twist Drill & Tool Co.

Connecticut

SAUGATUCK, CONN.—Sealund Corp., 589 Riverside avenue, Westport, has let contract for research-assembly plant and office to T. H. Hrivnack, 54 Prescott street, Bridgeport, Conn. Cost \$45,000. E. B. Caldwell and F. C. Anderson, 177 State street, Bridgeport, architects.

STAMFORD, CONN.—American Cyanamid Co., 30 Rockefeller Plaza, New York, will soon take bids on five-story 75 x 100-foot laboratory costing \$170,000. Lockwood Greene Engineers Inc., 10 Rockefeller Plaza, New York, engineer.

STONINGTON, CONN.—Owner, care of L. F. Caproni, engineer, 1221 Chapel street, New Haven, Conn., will soon take bids on one-story 80 x 160-foot factory. Cost \$45,000.

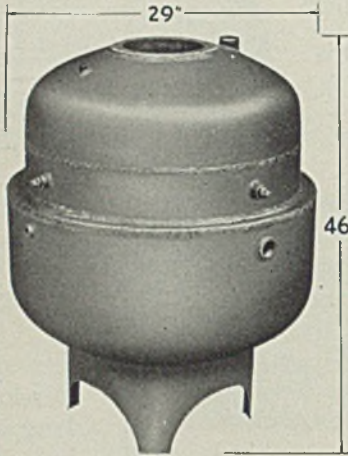
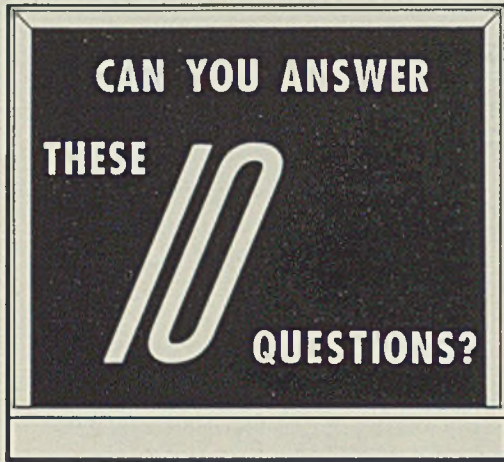
WALLINGFORD, CONN.—R. Wallace & Sons have let contract for one and two-story factory addition to C. F. Woodling Co., costing \$40,000. Norton & Townsend, 405 Temple street, New Haven, Conn., architects.

Massachusetts

CHICOPEE, MASS.—Reda Mig. Co., 165 Front street, has asked bids for one-story 60 x 150-foot plant, to cost \$40,000 including equipment. H. J. Tessier, 220 Dwight street, Springfield, Mass., architect.

Rhode Island

PROVIDENCE, R. I.—Liberty Tool & Gauge Works Inc., 235 Georgia avenue, has let contract to C. I. Bigny Construction Co., 44 Franklin street,



