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

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

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

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

STEEL

ESTABLISHED 1882

Contents

Volume 110—No. 17 **April 27, 1942**

PRODUCTION • PROCESSING • DISTRIBUTION • USE

SPEED UP THIS CHANGEOVER *Electrically*

via GraybaR

Here's help for those who face the important job of changing over their plants to war production: GRAYBAR representatives can aid you in meeting *electrical* problems in the following ways:

● **REWIRING**... In relocating or augmenting your power distribution circuits, GRAYBAR can help you make the best re-use of present materials in combination with new supplies. Wide experience in industrial wiring practice, plus an up-to-the-minute knowledge of the delivery situation, makes for time-saving decisions.

● **RELIGHTING**... If you're going to triple-shift operation, or taking on work requiring high precision, you'll need the best of modern lighting. The GRAYBAR Lighting Specialist can help you plan the system and pick units that best meet the needs of the seeing tasks.

● **"POWERING"**... When you look to GRAYBAR for motors, controls and other apparatus for efficient operation of power-driven equipment, you save time and avoid mix-ups by getting equipment that "goes together" from a single source.

● **PROTECTION**... Warning sirens, fire and burglar alarm systems, communication and paging systems, floodlights and other outdoor lighting... all are part of an overall protection setup that's efficiently arrived at with the help of GRAYBAR.

• • •

Whether you're constructing, revamping or operating a plant for war production, remember that your essential electrical needs come first... via GRAYBAR.

GRAYBAR *in over 80 principal cities*

GraybaR — Everything Electrical — GraybaR ELECTRIC COMPANY — QUALITY — SINCE 1869 — REG. U.S. PAT. OFF.

Executive Offices:
GRAYBAR BUILDING
NEW YORK

HIGHLIGHTING
THIS ISSUE OF
STEEL

STEEL'S pictorial treatment of conversion to war production this week suggests the gigantic accomplishment along these lines made in Great Britain where every plant and every available worker is engaged on war or essential civilian production **(pp. 22-25)**. Those American manufacturers who have not yet converted to war production—and a great many of them have not yet done so—no longer can afford to postpone action, for our allout war effort requires that every facility, every available worker, must be mobilized behind the drive for victory. Every last ounce of effort is needed!

♦ ♦ ♦

Radio Sets Are Out

Manufacture of civilian radio sets last week was discontinued at 30 of the 55 plants in the industry and the rest will take similar action as soon as they are ready to convert to war production **(p. 32)**; manufacture of laundry and dry cleaning equipment is to be stopped; some farm equipment has been rated A-1-a. . . . New process is announced for treating low-grade chromite **(p. 30)**; prices on brass small arms ammunition parts have been reduced. . . . Additional industry advisory committees have been appointed by WPB **(p. 56)**. . . . Products made of iron and steel now may be shipped only on A-10 or higher priorities **(p. 34)**. . . . All manufacturers hereafter must apply for priority assistance under the Production Requirements Plan **(p. 35)**; plate users with excess inventories will receive no allocated tonnage in May.

♦ ♦ ♦

Too Much Steel For Civilians?

Under recent War Labor Board decisions workers are forced to pay union dues or lose their jobs **(p. 26)**. . . . Joint labor-management production committees have been organized in some 600 plants **(p. 27)**. . . . President Roosevelt, despite WPB assurances to the contrary, feels that too much steel still is being used for civilian purposes **(p. 27)**; he feels optimistic about scrap. . . . Lake passenger ship has been converted into an airplane carrier **(p. 31)**. . . . A new color film is available for training arc welders **(p. 45)**. . . . An airplane producer has stepped up production through an "8-ball" campaign **(p. 46)**. . . . OPA has entered suits against alleged scrap price violators **(p. 52)**. . . . Wing Tips describes Boeing's remarkable "cold room" **(p. 42)**. . . . Production lags are overcome by having men report five minutes earlier when changing shifts **(p. 40)**.

♦ ♦ ♦

Heat Treating Plane Parts

This week, Gerald E. Stedman **(p. 62)** describes the efficient heat treating procedure being utilized by a Michigan tool plant converted recently to manufacture aircraft parts. . . . Paul J. McKimm **(p. 74)** continues his discussion of the general characteristics of steelmaking in his concluding article on this subject. . . . Due to the installation of a mechanized conveyor line **(p. 88)** the possible plane production of an aircraft plant was raised several hundred per cent. . . . Fred C. Gandert **(p. 95)** outlines the four factors involved to obtain quality control in welding diversified metals at Westinghouse.

♦ ♦ ♦

Substituting With Scrap

In a pictorial presentation, C. M. Taylor **(p. 60)** shows how welded scrap can be used to good advantage in face of present shortages and other restrictions. . . . Gordon J. LeBrasse **(p. 68)** explains how to ease present excessively stringent bronze impurity limits which are impeding our war production. . . . In discussing hot dip galvanizing, Wallace G. Imhoff **(p. 80)** outlines some of the heat requirements for satisfactory production. . . . A fast tool-brazing setup **(p. 92)** is enabling Buick to increase production considerably, at the same time keeping costs at a low level. . . . A new high-speed abrasive belt grinder **(p. 100)** not only deseams and spot grinds tubing, but also finishes all types of strip, including stainless steel.

100,000 more freight cars *without cost*

NEEDED FOR THE WAR PROGRAM ★ POSSIBLE WITH YOUR HELP

FIVE percent more effective utilization of freight cars now in service would be equivalent to the addition of approximately 100,000 new cars. Ten percent more efficient use would be equivalent to adding 200,000 new cars.

As America's war effort gains momentum, the railroad burden grows heavier and heavier. New rolling stock is being built to help meet this demand, but better use of the freight cars already in service will avoid transportation bottlenecks *now*.

While a freight car is moving in trains less than two days on an average trip, it is in the hands of shippers or consignees several more days being loaded or unloaded, or in railroad yards and terminals. Every day—every hour of car detention time that can be saved is a boost to the war program. Ordering only the kind and number of freight cars actually needed, and loading them to capacity in the quickest possible time, is just as important.

By careful planning, Inland Steel Co. has increased the average weight of outgoing carload shipments 10% and decreased the average car detention time 20%, thereby greatly reducing the number of freight cars required. Inland considers its freight car economy just as important to the war program as the steel it produces for rails and freight cars, and for ships, guns and ammunition.

Let's all help America by helping the railroads

INLAND STEEL CO. ★ CHICAGO, ILLINOIS

STEEL
April 27, 1942

IS PERSECUTION NECESSARY FOR VICTORY?

During the past several weeks a number of developments have occurred which seem to place American industry and American industrialists on the spot. The frequency with which business houses and business men have been charged with wrongdoing would indicate that something is radically wrong. Either they are guilty of the charges or the government is engaged in a deliberate attempt to smear them.

The accusations include all sorts of exaggerations and distortions in regard to the effect of the cartels in which a number of American corporations participated with German companies. They include also loosely worded inferences that some war contractors are guilty of corrupt practices because of exorbitant profits, or because they have increased the salaries of executives too great a percentage.

Another form of persecution is illustrated by the actions, presumably by WPB, in charging two steel companies with violating priority regulations. Another case of insincere accusation was furnished by the War Labor Board's statement that Messrs. Green and Murray were correct in their declaration that the National Association of Manufacturers had "walked out" on the employer-employe agreement of last December.

The effect of these accusations is to mislead the public. After reading the charges or hearing them over the radio, the man in the street is strongly inclined to believe they must be true. As a matter of fact, few of the charges are true. In all but a very few minor cases, the charges are grossly unfair. Injured companies and individuals have been forced to resort to advertising in newspapers and to other means to protect themselves.

This situation is bad. It is so bad that Donald M. Nelson, appearing before a Senate committee in support of a fair deal for dollar-a-year men, declared that things are getting to the point where "if a man knows anything about business he is suspect."

Such is the price we must pay for politics. There can be little doubt that much of the injustice meted out to business in recent weeks seems out of the desire of the administration to put management in a bad light in order to relieve the pressure for a realistic wartime labor policy.

The war must be won, but is this persecution necessary to victory?

E. L. Shaner
Editor-in-Chief

Fig. 1—Grinder and polisher for 55 years, Henry Cray, aged 70, worked on 6-inch howitzers during the last war. Now he helps Britain in this war. He has trained 25 first class women workers in grinding and polishing; has nine children, all busy on war work. British official photo from Office of Emergency Management

Here are the reasons why

YOU MUST CONVERT

your plant

TO WAR PRODUCTION

Part II—Britain Converts

ENGLAND awoke at Dunkerque to find it was fighting with one hand tied behind its back. The hand it hadn't been using represented the hundreds of small manufacturers with their thousands of skilled workers who for decades had been turning out such items as fountain pens, safety pins, shoe horns, sewing machines and the like.

And many sanguine Britishers doubted at first that even the larger peacetime plants—making trucks, autos, farm machinery, stoves and so on—would have to be geared to all-out war production of planes, tanks, guns and bullets. Many Englishmen, who know better now, were content to fidget nervously *hoping* that the new and existing special war plants would soon turn out enough to repulse the Nazis. Then came the shock of the months from the invasion of Norway to the withdrawal from Dunkerque, months that made a tough fighter of a sluggish gentleman.

What had been but vaguely apparent became electrifyingly obvious! *If Britain was to depend upon special purpose plants, she might just as well quit.* Thus, in the late spring of 1940, England was jolted into realizing that all-out war requires all-out production, that *every available machine and worker must somehow find a place in war production,* for war materials were needed so desperately that there was no time to wait for new plants and machines to make them. A system HAD to be devised to get the needed war production *with existing facilities.*

Hitler, who had the advantage of knowing what he was going to do next, had come to this same realization *two years before.* And, lest we get too smug about Britain's sluggishness, we might well listen to those here who accuse us of not yet fully realizing that the war will be won or lost with the production facilities we now have. Thus conversion from peace to war production is a MUST for every American manufacturer, large or small, for our war production in this critical year of 1942 may determine who wins or loses this war.

In attacking its conversion problem, an alarmed Britain adopted the system of subcontracting that became known as "bits and pieces." That isn't bad terminology for a tank is not considered as a "tank" but as the 25,000 separate pieces—5000 different items—which compose it, pieces which Britain discovered could be made in ordinary factories and machine shops. Thus to speed plant conversion, the 5000 different

Fig. 2—No man in Britain today is too old to contribute to the war effort. E. H. Wenman, 80, master coppersmith, retired 10 years ago. With the outbreak of the war, he resumed work producing copper pipes for Wellington bombers. Although a Nazi bomb destroyed his home last Christmas, he hasn't lost a minute from his bench since the war began, for he knows every pair of hands, every tool that can be kept at work will speed victory. British official photo from Office of Emergency Management

Fig. 3—This English woman, in addition to maintaining a home for her husband and six children, works in a nearby small arms factory assembling "bits and pieces" of rifles which flow in from the little shops of the community. Thus by "doing what they can with what they have", they all contribute to war production. British official photo from Office of Emergency Management

Fig. 4—A tank, the British learned, is not a tank until it first is 25,000 separate pieces, 5000 of them different. But by subcontracting these "bits and pieces", many small factories and shops can contribute their share. Sent to a central assembly plant, these "armored greyhounds" of war quickly result. British official photo from Office of Emergency Management

parts were put on display and all manufacturers invited to look them over and determine which ones they could make with their existing production facilities.

That this program works is evident from the tremendous upward surge that it gave to war production. These studies quickly revealed to Britain that it had three types of available plant facilities:

First, for example, were concerns like the one making eyelets for shoes and corsets. This plant now makes eyelets but for army shoes. Also, with practically no change in machinery, it turns out airplane rivets. There were many plants of this type that could swing immediately into war production with little or no change in equipment or processing.

Second, there were many other plants that were convertible to war production with only slight changes in machinery and re-training of workers. One small shop, for instance, had been making display counters, shop fronts, tailor's dummies and mannequins. Its management discovered that after a little jiggery-pokery, as the British insist upon calling it, its craftsmen and layout men could handle composition airplane parts, gradually working up to all-metal parts, wing flaps, and the like.

Finally, there were some plants that could not convert their production facilities. Some stove-making plants were in that class, and no war use could be discovered for much of their machinery. But they did have intelligent management, highly trained workers and lots of plant space. The only thing to do was to store the inconvertible machinery and replace it with machines that could do war work, thus fully utilizing the management, labor and plant space.