1. Q: How are Hackney special deep drawn shapes and shells helping manufacturers to increase the advantages of their products—for both Victory and industrial needs?
A: A few of the benefits gained by concerns using Hackney special deep drawn shapes and shells are: improved product appearance... faster production... decreased over-all weight... increased strength... lower cost of an individual part... greater durability.
2. Q: In what sizes are Hackney deep drawn shapes and shells manufactured?
A: They have been made as small as one quart and as large as 110 gallons.
3. Q: From what metals can Hackney deep drawn shapes and shells be manufactured?
A: Hackney's deep drawn shapes and shells have been made in numerous metals (steel, stainless steel, monel-metal, nickel, aluminum, Herculoy, Everdur, bronze, copper, various alloys, etc.).
4. Q: How is a Hackney deep drawn shape made?
A: Each shell is pressed and drawn from a solid circular sheet or plate of metal by means of high-pressure, hydraulic presses especially designed for this work.
5. Q: What is this production method called?
A: Hackney's Special Cold-Drawing Process.
6. Q: What are the advantages of this process?
A: It results in smooth finish, uniform thickness, and temper—elimination of laminations in the finished product—and usually provides lighter tare weight.
7. Q: Who are using Hackney deep drawn shapes and shells?
A: Scores of manufacturers in many industries are increasing their product advantages by using Hackney facilities.
8. Q: How can Hackney engineers help you?
A: By co-operating with you in developing new products or improving on those now being used.
9. Q: What company is engaged in the manufacture of Hackney deep drawn shapes and shells?
A: Pressed Steel Tank Company. They have specialized in the manufacture of seamless deep drawn shells and shapes for more than 40 years.
10. Q: What should be done to find out the full facts about Hackney's design and manufacturing facilities?
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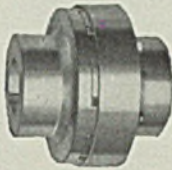
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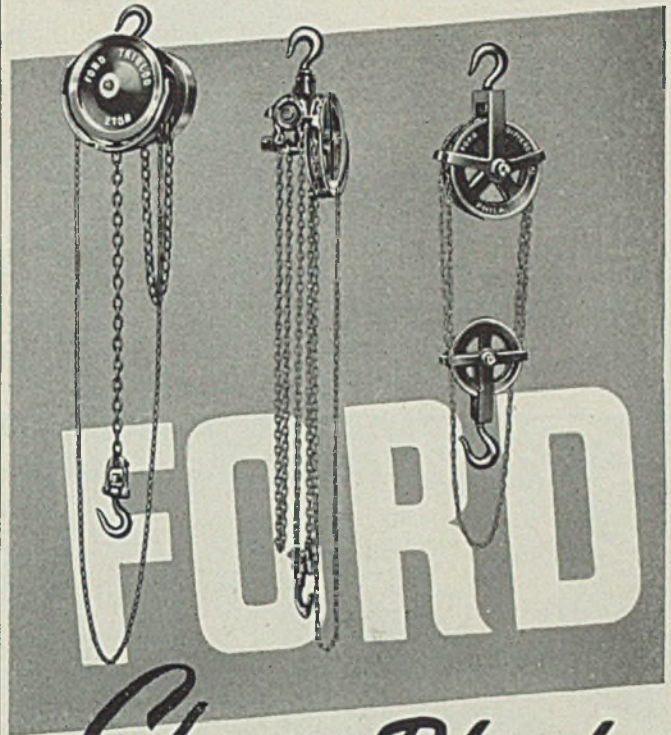
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WESTERLY, R. I.—C. B. Cottrell & Sons Co. has plans by Westcott & Mapes Inc., 139 Orange street, New Haven, for plant extension. Cost estimated at \$40,000.

New York

BROOKLYN, N. Y.—Charles Fischer Spring Co., 234 Kent avenue, has plans by Morris Rothstein & Son, 391 Fulton street, for altering three-story factory. Cost \$40,000.

JAMESTOWN, N. Y.—Rano Tool Co. Inc. has awarded contract for construction of an addition to its plant providing 16,000 square feet of space.

New Jersey

FORDS, N. J.—Heyden Chemical Co., has let contract for two-story 30 x 120-foot factory to Michael Riesz, 871 King George road. Estimated cost \$40,000.

NEWARK, N. J.—Tung-Sol Lamp Works Inc., 95 Eighth avenue, has plans by Epple & Kahrs, architects and engineers, 15 Washington street, for factory.

RAHWAY, N. J.—Regina Corp., 54 West Cherry street, has awarded contract for factory addition to Miller Blyth Inc., 441 Lexington avenue, New York.

Ohio

CANTON, O.—D-N-X Engine Corp., a

new company, is being incorporated through Attorney D. B. Day, of Lynch, Day, Pontius & Lynch, First National Bank building.

CLEVELAND—Cleveland Electric Illuminating Co., 45 Public Square, E. G. Crawford, president, and W. H. Hartman, purchasing agent, will start work at once on enlargement of Avon power plant. Estimated cost is \$3,000,000, including equipment. (Noted Feb. 2.)

CLEVELAND—Lucas Machine Tool Co., H. M. Lucas, president, 523 East Ninety-ninth street, will build \$55,000 extension of 13,500 square feet to factory.

CLEVELAND—Pal-Vin Machine & Mfg. Co., James Juliano, president and treasurer, will soon start 6500-square foot extension of factory space at 1419 East Fortieth street.

RAVENNA, O.—Chamberlain Engineering Co., Tallmadge, O., will manufacture and fabricate "Tygon," a new synthetic material used in processing equipment for refineries, arsenals, chemical and metallurgical plants, in the former Browning Foundry Co. plant here, which has been purchased by J. J. Chamberlain, president, Ravenna Ceramics Corp. The plant will be remodeled, and J. M. W. Chamberlain will be manager.

WARREN, O.—Lenney Machine & Mfg. Co., 733 Niles road Southeast, will soon start erection of an addition to its plant. C. B. Lenney is president.

WARREN, O.—Warren Tool Corp., Griswold street Northwest, will soon start work on 3200-square foot structure for additional manufacturing space and heat treating department.

Illinois

AURORA, ILL.—United Wall Paper Factories Inc. will build a \$60,000 plant here.

CHICAGO—R. Krasberg & Sons Mfg. Co., 925 West Wrightwood avenue, will soon start construction of a \$65,000 factory and office to provide a 50 per cent expansion of production. Some new equipment will be installed.

CHICAGO—Tri-Jay Tool Co., 4440 North Elston avenue, plans one-story 75 x 125-foot factory, and has let contract to Stelgerwald Cement Construction Co., 5308 Northwest Highway. Estimated cost \$40,000. S. Klefstad, 6324 Leggett avenue, architect and engineer.

CHICAGO—Ingersoll Steel & Disc Division of Borg-Warner Corp., 1000 West 120th street, has let contract for plant addition to Abell-Howe Co., 53 West Jackson boulevard. Estimated cost \$150,000.

DEKALB, ILL.—Nehring Electric Works plans to spend about \$40,000 for additions to its factory.

Indiana

RICHMOND, IND.—W. C. Shoemaker, city superintendent, plans erection of filter plant to cost \$65,000.

Florida

MIAMI, FLA.—Miami Shipbuilding Corp. will build \$1,200,000 shipbuilding plant here. T. C. Buhler, 1320 Venetian way, is president.

North Carolina

BURLINGTON, N. C.—H. Frank Mitchell Jr., Burlington, has contract for alterations and additions to manufacturing plant of Fairchild Engine & Airplane Corp. Albert Kahn Associated Architects & Engineers Inc., New Cen-



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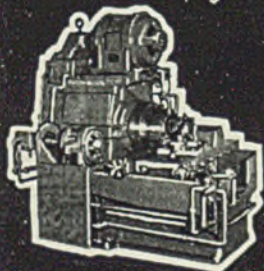
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CONCORD, N. C.—City, W. A. Wilkinson, mayor, receives bids April 28 for pumping station. Gilbert C. White Co., Durham, N. C., engineer.

Tennessee

MANCHESTER, TENN.—City, Thomas A. Johnson, Defense Public Works Project, will take bids April 30, Division B, sewage treatment plant with control house, primary and final clarifiers, high capacity rotary filter, etc. Walter L. Picton engineer, 711 American Bank building, Nashville, Tenn.

Virginia

GLEN LYN, VA.—Appalachian Power Co. has let contract to George F. Hazelwood, Cumberland, Md., for structure to accommodate additional boilers and turbo-generators.

Missouri

ST. LOUIS—Woermann Construction Co., 3800 West Pine street, has contract for \$40,000 factory at 4235 Clayton avenue for Mines Equipment Co., 1909 South Kingshighway.

Wisconsin

KENOSHA, WIS.—Holm Mfg. Co. plans one-story 30 x 170-foot factory addition. Contract awarded to Lindemann Construction Co., 4724 Fifth avenue. Estimated cost \$40,000.

MILWAUKEE—Globe Steel Tubes Co., 3801 West Burnham street, has given general contract for one-story 120 x 350-foot addition to Gebhard-Berghammer Inc., 5420 West State street.

Texas

PORT ARTHUR, TEX.—Neches Butadiene Products Co., organized by Gulf Oil Corp., Texas Co., Atlantic Refining Co., Pure Oil Co., and Magnolia Petroleum Co., will erect a \$40,000,000 plant in this area to produce butadiene.

RUSK, TEX.—Christopher Iron & Chemical Corp., care of J. I. Perkins, Rusk, is considering erection of iron ore plant here, costing over \$3,000,000. McGrossin & Co., 120 Wall street, New York, engineer, is surveying ore and water facilities.

Iowa

DAVENPORT, IOWA—Uchtorff Co., A. F. Uchtorff, president, 211 North Howell street, plans factory additions costing \$40,000.

California

LOS ANGELES—Caso Mfg. Co. will erect machine shop at 832 East Sixtieth street, 50 x 140 feet, to cost \$10,000.