Almost always, however, there was some machinery that could be adapted. The stovemakers discovered, for example, that they could make bomb and shell fuzes on the same machines formerly used to produce thermostats and valves.

Nor was "bits and pieces" a program for the small plant alone, for many large producers accepted subcontracts while awaiting the opportunity to enter war production as prime contractors. The experience of one such plant is typical:

"We found ourselves accepting subcontracts from main contractors for quite a few months," said one manager, "and it is most important to make large producers realize that they in turn can learn much from handling small jobs of this nature, for the slow infiltration of these small jobs provides just the experience that can be invaluable in getting into production on prime contracts later. It is surprising how many large companies overlook the value of taking on 'bits and pieces', little realizing how well it serves to train all participating departments along the right lines in preparation for the bigger jobs that automatically follow."

Conversion that rapidly followed adopting this realistic attitude toward war production in Britain was amazing. A manufacturer of lipstick cases discovered that—after a minimum of machine adjustments and a short training course for his nimble-fingered employes—his plant could turn out cartridges. Not to be outdone, a fountain pen maker found his plant could do the same thing. A tobacco machinery factory began to make the same sort of tank parts already being produced down the street on century-old lathes of a candlemaker.

Manufacturers of textile machinery, sewing machines, printing presses, office equipment and machine shops of all sorts began breaking up a difficult bottleneck by turning out forgings, jigs, tools, fixtures, gages, dies, cutting tools and other necessities for war production. It was found that many small plants could turn out certain items more efficiently than larger ones because of the greater skill of the workmen and the greater versatility of the tools in the smaller plant.

Britain found that it was possible to manufacture 75 per cent of its aircraft parts and 62 per cent of its aircraft engine parts in plants which originally were not counted on for war production. What this means in increased output is nothing short of amazing for it enlists the production facilities of a host of small

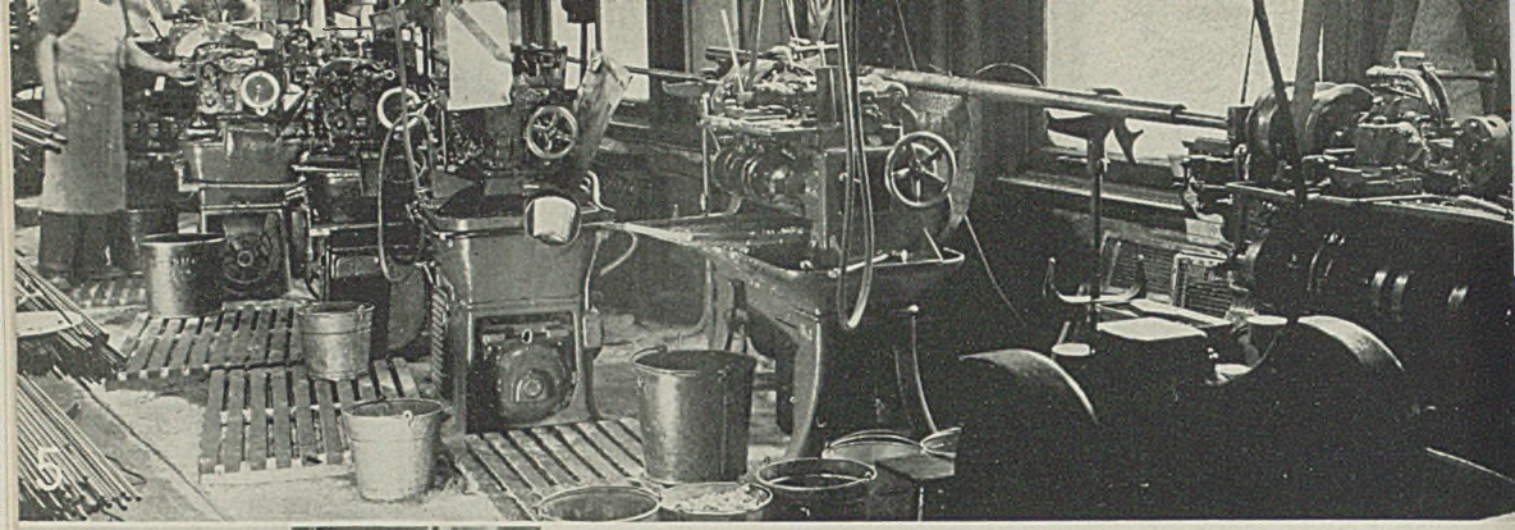


Fig. 5—A small loft metal-working shop in an eastern American city now converted to war production keeps a battery of nine automatic screw machines busy on subcontract work whereas none were previously employed. Portions of six of these machines can be seen here. This shop was formerly largely devoted to stamping brass, now works alloy steels. Former press operators run screw machines

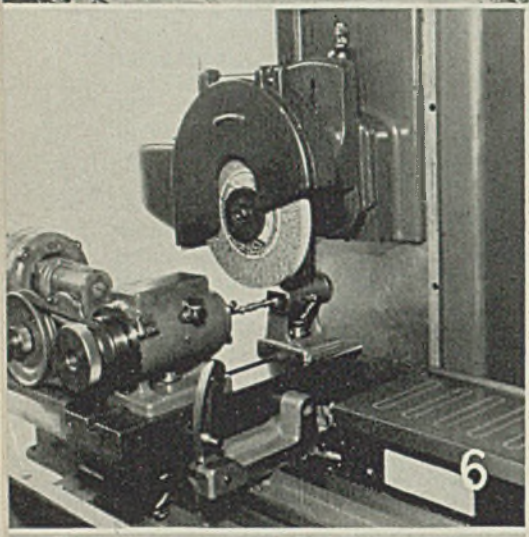


Fig. 6—When deliveries threatened to hold up war production, the tool room of this former stamping shop designed and built this precision cylindrical grinder. It is convertible to a surface grinder. It works so well the company is now building 20 more units for other subcontractors doing the same work, has a number in use itself

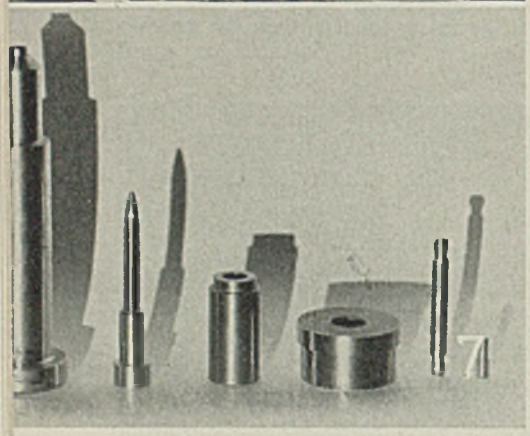


Fig. 7—Instead of making dies for stamping vanity and cigarette cases, the tool room of this small shop designed and built a number of cylindrical grinders with which it produces many different ordnance parts, including those shown here. They are: left to right, a crimping punch, contour hob, 30-caliber bullet cover die, loading fixture part, ball gage, loading fixture anvil

plants that otherwise would not be utilized. At the same time the larger plants with the assistance of a brood of small shops were able to contract to turn out more or less complete units of warfare—units which they did not feel capable of attempting themselves without large expenditures for new plant facilities.

Can We Learn This Lesson? There are still some manufacturers in America who appear to believe their production facilities cannot be of value in this emergency. Those are the ones who will shortly set up a tremendous howl when they are forced to close as nonessential producers. Yet farsighted management in many small shops has already seen the need for conversion of their facilities to war work.

For example, there are numerous small machine and metalworking shops tucked away in lofts of large buildings among a conglomeration of industrial and commercial activities. In peacetime, they may operate only a few presses or machine tools. Conversion to war production in such a shop may be fully as drastic a step as in a giant plant employing thousands.

A little one-floor loft shop in a large eastern city is an outstanding example. Slightly over a year ago it was doing a tidy business in metal specialties, making compacts, vanity and cigarette cases and handling small stamping operations with power presses. Today nothing but work on prime and subcontracts on war work will be found there. Output includes artillery fuze parts and similar screw machine work, fuze-loading fixtures and dies for .30 and .50-caliber bullets and other tool-room products. Most of the power presses now are in use in assembling detonator parts.

Not only has plant equipment been added and readjusted, but 90 per cent of metal now being fabricated is alloy steel, tool and bar stock. Previously fully 90 per cent of production was in brass, so the workmen are not only handling new operations but working a different material as well. Now nine automatic screw machines, Fig. 5, are being utilized against none before conversion, and 12 lathes are operated instead of only two. The power presses now work on detonator test assemblies on a subcontract.

In retooling, an early pressing need was for small cylindrical grinders. (Eight grinders are now in production compared with one before conversion.) Unable to get deliveries on the units required in less than six months, the shop engineer designed and built a grinder for their specific needs, the machine being convertible to surface grinding as well. The company is now operating four of these units, and so successful have these been that 20 more grinders are now being built for other shops engaged in similar war work.

Thus the shop has not only been converted to war production but has developed a machine tool business that may well prove extremely valuable after the war. The shop now operates 21 hours a day, six days a week and has increased its original working force nearly fourfold. Thus in addition to retaining its original workers during conversion, many additional hands have been engaged. Press operators are now screw-machine hands; a former spray gun operator handles precision grinding; tool-room help comes from all old departments.

From frying pans, egg poachers, radio dials and control devices to making percussion caps as well as

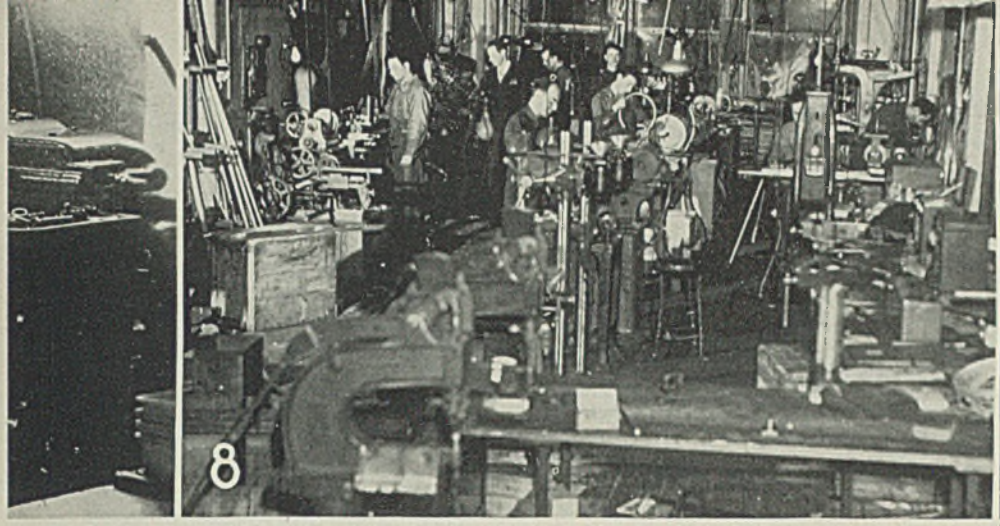
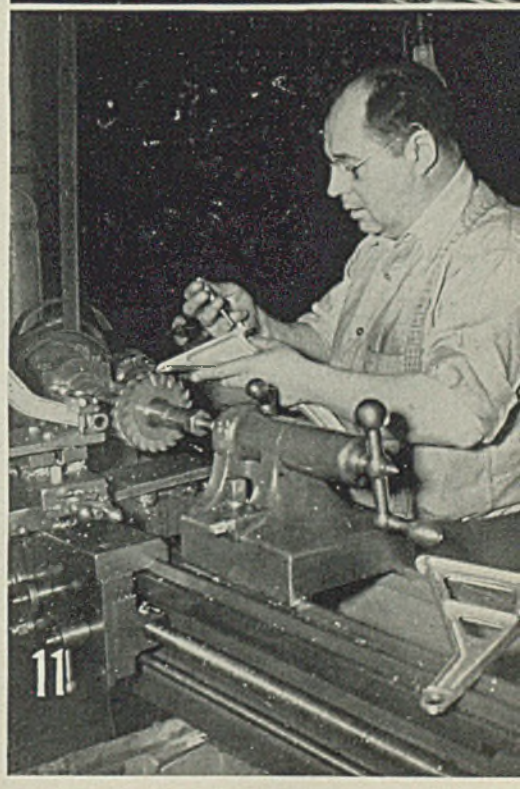


Fig. 8—General view of part of a small shop formerly devoted to working aluminum to make frying pans, egg poachers, radio parts. Now it produces parts for American fighting planes. Figs. 8, 9, 10 and 11 from Office of Emergency Management, by Gruber

Fig. 9—One of the partners in a small American manufacturing company discusses the construction of a sound-deadening cover for an airplane auxiliary engine, an item that he is now producing on an experimental basis, along with small aircraft parts

Fig. 10—Shop supervisor and workman discuss how to convert a lathe for use in war work. Some retooling and a change in procedure eventually adapt the machine for use in making parts for aircraft engines on a subcontract from a prominent plane-maker in the eastern section of the United States

Fig. 11—This particular lathe was converted to war production by making a milling machine out of it. A milling cutter now shapes forged aluminum-alloy flap hinges for American fighting planes. The ingenuity displayed by this manufacturer of frying pans, egg poachers and radio parts in converting to war work has enabled him to expand his plant from a dozen to 40 employes, assures his staying in business throughout the duration of the war



struts, flap hinges and other aircraft bits and pieces is the story of another small firm specializing in the working of aluminum. Two years ago the two young owners saw this war would involve a huge aircraft building program. That meant aluminum. They had two ideas—that there would not be enough aluminum, that they ought to help their country. They knew they were too small to make complete planes, but they had not been making complete radios either. They had been producing parts on subcontracts. Why not go after war work in the same manner?