LOS ANGELES—Neubart Stamping Co. will erect factory at 120 West Slauson avenue, 75 x 103 feet, to cost \$10,800.

LOS ANGELES—A warehouse will be erected at 2500 East Twenty-fourth street, for Western Iron & Metal Co. The structure will cover an area 118 x 153 feet and will cost \$20,000.

Washington

CENTRALIA, WASH.—F. D. McLaughlin, president, George Auto Train Control Co., manufacturer of mechanical control devices for railroads, announces conversion of plant with \$50,000 advanced by WPB.

SEATTLE—Barbee Marine Works Inc., 2601 Market street, has awarded contract for addition to machine shop.

VANCOUVER, WASH.—Kaiser Co. has awarded contract to George H. Buckler Co., Portland, Oreg., to construct dormitory at local shipyard, and contract to Wegman & Son, Portland, to build \$140,000 forge and machine shop.

Canada

FORT WILLIAM, ONT.—Canadian Car & Foundry Co. Ltd., 621 Craig street West, Montreal, has given general contract to Barnett McQueen Co. Ltd., 460 Christina street, for addition to shipyard No. 7 here at cost of approximately \$100,000. L. J. Soulsby is local manager. C. D. Howe Co. Ltd., Public Utilities building, Port Arthur, consulting engineers.

HAMILTON, ONT.—Toronto, Hamilton & Buffalo Railway Co., Aberdeen avenue, has received bids and will award contracts immediately for car repair plant here to replace plant recently destroyed by fire.

HAMILTON, ONT.—Barber Die & Casting Co. Ltd., 68 Sanford avenue North,

is having plans prepared by Prack & Prack, architects, Pigott building, for one-story plant addition to cost about \$50,000.

HAMILTON, ONT.—H. Bernard Stamp & Stencil Co., 24 Gore avenue, will award contract immediately for rebuilding plant here, to cost about \$60,000, with equipment.

HAMILTON, ONT.—Union Drawn Steel Co., 2 Weber street, has given general contract to Pigott Construction Co. Ltd., Pigott building, and construction work will be started at once on plant addition to cost about \$100,000 with equipment.

LONDON, ONT.—Sparton of Canada Ltd., 100 Elm street, is taking bids for further plant addition to cost about \$50,000. G. A. Holmes is secretary and manager.

ST. CATHARINES, ONT.—Foster Wheeler Ltd., 81 Eastchester street, is taking bids for addition to boiler shop, 110 x 160 feet, to cost about \$60,000, with equipment.

ST. CATHARINES, ONT.—McKinnon Industries Ltd., Ontario street, is having plans prepared by A. E. Nicholson, 46 Queen street, for addition to plant here to cost about \$40,000.

TORONTO, ONT.—Peerless Engineering Ltd., 11 Charlotte street, is considering plans for plant here to cost about \$240,000, with equipment.

TORONTO, ONT.—International Business Machines Ltd., 36 King street East, has given general contract to Dickle Construction Co. Ltd., 17 Yorkville avenue, for plant addition to cost \$10,000. Plans prepared by Harkness & Hertzberg, engineers, 57 Bloor street West.

TORONTO, ONT.—Ferranti Electric Ltd. is receiving bids through Ewart, Armer & Byam, engineers, 36 Toronto street, for plant addition to cost about \$50,000, with equipment.

WINDSOR, ONT.—Advance Machine & Tool Co., 1164 Albert road, has received bids and will soon let contracts for plant to cost, with equipment, about \$30,000. Sheppard & Masson, 52 Chatham street West, architects.

WINDSOR, ONT.—Dominion Forge & Stamping Co. Ltd., Seminole road, has given general contract to Allan Construction Co. Ltd., 44 Wyandotte street East, for erection of plant addition to cost \$85,000, including equipment.

WINDSOR, ONT.—Department of Munitions and Supply, Ottawa, C. D. Howe, minister, will erect plant here for manufacture of cutting tools, to cost \$500,000, with equipment.

HALIFAX, N. S.—Nova Scotia Light & Power Co. Ltd., Barrington street, J. B. Hayes, general manager, is having plans prepared by C. St. J. Wilson, Roy building, for steam electric power plant on Water street, to cost \$65,000.

MONTREAL, QUE.—Canadian Vickers Ltd., 1536 Notre Dame street East, is having plans prepared by T. Pringle & Son Ltd., 485 McGill street, for plant addition to cost about \$250,000.

MONTREAL, QUE.—Montreal Locomotive Works Ltd., 215 St. James street West, has received bids and will soon place contracts for plant additions, 70 x 480 feet and 60 x 400 feet, respectively, at the Longue Pointe works, and bids will be called early in May for another extension to the company's works here. T. Pringle & Son Ltd., 485 McGill street, engineer.

QUEBEC, QUE.—Department of Munitions and Supply, Ottawa, H. H. Turnbull, secretary, has given general contract to Anglin-Norcross, Quebec Ltd., 892 Sherbrooke street West Montreal, for addition to foundry here to cost about \$500,000, including equipment.



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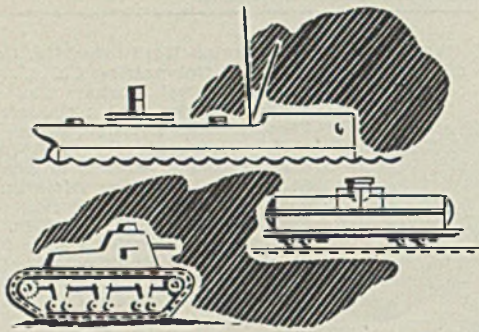
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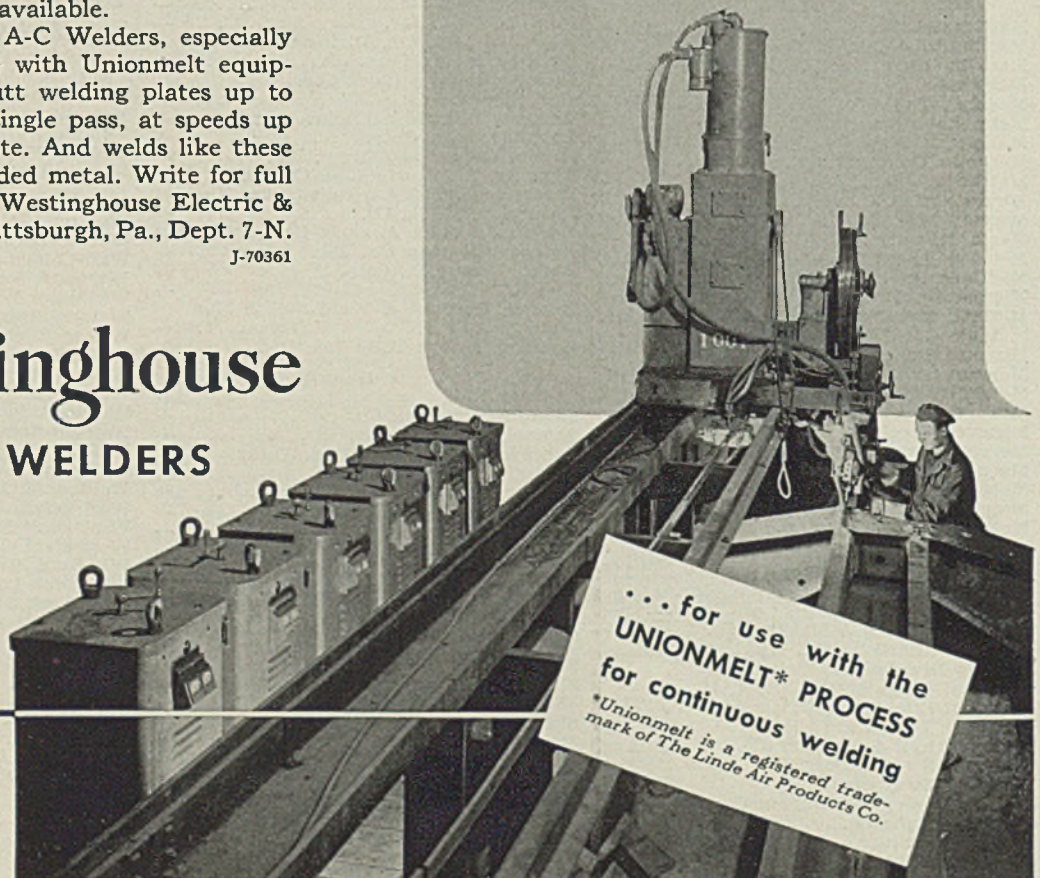
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