Checking lists of plane manufacturers, they started at once to see what business they could get. It wasn't easy for subcontracts are not to be had for the asking. But by fall, it was clear their idea was sound. As a result, war work, which first seemed a threat, has in fact meant a great increase in business. The 1941 production of $220,000 worth of war goods was double the 1940 figure, which was largely civilian. At present the order backlog totals $300,000, and the plant is ready to take on additional work.

At first they bid only on jobs they could handle with their existing facilities. Later they expanded a bit, adding such items as pipe and tube benders. Instead of 12 workmen, they now employ 40. The day shift of 28 works 10 hours, six days a week; the night shift of 13 works 10 hours, five days a week.

Always anxious to increase their production, the partners visited the OPM regional office in May, 1941, soon after it was established in their city. While most of this company's work was obtained through its own resourcefulness, several contracts were obtained with the assistance of the field office. (See list of War Production Board Field Contract Offices, STEEL, April 20, 1942, Section Two, p. 26.) Among these was an experimental order for soundproof aluminum enclosures, Fig. 9, for auxiliary aircraft motors.

What advice does this successful subcontracting firm offer to others?

"At first, bid only on products that you can make with machines you have in your shop and can surely handle. And always remember—a letter will bring you blueprints and invitations to bid, but you will never get a contract unless you go to the plant and keep everlastingly after the prime contractor.

Material shortages, priorities, allocations do not bother this company for the prime contractors see that the needed materials are made available. Some of the most important plane-makers in the East subcontract work to this plant. Is your position as good? If not, why not do something about it, NOW?

Federal Agencies Pool Efforts To Eliminate War Plant Slowdowns

✦

"Maintenance of membership" clauses ordered by WLB arouse criticism as "closed shop under another name." Appear to be board's answer to union demands . . . "Little Steel" decision expected early in June

✦

WASHINGTON

CONCERTED action is being planned by the Army, Navy and five other government agencies to minimize slowdowns in war production work.

This was made public last week by Senator Byrd, Virginia, in a letter from Daniel S. Ring, director of maritime personnel, reporting that efforts were under way to "develop a centralized method of treatment of this problem. Mr. Ring did not detail the method.

Senator Byrd recently made public a report from a high Navy official showing slowdowns in eight vital war plants had reduced production from 25 to 90 per cent.

Co-operating with the Army and Navy in the program are the Maritime Commission, War Production Board, War Labor Board, the Labor Conciliation Service and Bureau of Labor Standards.

Emory S. Land, chairman of the Maritime Commission told a Senate committee the government should stabilize labor-management relationships to end this "infernal agitation" about the closed shop and other issues. He predicted that ship construction could be increased by 12½ per cent this year and 25 per cent in 1943 if morale were improved and slowdowns ended.

Meanwhile the policy of the War Labor Board toward union demands for closed or union shop began to develop through decisions handed down by the board.

It will be called "maintenance of union membership" and has been incorporated in several recent decisions by the twelve-man board.

One of these cases involved the Walker-Turner Co. Inc., East Plainfield, N. J., and the board's decision was something more than "maintenance" of membership. Since the union and the management began to dispute about six months ago, the union has lost a large portion of its membership. Nevertheless, the board in ordering the maintenance of membership clause also ordered that all who were union members last Nov. 27 must again become union members in good standing, or lose their jobs.

Shortly after the Walker-Turner case the board ordered a maintenance of membership arrangement between International Harvester Co. and its employes, but provided the arrangement should not become effective until a referendum of employes approved the plan.

Last week a maintenance of membership clause was ordered in the case of Babcock & Wilcox Co., Bayonne, N. J. The board in this case also approved a five-cent wage increase retroactive to Jan. 26.

May Set a Precedent

Although the board denies that any individual settlement establishes a precedent for future cases, it is believed the maintenance of membership arrangement will be its usual answer to union demands for a closed or union shop.

The arrangement provides that any worker who was a member of the union at a given date must retain that membership in good standing—pay dues—or lose his job. Any other employe who subsequently joins the union likewise must retain his membership in good standing. Thus the union can expand, but not decrease.

Critics of the arrangement contend it is virtually the union shop under another name.

When Washington reports several months ago indicated W. H. Davis, WLB chairman, favored the maintenance of membership as a solution to the pending "Little Steel" case, the four companies involved attacked the plan as "clever camouflage" (STEEL, Feb. 23, p. 23). Spokesmen for the companies expressed opposition to the proposal.

The "Little Steel" case came before the fact-finding panel of the board for final review last week and the board is striving for a decision early in June. A maintenance of membership decision here would meet strong opposition.

According to unofficial reports, much of the delay by the board in arriving at decisions has been caused by internal disputes over union security demands. The lineup reportedly has been the four employer representatives against the four labor representatives and the four public representatives. The minority has had to yield on the membership maintenance clauses in recent decisions.

Board ruling for maintenance of membership as a condition of employment were censured last week by the National Association of Manufacturers, Washington, in full-page advertisements in papers in this city, April 20.

Variant of Closed Shop

Headlined "Americans Want Victory—Not the Closed Shop," the statement exposed maintenance of union membership as a variant of the closed shop.

"The principle of the closed shop is the same whether it is called union security, maintenance of membership or some other sweet-sounding name," the advertisement stated.

"The War Labor Board closed shop policy wholly disregards the sound concepts of the citizen's rights expressed by President Roosevelt when he said: 'The government of the United States will not order, nor will Congress pass legislation ordering the so-called closed shop.' As the President said, 'That would be too much like the Hitler method toward labor.' . . .

"The War Labor Board says its policy follows democratic principles. Is it democratic to compel a worker to stay in a union or lose his job?

"Americans want victory. Will the closed shop bring victory? If it will, let's have it. If it won't, then in Victory's name, let's forget it for the duration. Let's stop wasting

precious hours and days in quibbling. Let Congress freeze the status quo until we've won the war!"

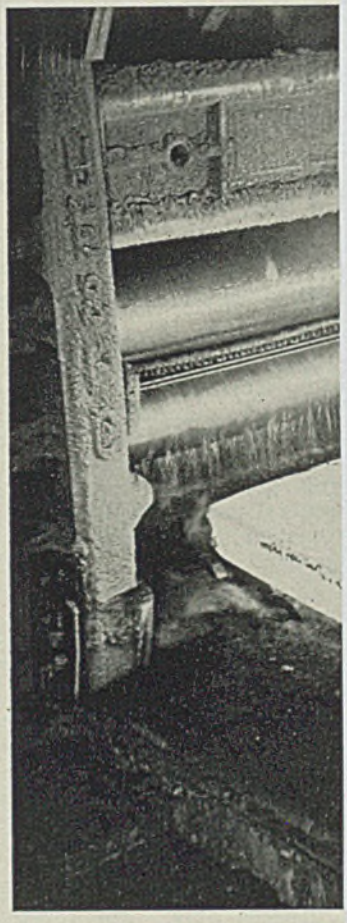
AFL President William Green and CIO President Philip Murray countered with a statement to the effect that the employers by publishing the statement were "running out" on the joint labor-management agreement that all disputes be settled by the WLB. They were upheld by WLB Chairman Davis.

Members of the manufacturers association retorted that the closed shop issue was not included in the agreement.

Labor-Management Committees Now Working in 600 Plants

One hundred war plants have reported in the past week the establishment of voluntary labor-management committees, bringing to 600 the number to launch war production drives.

Seventeen of the new plants reporting are in Pennsylvania, whose total is now 109, the highest in the country. Twenty-one more committees reported from Ohio, bringing that state's total to 75. Eight additional committees reported from New York, raising the number there to 76. In all, 32 states are represented.



VISITORS to Lukens Steel C
were impressed by the perfor
of armor plate steel. Fac

Too Much Steel Is Still Being Used For Civilian Goods, President Says

WASHINGTON

CIVILIAN uses of steel still are too large, President Roosevelt said in an impromptu discussion of steel supply and consumption at his press conference last Friday.

the shipbuilding program seemed to be the only part of the January war program which is behind schedule, the President remarked that he thought everyone is working on the shipping problem now.

would meet munitions needs, the President replied that he could not say so because by that time the munitions program may have grown again.

Mr. Roosevelt thought there was plenty of scrap in the country. Railroads have empty car sidings for which they have no use, and farms still have a large amount of scrap. He told newsmen that when he was riding in his Hyde Park estate a short time ago he passed scrap piles where workmen were trying to fill in a swamp and where he saw old farm machinery, trucks and lots of other scrap, which he gathered up and sold to aid the war program.

A suggestion was made by a reporter that WPA employes be put to work tearing up old trolley tracks. The President said he would pass the suggestion along.

been commissioned), according to the monthly report of C. C. Lindeman, M. A. Hanna Co., Cleveland. Ships designated for the ore trade number 299, compared with 292 at the end of the 1941 season. Some are automobile carriers being converted for the ore trade.

Mr. Lindeman's report is as follows:

Fleet	†Trip Capacity-	No. Boats	In Com.	In Ore Trd.
Pittsburgh S. S.	695,350	70	68	68
Interlake S. S..	400,600	43	43	43
Hutch. & Co. . .	283,350	35	34	34
Cleve.-Cliffs . .	183,400	22	21	21
Hanna Co. Agts.	148,900	14	14	14
Grt. Lakes S. S.	147,200	18	18	18
Bethlehem Tran.	132,600	13	13	13
Wilson Transit	118,200	13	13	13
Columbia Trans.	95,500	11	11	11
Reiss S. S.. . .	85,600	10	10	10
Tomlinson . . .	79,300	8	8	8
Midland S. S. .	57,150	7	7	7
*Nich.-Univ. S.S.	55,200	9	1	0
Interstate S. S.	43,000	4	4	4
Steinbrenner . .	37,700	4	4	4
Shenango Furn.	36,600	3	3	3
Bol. & Cornelius	33,300	4	3	3
Ford Motor.	23,750	2	1	1
Wisconsin Steel	22,300	2	1	1
Brown & Co. . .	21,400	3	3	3
Sullivan & Co. .	17,100	2	2	2
Hick.-Williams.	6,700	1	1	1
Dolores S. S.. .	5,300	1	1	1
Total	2,729,540	299	284	283
Apr 17, 1941. .	2,681,340	291	280	280

*Based on 20-foot draft. †Estimated.

Demolition of the Weitzel lock at Sault Ste. Marie to make room for the new $9,300,000 Gen. Douglas MacArthur lock was started last week. Construction company officials and the military commander in charge of the area, Col. Fred T. Cruse, estimate the 800-foot long, 80-foot wide lock may be completed in two years.

ODT Asks Lake Carriers To Move 88,000,000 Tons Ore

A. T. Wood, assistant on Great Lakes carriers, Office of Defense Transportation, met with vessel operators in Cleveland late last week to discuss possibilities of moving 88,000,000 tons of iron ore during the current season. This is several million tons more than was considered at the outset of the season.

A letter from Joseph B. Eastman, ODT director, suggested that much of the lake coal, limestone and grain be moved by rail to relieve the fleets.

Consumption of Lake Superior iron ore in March totaled 6,899,667 gross tons in blast furnaces in the United States. Canadian figures are not available. This compares with 6,222,583 tons consumed in February and 6,288,793 tons in March, 1941, both figures for United States furnaces only. For three months ore consumption totaled 20,082,553 tons, compared with 18,061,473 tons in the comparable period last year.

Otis Stockholders Vote for Merger; Expansion Plans

E. J. Kulas, president, Otis Steel Co., Cleveland, announced that at a meeting of shareholders April 24 the plan for the sale of substantially all company assets to Jones & Laughlin Steel Corp., Pittsburgh, and the distribution of the proceeds among the company's shareholders was approved.

Of the 832,112 shares of capital stock represented at the meeting 805,245 shares or approximately 97 per cent voted in favor of the plan. Mr. Kulas said that as yet no date has been set for the sale consummation.

Mr. Kulas reported on progress of negotiations with Defense Plant Corp. for construction at Otis of a battery of by-product coke ovens, a blast furnace, two additional open-hearth furnaces and other facilities.

He said this program, which would involve principally an expansion of facilities for the production of war materials rather than facilities to manufacture a more diversified line of peacetime products, was so large in relation to the size of Otis that the financing of the undertaking would have been a difficult problem if Otis had continued as an independent unit.

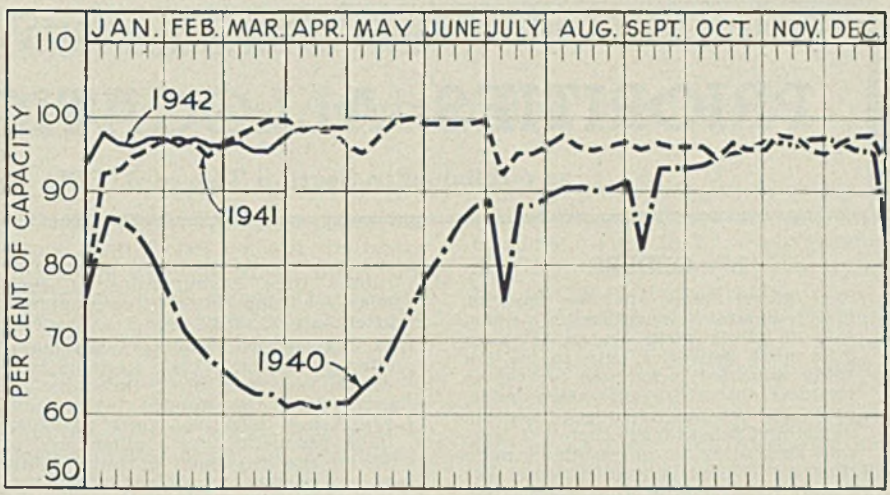
However, in view of the favorable vote of the Otis shareholders upon a sale of its properties to a concern with much larger resources, it was believed pending negotiations might now culminate in agreement upon an expansion program.

Program for Institute Meeting Outlined

Program of the fifty-first general meeting of the American Iron and Steel Institute, May 21, will feature addresses by Walter S. Tower, institute president, and C. E. Adams, chief of War Production Board's iron and steel branch, at the morning session.

Two round-table sessions will be held simultaneously in the afternoon, one devoted to technical problems, and the other concerned with industrial relations. Attendance at all sessions will be restricted to individual members. Because of war conditions, the customary banquet and evening session will be omitted.

Illinois Institute of Technology, Chicago, has appropriated $100,000 for an addition to its Armour Research Foundation's new metallurgy building.



PRODUCTION . . . . Steady

PRODUCTION of open-hearth, bessemer and electric furnace ingots last week was unchanged at 98½ per cent of capacity. Three districts advanced, five declined and four were steady. A year ago the rate was 96 per cent; two years ago it was 61½ per cent, both computed on capacity as of those dates.

Youngstown — With 74 open hearths and three bessemers producing, the steelmaking rate last week was 94 per cent, 2 points higher than the prior week, as slightly more scrap became available. All 25 blast furnaces in the district are in blast. Outlook for next week is about 93 per cent.

St. Louis—With better scrap supply, four open hearths were added to the active list, the rate rising 2½ points to 93 per cent.

Buffalo—Lighting of its last idle open hearth by Republic Steel Corp. increased the operating rate for this district 2½ points to 93 per cent.

Birmingham, Ala. — Production was held at 95 per cent, 23 open hearths active.

Chicago — Production eased ½ point to 104½ per cent. Three mills increased and three declined. Only one interest is at less than 100 per cent.

Detroit—Declined 3 points to 87 per cent as an open hearth was taken off for repair. Three furnaces are now idle for relining.

Cincinnati—Removal of an open hearth for repair caused a drop of 4 points to 87½ per cent.

Central eastern seaboard — Unchanged at 94 per cent. Scrap supply continued to improve.

Cleveland—Receded 2 points to 87½ per cent as one producer's scrap receipts were insufficient to maintain its rate.

Pittsburgh—Steady at 95½ per cent, as high as current scrap supply will support.

Wheeling—For the fifth week production held at 82½ per cent.

New England — Furnace repairs caused a drop of 15 points to 85 per cent.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Apr. 25	Change	Same week 1941	Same week 1940
Pittsburgh	95.5	None	96	55
Chicago	104.5	— 0.5	96	57
Eastern Pa.	94	None	96	57
Youngstown	94	+ 2	94	45
Wheeling	82.5	None	88	80
Cleveland	87.5	— 2	92	70
Buffalo	93	+ 2.5	90.5	44
Birmingham	95	None	90	83
New England	85	—15	92	57
Cincinnati	87.5	— 4	92.5	42.5
St. Louis	93	+ 2.5	98	42.5
Detroit	87	— 3	79	72
Average	98.5	None	*96	*61.5

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

Steel To Substitute for Brass in Light Bulbs

Yearly savings of about 2,000,000 pounds of brass and other vital war metals will result, it was reported, from a substitution policy announced last week by Westinghouse Electric & Mfg. Co.'s lamp division in Bloomfield, N. J.

According to A. E. Snyder, assistant general manager, all civilian lamp bulbs in 10 to 300-watt sizes and most industrial lamps will have iron instead of brass bases, but with a thin coating of brass to prevent corrosion. Sizes and wattages will be simplified. Types of display and decorative lamps will be reduced.

REVISIONS AND ADDITIONS TO

PRIORITIES—ALLOCATIONS—PRICES

as published in Section Two of STEEL, April 20, 1942

"M" ORDERS

M-6-c: Nickel Scrap, effective April 23, 1942. Requires segregation by all persons handling nickel scrap. Dealers may make deliveries only to melters being allocated nickel and for use in products for which allocation made, or to melters having orders requiring nickel and rated higher than A-2. Persons generating scrap containing more than 500 lbs. of contained nickel per month, or who have that amount on hand at end of month, or who have on hand at end of month more than 30 days accumulation of scrap they produced (if nickel content more than 100 lbs.) required to report by 15th of each month. Use PD-149, 150, 151 for iron and steel scrap, PD-394 for other nickel scrap and secondary nickel.

M-21 (Amendment) Steel Products, effective April 21, 1942. Restricts deliveries of both cast and rolled iron and steel products after May 15 to orders rated A-10 or higher, except for warehouse deliveries of carbon steel for repair and maintenance purposes, with such shipments by quarters limited to 3% of warehouse quota. Persons other than producers may ship nails, bale ties and small black or galvanized pipe on unrated orders. Form PD-73 abolished May 1. Producers file PD-138 by 15th each month to report shipments, PD-139 by 10th each month to report delivery requests.

M-56: Natural Resins, effective April 16, 1942. Restricts use in any quarter to 50% of amount used in corresponding 1941 period. Use in barn paint, on farm equipment finishes, floor finishes, freight car paints, interior housing paints, pencil and playing card finishes, road marking and porch paints, spirit label varnishes and toy and novelty finishes prohibited entirely. Users report inventories quarterly on PD-339.

M-57 (Amended): Tung Oil, effective April 15, 1942. Extends restrictions of original order to oiticica oil.

M-86-a (Amendment): Canned Foods, effective April 13, 1942. Requires canners to provide materials necessary to pack in export boxes canned goods directed to be set aside for the armed forces.

M-95 (Amendment): Rhodium, effective April 17, 1942. Bans all use of rhodium in manufacture of jewelry. Original order prohibited only plating with rhodium.

M-116 (Amendment): Closure Enamel, effective April 20, 1942. Postpones effective date from April 4 until April 30.

M-132: Sulfur, effective April 18, 1942. Relaxes priorities regulation No. 1 to permit deliveries of sulfur in excess of practical minimum working inventory.

M-137: Benzene, effective April 20, 1942. Bans use in motor fuel, except that any producer or distributor may use within next 30 days one-sixth of amount used during three months ended March 31.

"L" ORDERS

L-26-a (Amendment): Farm Machinery, effective April 20, 1942. Prohibits after April 30, 1942, manufacture of farm machinery and equipment requiring rubber tires. Manufacture of combines requiring rubber tires prohibited after July 31, 1942.

L-63 (Exemption): Supplier's Inventory, effective April 17, 1942. Exempts steel warehouses from filing inventory reports under this order.

L-76: Tubes, effective April 24, 1942. Bans production for civilian use of 349 of the 710 types of radio tubes.

L-84 (Amendment): Electric Heating Pads, effective April 15, 1942. Permits manufacturers to use inventories which cannot be used for other purposes and bans all production after June 30, 1942.

L-91: Laundry Equipment, effective April 18. Bans production of laundry equipment after June 1 and of dry cleaning equipment after July 1, except for Army, Navy, or Maritime Commission orders. Freezes existing equipment and stocks made prior to deadlines.

L-100: Compressors, effective April 17, 1942. Provides for complete allocation of all heavy compressors and prohibits manufacturers from accepting orders unless authorized on PD-420. Application for authorization to place orders made on PD-415. PD-416 is application form for permission to make delivery. Order applies to new, secondhand and reconditioned equipment.

"P" ORDERS

P-19-c, d (Amendment): Defense Housing, effective April 20, 1942. Permits extension of preference ratings by materials suppliers at any time within three months after supplier entitled to apply them.

P-56 (Amendment): Mines, effective April 13. Grants mines use of A-1-c rating to obtain explosives.

P-83: Supplies for Petroleum Industry, effective April 16, 1942. Revokes order.

P-95 (Amendment): Farm Machinery and Equipment, effective April 16, 1942. Assigns A-1-a rating until June 30 to insure delivery of 346,507 tons, mostly iron and steel, during period April 1-June 30. Material may be used only to manufacture specified machinery and equipment, and receipts are limited to specified percentages of total materials consumed during 1940. Rating use is reported monthly on PD-81.

P-118: Dairy Machinery, effective April 18, 1942. Assigns A-2 rating for materials required for emergency repairs; A-3 for normal repair materials.

PRICE SCHEDULES

No. 20 (Amendment)—Copper and Copper Alloy Scrap, effective April 17, 1942. Removes from the schedule heavy yellow brass, cast yellow brass borings, brass and yellow brass breakage grades. Adds a new grade, with maximum price fixed at dry copper content times 9.25c where the assay is 60.10% or more and at dry copper content times 9.00c where the assay is 50.01% to 60.00%.

No. 88 (Amendment)—Petroleum, effective April 23, 1942. Increases maximum price for crude petroleum in the Ritchie oil field in Acadia parish, La.

No. 112—Anthracite Coal, effective April 16, 1942. Eliminates requirement for seasonal discounts in sales at mines.

No. 114—Wood pulp, effective April 20.

Bureau of Mines Develops Process For Treating Low-Grade Chromite Ores

WASHINGTON

NEW process for treatment of the large American deposits of low-grade chromite ores to help satisfy the urgent wartime demands for chromium was announced last week by the Bureau of Mines. Process, which was developed as the result of years of research and experimentation, said Dr. R. R. Sayers, director of the bureau, has successfully passed all tests made thus far and has proved to merit large commercial production. Definite recommendations for the construction of commercial plants will be made when final data are received on additional tests now being made.

The bureau's new method, known as a roasting and leaching process, is designed to convert chromite concentrates into a higher grade material which may be used to produce either high-purity chromium or standard ferrochromium for the manufacture of alloy steel, Dr. Sayers stated. The process was developed in the bureau's laboratories at Boulder City, Nev., and Salt Lake City, Utah, under the direction of Dr. R. S. Dean, chief of the metallurgical division. It is capable not only of increasing the chrome content of the ore but can also raise the ratio of chromium to iron from about 1.7 to 1 up to as much as 30 or 40 to 1.

Vast deposits of low-grade chomite reserve ores in Montana, estimated at 2,500,000 tons by the Bureau of Mines and Geological Survey, and deposits of similar ore in other western states are expected to furnish the raw materials for concentration plants and proposed processing plants. The Montana deposits lo-

cated in the Benbow and Mouat areas of Stillwater county, are believed to contain enough chromium to yield over 900,000 tons of chromite (concentrates containing 45 per cent or more chromic oxide) of a grade suitable for making ferrochromium. This is equivalent to four and a half times the total amount of chromite shipped from domestic mines in the past 28 years. The utilization of domestic deposits would enable the United States to become less dependent upon foreign sources and save much valuable shipping space.

In 1940 the United States consumed more than 600,000 tons of chromite, all of which was imported from abroad, except 2662 tons mined in this country. It came from Africa, the Philippines, India, New Caledonia, Turkey, Cuba and Greece. Imports for the first nine months of 1941 reached approximately 650,000 tons, and domestic production rose to about 13,000 tons—still a small part of the total consumption. With increasing wartime demands, it may be expected that chromite consumption will advance to a new high in 1942 and 1943.

Utilization of the low-grade domestic chromite ores of Montana and the Pacific Northwest has long interested the Bureau of Mines.

"We have been definitely interested," stated Dr. Sayers, "in developing our domestic resources of minerals to the fullest possible ex-

(*Please turn to Page* 126)

Prices of Brass Materials Used for Small Arms Ammunition Reduced

WASHINGTON

THIRTEEN firms, producing more than 95 per cent of the brass materials used for small arms ammunition, have agreed to reduce prices of these products one cent per pound at OPA's request.

The reduction, OPA announced, will effect for the government substantial savings which will become increasingly larger as production expands.

All future deliveries of cartridge case cups, bullet jacket cups and sheet metal required therefor—produced by these companies—will be affected.

In his request for the price cut, Administrator Henderson indicated that OPA has been studying for some months the general price level on all brass mill products. Particular attention has been devoted to those which are being sold in large volume to the Army, Navy and Maritime Commission for small arms and artillery ammunition and other material.

Prices of these materials have been considered in the light of marked increases in brass mills' profits, the adminstrator added. Mr. Henderson emphasized the fact that the large volume of business that these mills now do and will continue to do in an even greater degree in these relatively few items has produced these profits.

Mr. Henderson described the current price reduction as only "a preliminary and partial step in dealing with this whole question."

"In view of the fact that there will be an increasing concentration of production on a limited number of items for the war efforts", the administrator pointed out in his letter to brass mills, "we believe you will wish to give careful consideration not only to a further reduction in the prices of the items which are the subject of this letter, but also to a downward readjustment of your prices on all the other items sold in large volume to the government."

Co-operating firms were: American Brass Co.; Bridgeport Brass Co.; Bristol Brass Corp.; Chase Brass & Copper Co. Inc.; Miller Co.; New England Brass Co.; Plume & Atwood Mfg. Co.; Revere Copper & Brass Co.; The Riverside Metal Co.; Scovill Mfg. Co.; Seymour Mfg. Co.; Stamford Rolling Mills Co.; and Waterbury Rolling Mills Inc.

Converting Great Lakes Passenger Ship to Airplane Carrier

CLEVELAND: Largest passenger ship on the Great Lakes, the 500-foot SEEANDBEE is being overhauled and the upper decks reconstructed to carry airplanes for training Navy fliers. The vessel was built in 1913 for Cleveland-Buffalo service. NEA

Windows of WASHINGTON

Home radio manufacture practically halted as industry converts for war production . . . Iron and steel deliveries to be restricted to priority ratings of A-10 or higher after May 15 . . . Segregation of nickel scrap required . . . United States Chamber of Commerce offers 12-point war tax program . . . Restrictions on production of critical industrial machinery removed until May 15 . . . Some farm equipment given high ratings

By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

THE MAJOR part of the country's radio industry stopped production of radios for civilian use April 22 to make its entire facilities available for war work. The remainder of the industry will wind up its operations within a few weeks.

Thirty of the 55 companies producing civilian radios ceased putting sets into production when the deadline fixed in WPB order L-44-a was reached. Two other large companies, RCA and Philco, each operating several plants, shut off civilian production at midnight April 22 in plants representing more than 80 per cent of their total production. These 32 companies already have war contracts totaling $780,000,000, representing 87 per cent of all the war contracts let so far to the home radio industry.

The remaining 25 companies were given additional time, ranging from one to six weeks to produce additional sets to facilitate their programs of conversion to war work, as provided for in L-44-a. Half of the 410,000 sets to be produced after the shutoff date will be reserved for export to friendly nations, as requested by the Co-ordinator of Inter-American affairs and lend-lease.

The plants which have discontinued civilian production produced 57 per cent of all the civilian sets, on a dollar basis, sold in 1941.

Production of Laundry, Dry Cleaning Equipment Banned

Commercial laundry and dry cleaning machinery have been added to the list of durable goods for which civilian production is to end for the duration of the war.

Limitation Order L-91 bans production of the laundry equipment after June 1, and of the dry cleaning equipment after July 1, except for Army, Navy, or Maritime Commission orders.

In addition, the regulations freeze existing equipment and stocks to be manufactured until the cut-off date, except for Army, Navy, or Maritime Commission orders, or for deliveries specifically authorized by the Director of Industry Operations.

High Ratings Assigned for Refrigeration Equipment Repair

WPB has granted high preference ratings for deliveries of materials needed for repairs to air conditioning and refrigeration equipment.

The top rating—A-1-a—is available in the case of an actual breakdown of equipment used primarily to process, transport or store food and daily products for the Army, Navy or Maritime Commission, or used in cold storage warehouses, meat-packing houses under government inspection and blast furnace air conditioning.

Other ratings, each in the "A" class, are provided to avert breakdowns of essential equipment and to maintain emergency repair service for existing equipment of all types, except domestic mechanical refrigerators. No rating is available for repairs to household refrigerators.

Limit Thicknesses of Steel Shoe Shanks

WPB Leather and Shoe Section has requested manufacturers of steel for shoe shanks to restrict production to three specific thicknesses.

A shoe shank is a sheet steel stamping which is inserted between the insole and the outsole of a shoe to reinforce the part that supports the arch of the foot. Steel shanks are used in more than 60 per cent of the total production of shoes, exclusive of slippers.

Leather and Shoe Section said that while steel shanks will continue to be used in some types of shoes, the use of wood shanks is advocated. The section added that the request is designed to save steel for war purposes by encouraging the standardization of steel shanks of light gages. Shoe shank manufacturers also will be able to operate on a smaller inventory of steel.

A-1-a Rating Assigned Some Farm Equipment

To speed production of foodstuffs needed by the armed forces, WPB has granted an A-1-a rating to manufacturers of certain types of farm equipment and machinery.

The A-1-a rating will be available only until June 30, and its use is surrounded by rigid restrictions.

Producers may apply the high rating only for materials scheduled to be delivered in their plants before June 30 for the manufacture of the following groups of new machinery, attachments and repair parts:

Planting, seeding and fertilizing machinery; plows and listers; harrows, rollers, pulverizers and stock cutters; cultivators and weeders; harvesting machinery; wagons and trucks; complete spraying outfits; farm elevators; poultry farm equipment, and miscellaneous farm machines and equipment.

Restrictions on Machinery Production Removed to May 15

Restrictions on production of critical industrial machinery listed in Limitation Order L-83 have been removed until May 15 to avoid disruption of schedules in plants preparing to convert to the output of war supplies.

Provisions of L-83 remaining in force, however, make it unlawful for manufacturers or distributors to accept orders for such equipment or to make deliveries without WPB approval.

Amendment No. 1, delaying restrictions on production until May 15, will permit manufacturers to continue production on orders that

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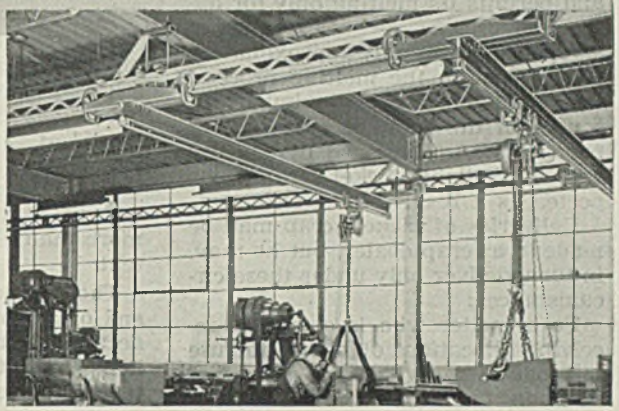

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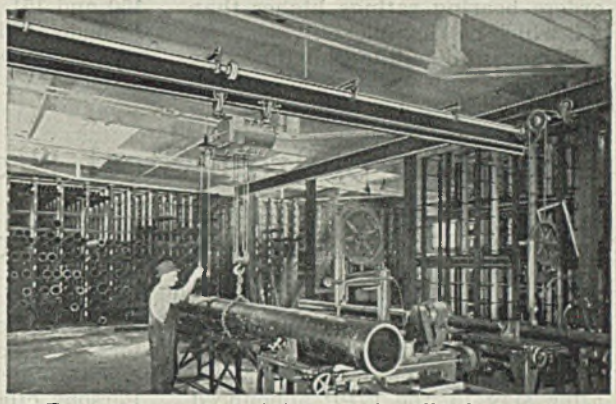

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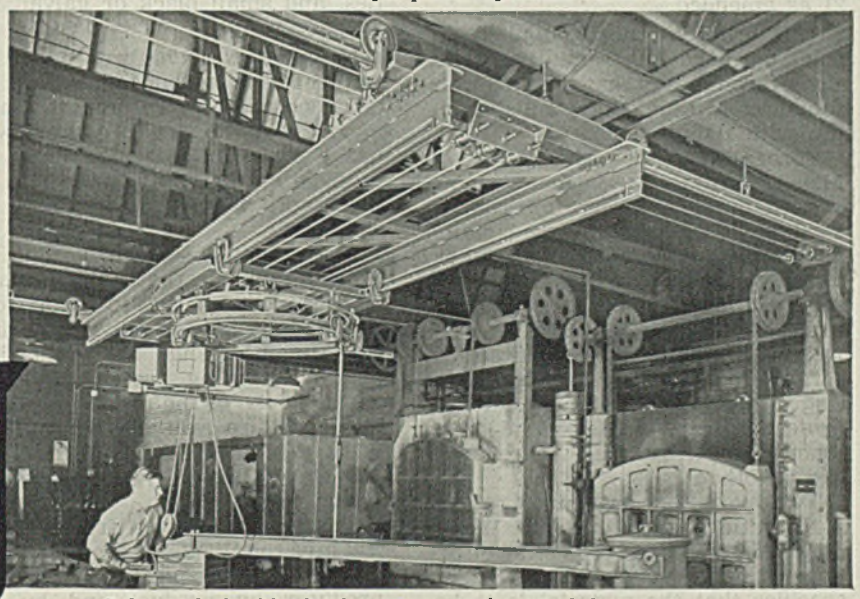


● Special double bridge crane with swivel features for quick removal and quenching annealing pots.

were on their books before L-83 became effective. The order as originally issued was effective April 9.

Control Established Over Nickel Scrap; Segregation Required

Complete control over nickel scrap was established last week through Order M-6-c, issued by J. S. Knowlson, Director of Industry Operations. It requires segregation of scrap containing more than one-half of one per cent nickel by weight and permits its melting only for authorized uses.

As nickel loses only approximately 10 per cent in the melting process, this scrap represents an important source of the element for alloying purposes. An increase of 150 per cent in available nickel scrap is expected as a result of the order.

Deliveries of nickel scrap may be made to a scrap dealer, but he may, in turn, deliver only under these circumstances:

To a melter who is currently receiving allocations of nickel, for use in products for which the allocation is made.

To a melter who is not receiving allocations of nickel, but who has orders bearing ratings higher than A-2 which call for nickel.

Persons other than melters are restricted to a 30-day accumulation of nickel scrap, unless the nickel content is less than 100 pounds.

Segregation of nickel scrap by all persons who handle it is required by the order. Nickel scrap must not only be kept separate from other scrap, but various grades and degrees of content of nickel scrap must be segregated.

Purchase orders for nickel scrap or secondary nickel must bear a certification that the purchaser is authorized to receive nickel and that the material will be used only as permitted by the order.

Reports are required by the 15th of each month from these persons:

Those who generate in their own operations scrap containing more than 500 pounds of nickel content per month.

Those who have on hand at the end of a month scrap containing more than 500 pounds of nickel content.

Those who have on hand at the end of a month more than 30 days' accumulation of scrap generated in home operations, if the nickel content is more than 100 pounds.

Nickel-bearing iron and steel scrap are to be reported on Forms PD-149, 150 and 151. Other nickel scrap and secondary nickel are to be reported on Form PD-394.

Deliveries of Iron, Steel Products To Be Restricted to "A" Priorities

DELIVERIES of iron and steel products will be restricted to preference ratings of A-10 or higher after May 15, the WPB announced last week, with issuance of Order M-21 as amended.

The order formerly applied to steel products only and the inclusion of iron means that the 2700 iron foundries in the country must comply with its provisions.

Form PD-73 is abolished, effective May 1. In its place is this system:

Each purchase order for iron or steel must contain a signed statement by a duly authorized official or agent of the purchaser, either stamped or typed on the order, stating that the material is to be used for one of the group classifications set up in the order. These are Army, Navy, Maritime, defense projects (war plants), lend-lease, other export, railroad, warehouse and all other.

Two exceptions are made to the A-10 rating requirement. Warehouses may deliver carbon steel on unrated orders when the purchaser specifies that the material is to be used for repair and maintenance. Each warehouse is limited, by quarters, to 3 per cent of its quota for any product for such deliveries. Persons other than producers may deliver on unrated orders nails, bale ties, and small black or galvanized welded pipe.

New forms have been provided for producers in connection with the amended order. To report shipments, iron and steel producers will use Form PD-138, which must be received by the WPB by the 15th of the month following the month of shipment.

Form PD-139, which is due in Washington by the 10th of each month, must be used to report tonnages requested for delivery, during that month and the following month, including past-due tonnage on the books of the producer. Both forms will be available soon at all WPB field offices and at the Iron and Steel Branch, WPB, in Washington.

Information derived from PD-139 will give the WPB, for the first time, total tonnage requested from each producer by product and by recipient. Summarized, it will be the first complete picture of all types of steel being produced and who is getting them.

The new order, designated as Amendment No. 3 and Extension No. 2 of General Preference Order M-21, is effective immediately and will remain in effect until revoked.

12-Point War Tax Program Submitted by U. S. Chamber

Twelve recommendations for a definite and consistent war tax program, in lieu of haphazard tapping of revenue sources, last week were submitted to the House Ways and Means committee by the Chamber of Commerce of the United States. The chamber's recommendations:

A 100 per cent tax upon excess profits during the war period, to be levied only after every effort has been made to define true normal profits.

A corporate normal tax of 25 per cent and a war surtax of 10 per cent, with appropriate adjustments for corporations having net incomes of less than $25,000.

Increased individual normal and surtaxes to produce at current income levels an additional $1 billion.

A retail sales tax, without exemptions (except for direct federal and state governmental purchases), at an effective rate approaching 10 per cent, with appropriae graduations for necessities and luxuries.

Corresponding excise taxes upon services, etc., which are not subjected to the retail sales tax.

A 5 per cent withholding tax, collected at the source, on payments of compensation, dividends and interest to individuals.

The allowance of a deduction (with the maximum limited to 20 per cent of net income) to both individuals and corporations for the amount invested by individuals or corporations in non-negotiable government bonds, noninterest bearing during the war, negotiable and bearing 2 per cent interest immediately upon the cessation of hostilities, payable in five annual installments beginning immediately after the war, and taxable as paid at capital-gain rates, which in no event should exceed 15 per cent.

Continuity of the present provisions applicable to capital gains and losses, without substantial change.

Essential improvements in the so-called technical provisions of the present law.

The formulation of new security issues designed to attract maximum additional borrowings from individuals, corporations, and savings institutions.

The elimination of all nonessential government activities.

The reduction to the bone of all essential nonwar activities.

WPB To Discontinue Granting Ratings on Individual Applications

WASHINGTON

WPB soon will discontinue granting preference ratings on individual applications for material to be used in general manufacturing operations. Policy, announced last week by J. S. Knowlson, Director of Industry Operations, is a further step toward putting industry under the Production Requirements Plan.

Effective immediately, no individual application from a manufacturer for materials to be incorporated in his products over a period of more than one month will be approved.

As previously announced, virtually all American industries requiring priority assistance are expected to apply under the Production Requirements Plan for the quarter beginning July 1. Under the Production Requirements Plan, the producers file a single application to cover all of their materials requirements for a calendar quarter, or for the remainder of a calendar quarter, when the application is filed in an interim period.

It has been the practice of some producers, who need priority assistance for only a few of the materials which they use, to file applications from time to time on individual PD-1A forms. Last week's announcement will restrict the amount of materials to which a preference rating may be assigned in this way. The new policy will give the WPB a tighter check on the volume and uses of materials for which preference ratings are assigned, and will also require all applicants who need priority assistance in the regular course of their business to furnish full inventory information to WPB.

Producers whose annual volume of business amounts to less than $100,000 may file their PRP applications on a simplified form, PD-25X. All others must use the regular PD-25A application.

In announcing the new policy, which is intended to reduce the volume of PD-1A applications, Mr. Knowlson also said that he has given definite orders against "hand processing" of priority applications received by the WPB. Hereafter, no priority applications will be accepted from anyone who presents them in person except in Room 4-101, Temporary "E", where they are received in the regular course of business, and no one will be allowed to intervene in the routine processing of applications.

New Survey Undertaken To Determine Metal Use, Probable Requirements

WASHINGTON

COMPLETE survey of the use of metal in the United States during the first quarter of 1942, and of anticipated requirements for the quarter beginning July 1, is being undertaken by the WPB with the mailing of questionnaires to all American users of metal in raw or semifabricated form.

Questionnaire, which is being sent out on Form PD-275, is a refinement of the metals questionnaire which was mailed to 11,000 users Jan. 30. Reports were received at that time from 85 per cent of those to whom the questionnaire was sent, and the information has proved of value to the WPB in deciding the permissible uses and allocations of metals needed in the war program.

The original questionnaire, covering metals used in the last quarter of 1941 and requirements for the second quarter of 1942, was mailed only to manufacturers using metal in their products. The new survey will also cover mines, railroads, shipyards, utilities, construction jobs, and the petroleum industry, as well as military and naval contractors. The list of manufacturers has also been expanded. For all practical purposes, it should provide a complete picture of United States metal use and requirements.

To avoid duplication, only the uses and requirements of metal in raw and semifabricated form, specified on Form PD-275, will be reported. In this way, the use of metal will be recorded only at one stage of the movement from producer to end use, and double reporting of the same metal or metal product will be avoided. The report is broken down into kinds and types of metal and metal products, and each company is required to show this breakdown in detail.

The list of metals and metal products on Form PD-275 is identical with the metals section of Materials List No. One of Form PD-25A, which is used for filing applications under the Production Requirements Plan. Consequently, a manufacturer operating under the Production Requirements Plan who fills out Form PD-275 will be able to use this data in his PRP application for the third quarter.

As more and more producers come under the Production Requirements Plan, which will be the standard form of granting priority assistance beginning July 1, the reports required on Form PD-275 will become unnecessary in most cases, and the volume of paper work will be reduced.

All metal users who receive PD-275 forms are required to fill them out and return them to the Bureau of the Census not later than May 15. The reports will be analyzed by the Census Bureau and the WPB. This will constitute one of the largest and most rapid statistical jobs which has ever been undertaken, comparable to the corresponding part of the biennial census of manufacturers, whose analysis usually takes many months. The analysis of PD-275 reports is expected to be completed in not more than two weeks after May 15.

Basic information called for on the form includes:

Inventory of metals on hand Dec. 31.

Amount received during the quarter ended March 31.

Amount put into production during the quarter ended March 31.

Inventory on March 31.

Estimate of amount to be put into production in the quarter ending Sept. 30.

Shipments of products during the quarter ended March 31, analyzed by preference ratings.

Anticipated shipments during the quarter to end Sept. 30, 1942.

Plate Inventories Under Constant Surveillance

Following a telegraphic survey of steel plate consumers, C. E. Adams, chief, Iron and Steel Branch, announced last week that users with excessive inventories will receive no allocations in May.

Constant check upon inventories of plates is being made, Mr. Adams said, because demand continues at least 50 per cent in excess of rising plate production. May output is expected to exceed 900,000 tons.

Republic Steel Corp., Cleveland, recently set a world's record for plate production for a 24-hour period, he revealed, making record shipment of 90 cars of ship plate.

Steel Producers, Accused by WPB, Win New Honors from U. S. Navy

Charges are surprise to companies . . . Emphatic denials of priority regulations violations issued . . . Executives pledge continued record production

TWO leading steel producers, accused by the WPB of violating priority regulations, last week received additional honors from the Navy for excellent war material production.

The companies, Carnegie-Illinois Steel Corp. and Jones & Laughlin Steel Corp., were charged with having diverted to private customers large quantities of iron and steel needed for war materials. WPB said that from "May, 1941, to the present" the companies accepted and made deliveries on lower-rated and civilian orders while refusing to accept or make delivery under high-rated military orders.

Charges were emphatically denied by executives of both companies.

Department of Justice, acting on WPB's recommendation, has filed suits in federal district courts in Wilmington, Del., and Pittsburgh seeking to enjoin the companies from "further violations" of priority rules.

"Team Work Appreciated"

In sharp contrast to the WPB accusation, the Navy Department awarded Carnegie-Illinois the all-Navy "E". Company originally was awarded the "E" by the department's bureau of ordnance last November. The latest award means that all bureaus of the Navy concur in the presentation.

Jones & Laughlin received a telegram of congratulations for breaking many production records during March from Undersecretary James V. Forrestal. "Team work greatly appreciated," the message read. "Continuance this record vital to war requirements."

J. L. Perry, Carnegie-Illinois president, said the WPB charges were "not true," and that the company is complying fully with priority regulations. In March, 99.6 per cent of the company's shipments carried priority ratings. He termed the charges a "complete surprise" to the company.

Mr. Perry issued the following statement to employes, to be posted on all the company bulletin boards.

"Yesterday's newspapers reported that the War Production Board has charged the Carnegie-Illinois Steel Corp. with 'repeated, deliberate violations of priority regulations,' and that the Department of Justice had filed a complaint in the courts requesting an injunction restraining the company from continuance of this practice.

" 'Priorities' represent a method by which the War Production Board determines the relative importance of steel orders and controls the making and delivery of the steel involved. There has not been, nor will there be, any "repeated, deliberate violations of priority regulations.'

"In order to assure all of you that this unwarranted incident in no way reflects upon the magnificent production job that has been and is being accomplished within this company in furthering the war effort, I want to let everyone know that we have been doing and will continue to do everything possible to serve our country in its great hour of need."

"The fixed purpose of this company has been one of literal compliance at all times with allocations, priority orders and special directives," Mr. Perry stated. "It has issued a manual to its employes after many conferences with the War Production Board which has attempted to interpret the various and frequently conflicting orders of those charged with issuing priorities. The only purpose of this manual is to try to keep the company's procedures up to date in the face of a mass of changing regulations.

"Absolutely Without Foundation"

"To name this company as giving preference to customers of its choice without regard to war needs or preference ratings is a statement absolutely without foundation. Production and deliveries of highly rated tonnages have received the very closest attention which this company has been able to give them and its facilities and mills have been used to the fullest extent in furtherance of the war effort.

"Reference is made in the statement to plate deliveries in accordance with priorities procedures. . . . Those in the WPB who are familiar with the facts know that as soon as its predecessor, the Office of Production Management, was sufficiently organized to review plate mill schedules, those schedules were submitted for such review and were adhered to under the OPM and later the WPB direction. Thus the WPB was in control of the distribution of plates. . . ."

"Carnegie-Illinois Steel Corp. is working at top speed to supply vital war necessities of the country. It will, nevertheless, gladly appear and demonstrate its full compliance with all governmental regulations if those in charge of this investigation feel that the best interests of the nation's war effort can be served by a proceeding of this character at this time."

H. E. Lewis, chairman and president, Jones & Laughlin Steel Corp., said he was surprised by the charges and that the corporation "through its officers and employes has been in daily contact with the various agencies of the government and the latter were thoroughly familiar with the corporation's scheduling of steel products at all times.

99.8% Shipments Rated

"In March, 1942, priority shipments of our corporation were 94.8 per cent, and in April, 1942, to date priority shipments were 99.8 per cent of total shipments, most of which represent the requirements of the Army, Navy, Maritime Commission and lease-lend customers.

"Nothing is being left undone by our employes and management to do our utmost in the present crisis, and we are and have been breaking records repeatedly in our all-out war effort."

Publication of the charges, which WPB said resulted from an industry-wide survey of compliance, surprised many neutral observers, as well as the companies. It was interpreted in some sources as another step in a "smear campaign" against management.

Wording of the press release announcing the complaint was not confined to a statement of the charges,

but said the alleged violations were "repeated" and "deliberate" and that they continued from May last year to the present date, "more than four months after Pearl Harbor."

The WPB statement said the compliance survey within the industry was continuing.

Major U. S. Steel Corp. Subsidiaries Contributing to Aircraft Program

STEEL is playing an ever-increasing part in airplane construction and great progress is being made in the introduction of less expensive and more readily available steels in applications where formerly alloys involving more expensive metals were employed.

This observation was made last week by United States Steel Corp. in a statement describing the products being made by its subsidiaries for the huge aircraft program.

Carnegie-Illinois Steel Corp. engineers are perfecting, in co-operation with a number of aircraft manufacturing concerns, plans for utilization of low-alloy, light-gage steel sheets and strip in the construction of planes. Even the "skin" of certain types of planes can now be made of steel. This is an application which for many years has been reserved for expensive alloys other than steel.

"More Production Now" is the theme in the huge aircraft program. Steel, readily adaptable to various welding processes, eliminates the need for riveting and speeds up considerably the time necessary to produce the finished plane.

National Tube Co. has for years been engaged in the manufacture of seamless aircraft tubing made in many shapes, sizes, and qualities which is utilized in the basic structure of many airplane types.

Tennessee Coal, Iron & Railroad Co. is making steel for construction projects throughout the South. Products of the Tennessee company include structural shapes and plates, extensively used in building aircraft plants.

American Steel & Wire Co. is manufacturing aircraft control cables for flight control as well as electrical wires and cables used in the construction of industrial and commercial plants, many of which are aircraft plants. Cold-rolled stainless steel and other alloys furnished by this subsidiary are also an important factor in the fabrication of essential parts as well as for the complete airplane structures.

At the Pacific Coast subsidiary of the Corporation, Columbia Steel Co. is supplying aircraft plants with materials for jigs and fixtures essential to the tooling up these vital plants.

In addition, the demands of construction for the housing of aircraft manufacturing facilities is being met by American Bridge Co., which holds among its many records one for the construction of an aircraft plant with over-all dimensions of 300 x 1007 feet, two and three stories high, involving some 8700 tons of steel erected by the company's field forces in a record breaking 53 calendar days.

"Tungsten Carbide Patent Agreement Assured U. S. Independent Supply"

MORE economical ways of using tungsten carbide to speed America's war effort and assurance of an independent supply of the important metal in this country resulted from patent agreements between the Krupp interests of Germany and General Electric Co.

This was the testimony offered the Senate patents committee by Dr. Zay Jeffries, chairman, Carboloy Co. Inc., Detroit, a General Electric subsidiary.

Dr. Jeffries' statement constituted a reply to an accusation by John Henry Lewin, an assistant to the Attorney General, that the company's agreement with Krupp had caused a shortage of the material here.

Explaining that in the early days Krupp had owned the rights under the patents and could have withheld its use in the United States, Dr. Jeffries said that the agreements with the German firm, coupled with his company's initiative and enterprise, had enabled the building in this country of an important industry which is one of its great facilities for national defense.

Dr. Jeffries estimated American production of tungsten carbide now is higher in pounds than Germany's output. In addition, he said, less of the American product is required for a given cutting tool than of the German product.

Carboloy's 1942 production budget is 45 times its 1938 production, the witness said. "This increase has been accomplished without financial help from the government and provides not only a large share of the requirements of the United States, but also provides a large amount for export to Canada, England and Russia."

Explaining why the price of Carboloy was $1 a gram or $453 a pound in its early days, when Krupp was selling a cemented carbide for $50 a pound, Dr. Jeffries went into some detail on the differences in the way the business developed in the two countries.

"In Germany Krupp had no competition. There were no licensees to compete in the quality of the cemented carbide, no competition in smallness of tip size, no competition in tightness of the braze, and no competition in grinding technique.

"In this country the Carboloy Co. and licensees competed vigorously in all of these matters. There was constant and vigorous competition in the development of quality to such an extent that for certain work grades were developed which were more than 50 times as good as the original.

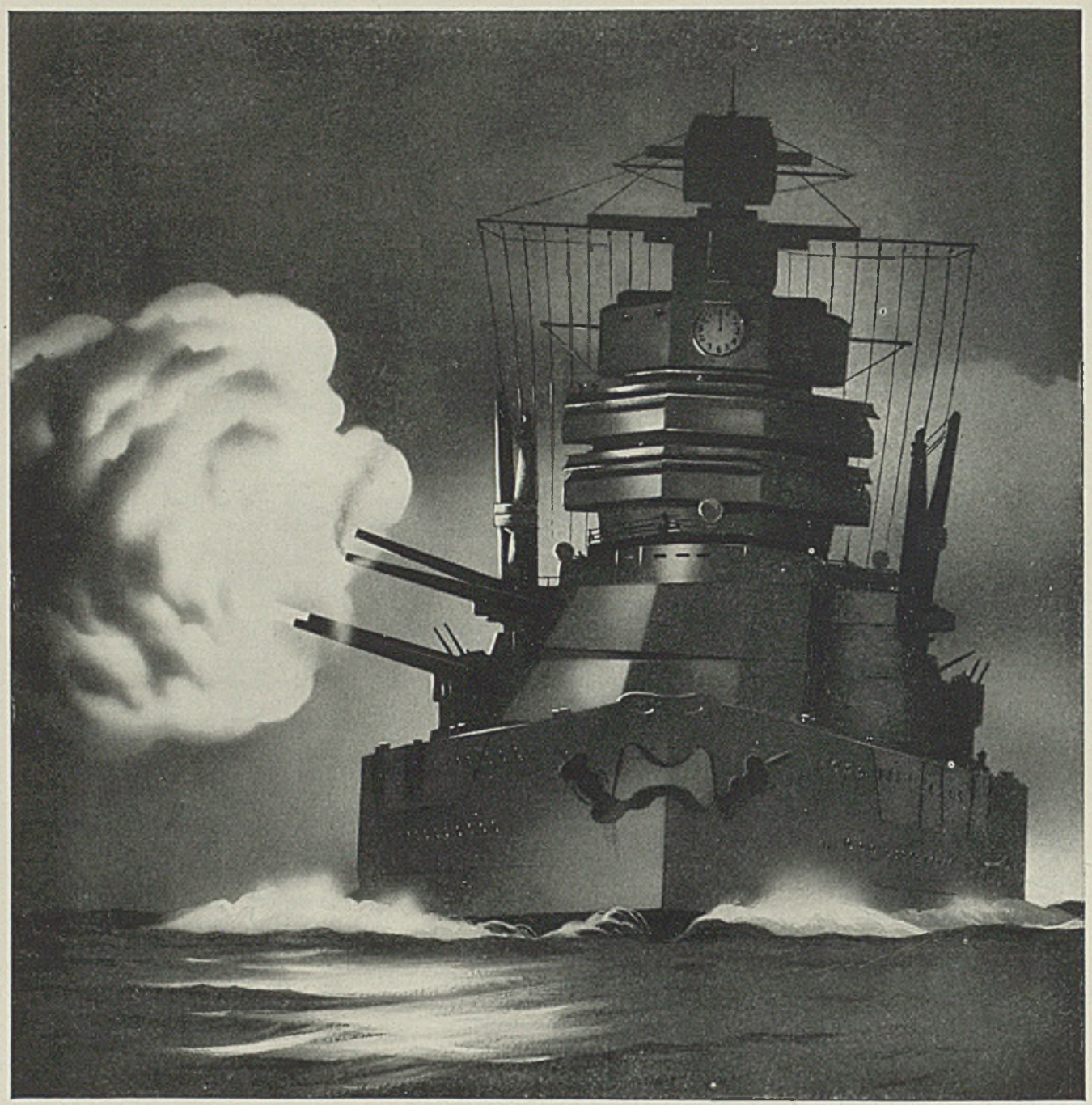
Sold Tool Service

"It was inevitable under the pressure of such competition that the American users would eventually demand the least amount of cemented carbide possible in a tool regardless of the price per pound. This least amount was determined by the acid test of trial and error with several manufacturers of tungsten carbide and many manufacturers of tools each trying to do a particular job with less cemented carbide. This resulted in the use of not more than one-fifth to one-tenth as much cemented carbide per tool as compared with Germany.

"The nature of the business was such it was costing nearly as much to make a 5 gram tip as a 20 gram tip. Each had to be ground separately to close dimensions, each had to be handled separately by hand. Germany could sell a 20 gram tip without any competition on grade or size, whereas in America, as a result of competition, a tip for equivalent service might weigh 3 to 5 grams."

Early experience in this country showed that it was necessary to supply instruction with sales of the new cemented carbide tools. This required the establishment of district offices, staffing them with engineers, and selling a tool service instead of just the hard metal as

(*Please turn to Page* 127)



MOLYBDENUM ENLISTS FOR THE DURATION

The enormous increase in requirements of molybdenum has necessitated the War Production Board Order M-110, placing molybdenum consumption under allocation control...Our metallurgical research staff is fully engaged in war work. At our mine, mill and converting plant, every effort is being made towards maximum production.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.
MOLYBDIC OXIDE—BRIQUETTED OR CANNED • FERROMOLYBDENUM • CALCIUM MOLYBDATE

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500 Fifth Avenue • New York City

MOLY

Mirrors of MOTORDOM

Freight cars and new super-truck-trailers to rush aircraft parts from motor capital to distant assembly plants. Make coast shipments in six days now . . . Thousands of dies, jigs and fixtures necessary before airplane parts production could get under way in auto body plant . . . Car rationing being liberalized in interpretation . . . Dealer mortality not serious as yet

By A. H. ALLEN
Detroit Editor, STEEL

DETROIT

IT IS a long haul from plants here to the outlying aircraft assembly points—on the West Coast, in Texas, Tennessee and elsewhere—but gradually there is being built up a shuttle service between Detroit and these locations the like of which has never been seen. One of the first such freight commuting arrangements was that set up by Douglas to move wing assemblies from plants of Murray Corp. of America and Briggs Mfg. Co. to the West Coast. This setup is now in operation and is being expanded.

Special box cars have been furnished by the Union Pacific and the Santa Fe. They really are "converted" automobile cars with extra high roofs, making clearance something better than 16 feet. Not much could be done about width or length, but the cars have been adapted specially to handling aircraft subassemblies which are bolted in structural steel frames and then loaded into the cars through end doors. Inboard wing and nacelle combinations are loaded four sets to the car, each set of two being the requirements of one attack bomber.

Still larger cars are required for outer wings of the Flying Fortress, which are loaded on edge. A variety of innovations has been worked out for supporting aircraft parts in transit, including the spring mounting steel frames pioneered by Fisher Body Division. Evans Products Co. here also is active in developing loading fixtures.

Cut Time To Six Days

Rail shipments to the West Coast are being pushed through with unheard-of speed. For example, some of the Murray shipments are reported to have arrived at their destination in less than six days which not so many years ago was considered good time for passenger travel to the coast.

When the Ford bomber plant gets into production it will be shipping large numbers of parts and assemblies to Texas for a plant there. It has apparently been decided that rail shipment of these parts has certain deficiencies and hence the experiment will be made of using truck-trailer units. About 50 of these combination hauling units have been authorized, it is understood, to be built in Kalamazoo, Mich. Trailers some 77 feet long, completely equipped for storage of fabricated parts and accommodating a crew of six or seven, will be hauled by powerful tractor units, and can make the trip in an estimated 33 hours. It appears obvious that trailers of this size will conflict with some state regulations restricting size and weight of truck transport units, but these restrictions will have to be waived in the case of the bomber freight.

Murray Corp. claims to be a full 11 weeks ahead of schedule on its original aircraft program, and the job of preparing to meet the production rate now being achieved has been tremendous. Two years ago the vast Murray plants were nearly dormant. Automotive business, principally Ford, was fast petering out, and although new lines of consumer goods such as bathtubs and kitchen cabinets were pushed into production to help fill the gap, the outlook was not too bright.

But aircraft production demands have changed all this. Now, formerly unused areas of the plants are filled with long lines of aircraft wing and nacelle assemblies in various stages of construction, and new contracts are in the offing which will still further boost activity. Several thousand employes are on the payroll—about 10 per cent of them women, incidentally—and although hiring has been temporarily suspended, additional demands will be felt soon.

An indication of the magnitude of the program of preparation for aircraft production at Murray Corp. is the quantity of tools required to build wings for just one contract now on hand. They included 1393 dies, 1838 jigs and fixtures, 1688 templates and patterns, and 108 routers and gages. Altogether, 725,000 manhours were consumed in the building of these tools, and this total does not include hours expended on purchases or furnished tools.

One important change in productive employe setup at Murray is the greatly increased ratio of inspectors. During car body building operations there was about one inspector for every 100 workmen on the line. Today there is one inspector for every 10 productive workers.

Relax Rationing Restrictions After Wide Dissatisfaction

Widespread dissatisfaction with the interpretation of the car rationing program by local rationing boards has been evident throughout the country. So intense has this feeling become that these boards are now loosening up and permitting more cars to be released to qualified buyers. Only small percentages of March quotas were released for sale, in Massachusetts, for example, 7 per cent. This failure to move cars is explained by a too strict interpretation of the rationing order and by a lack of knowledge on the part of the public as to who are entitled to buy cars. The latter condition is being corrected by enterprising dealers who are actually doing a selling job on prospects to convince them of their eligibility.

The whole situation has been badly confused, however, by continued silence on the part of the OPA. Furthermore there is disagreement among high OPA officials as to just how rationing should be administered. One official not so long ago was touring the country urging a better understanding of the rationing order by the public and that dealers co-operate to promote such

understanding, leading to release of cars. In the midst of this tour, this man was recalled and his addresses canceled. Meanwhile, during his series of addresses in one section of the country, rationing boards in other sections of the country were ordered by OPA officials to disregard statements of the traveling executive and to interpret the rationing orders rigidly.

The impasse is considerably relieved now, however, though not at the hands of the OPA. In Wayne county, Michigan, applications for new cars already exceed the month's quota, and authorizations are becoming fairly liberal. Aggressive dealers are taking on the job of getting applications filled out and approved, and are having a fair degree of success.

Generally speaking, the rationing order was not designed to prevent cars from getting into the hands of the driving public, but rather to insure that frozen cars were distributed promptly, and to properly qualified buyers. There is no quarrel with the plan as such, but there is plenty of grumbling over unnecessarily strict interpretations by local boards, and also by continual threats emanating from Washington over the possibility of confiscating private automobiles. These threats have the dual effect of scaring people away from buying new cars, where they might be entitled to them, and also of discouraging the intensive husbanding and conservation of present transportation equipment, so vital to its extended availability.

Care May Double Car Life

Estimates indicate the life of present private cars might be doubled over the normal expectancy by careful conservation, but a man has little incentive to conserve his car if he is faced with threats of its confiscation by the government, or legislation off the road, neither of which eventualities is either likely or remotely necessary.

Mortality among automobile dealers has not been serious as yet. One leading independent producer reports it has lost 16 per cent of the number of its retail outlets since last August, and 8 per cent of its potential sales volume. It foresees this figure mounting to 25 per cent and 18 per cent by Jan. 1. Dealers generally can absorb from 50 to better than 100 per cent of their fixed costs on service alone, and fixed costs have been reduced sharply following discontinuance of new car production. Furthermore dealers should be able to make about three times the net profit on new car deals that they made formerly, because they are not driven by competitive conditions to drop a large share of their profit on overtrading on used cars as was formerly the case. Naturally, as time wears on, and dealers have sold the 380,000 cars originally in Pool 1 and authorized for sale in the 12 months following the start of rationing, their difficulties will mount. Many are now looking actively into participating in some phase of war production, and a few have lined up small contracts. This trend should accelerate after the end of this year.

Show Fireproof Glass Fiber To Black Out War Plants

A new blast-cushioning, incombustible glass fiber material for blacking-out war production plants was shown here last week by Owens-Corning Fiberglas Corp. Known as OC-9 board, the material is composed of fine, resilient glass fibers compressed and treated with a binder which gives it sufficient rigidity to serve as a self-supporting, fire resistant panel which can be faced with glass fiber cloth, plywood or other surfacing materials. The product is designed to reduce damage from concussion and to provide protection against the spread of fire caused by incendiary bombs or explosives.

A machine gun plant in this area, now working around the clock seven days a week, noted that its plant power factor dropped sharply every time shifts changed, because machines were temporarily shut down or slowed down while new operators were taking the places of those leaving. To remedy this condition and to improve efficiency of production, the incoming shift reports for work about five minutes before the outgoing shift leaves and operators change positions without slowing down machines or cutting the power. Charts show a smooth power factor across all shift changes, the only dips being during lunch periods. This same plant, incidentally, now is employing 40 per cent women and finds them ideally suited to small hand operations and even machine work where no heavy lifting is required.

New machine developed for rifling gun barrels produces a completely rifled barrel in one complete cycle, against 160 passes by the old "hook cutter" method. Between 24 and 55 barrels can be rifled hourly now, against one an hour by the old method.

Chrysler Corp. stockholders were told last week that out of seven major war contracts undertaken prior to Pearl Harbor, six are now in volume production and shipments on the seventh will begin in about 30 days; that more than 60 per cent of the machines required to handle war orders will be retooled automobile production equipment; that when war activities are in full production the Corporation will be employing twice as many as in peak peacetime periods, this assuming materials are available to sustain planned production; and that Chrysler is now producing, tooling to produce or developing for production 24 separate war items.

Auto Industry Aims at War Load of 14 Billions Yearly

Reports from 180 companies, operating about 600 plants and representing 85 per cent of the automotive industry (based on labor), show these companies were committed in February to the production of war goods at the rate of more than 14 billion dollars a year and, in that same month, had reached a rate 22½ per cent of that goal.

This form of report now has been perfected by the WPB Automotive Branch, and shortly figures will be available to show the March progress of these same companies, according to Ernest C. Kanzler, chief of the branch.

The figures are based on sales, as reported by seven automobile manufacturers, 25 truck manufacturers and 148 parts manufacturers.

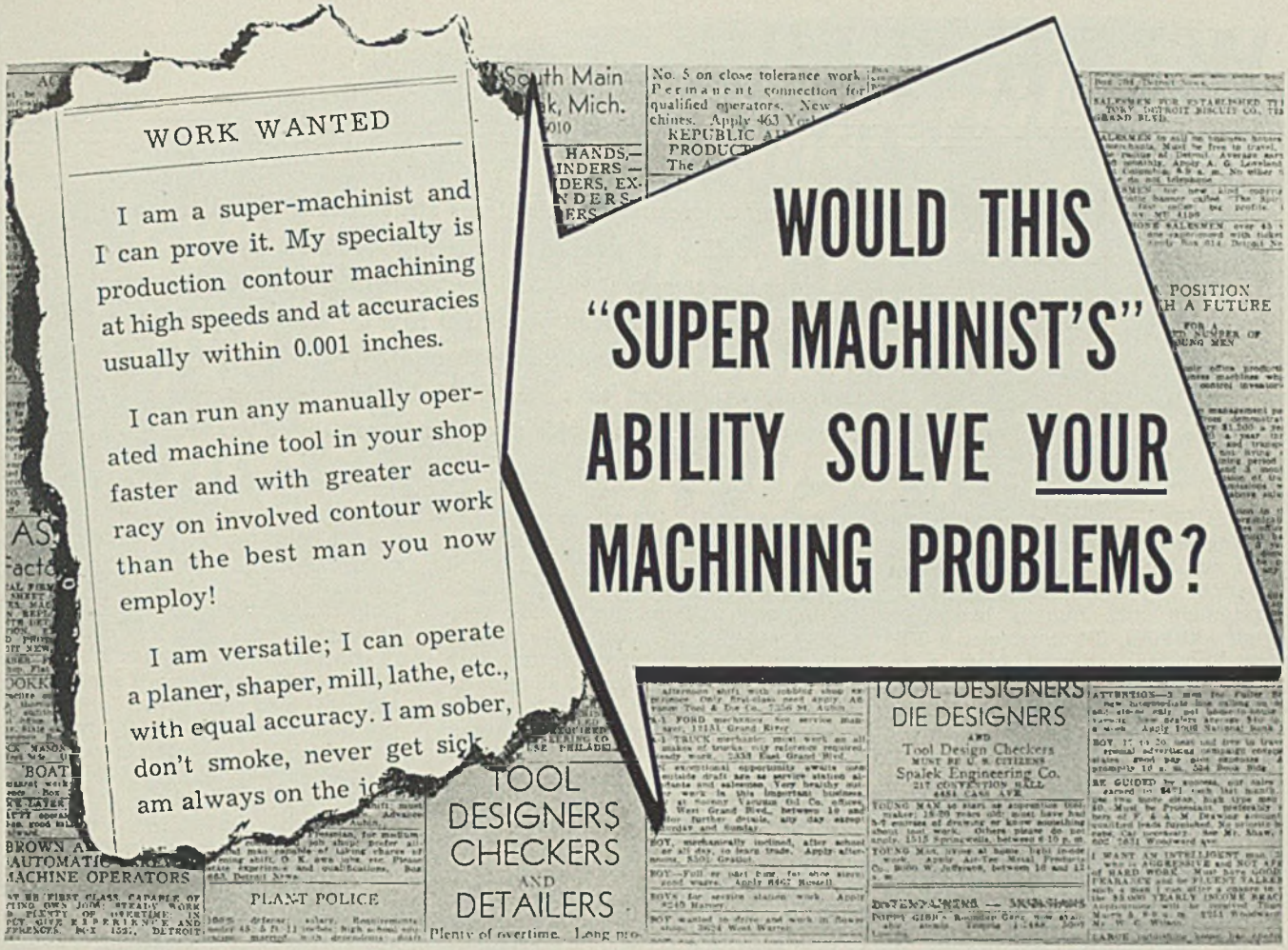
Mr. Kanzler points out the sales figures necessarily include some duplications, because one company may sell to another, but they long have been accepted by the public as one means of measuring production.

"Value added" figures probably afford a truer criterion of war work done in automotive plants, although they are more generally used by statisticians and production men than the general public. "Value added" represents work actually done in each of the plants reporting. The figure is reached by subtracting from the total sales the costs of raw materials and any parts supplied by other manufacturers.

On this basis, the 180 companies reporting are committed to a war load in "value added" at the rate of 7 billion dollars annually. This is a basic figure because it is in terms of value of end products purchased by the government. The February "value added" of war materials alone was $136,000,000, which is at the annual rate of 1½ billion plus.

Employment in the 180 companies was 759,610 in the peak 1941 month. It was 340,959 in February or 45 per cent. It will be 929,000 at the maximum war load, based on war orders on hand in February.

About $300,000,000 in new business has been booked by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., since Jan. 1, George H. Bucher, president, announced last week. Nearly all of the work is directly or indirectly for the fighting services, Maritime Commission or other government agencies.



This *super-machinist* is a **DUPLIMATIC!** It is to be used with your present equipment—same machines, same operators.

DUPLIMATIC gives you faster production contour machining at accuracies required in this war. It is quickly connected with the feed screws of the machine it is to control. It duplicates an original pattern or template directly and *semi-automatically* in metal at high speeds and at uncommon accuracies.

This precision control directs the movement of any manually controlled machining operation: milling, turning, planing, shaping, boring, die sinking.

DUPLIMATICS are foolproof in operation. Operators "catch-on" quickly. Maintenance is no problem.

If you have production machining that must be done on your present manually controlled equipment and yet should be done at speeds and at accuracies considerably beyond human capacity, tell us about it.

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These are sketches of the simplest and most typical

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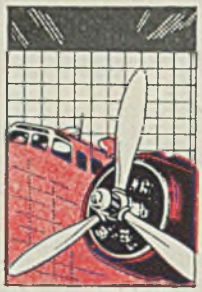
types of work now being handled by DUPLIMATICS.

WING TIPS



Boeing stratochamber simulates stratosphere conditions, permits testing of equipment for high-altitude flying. Combines low temperatures and low pressures, and even provides vibrations which occur in actual flight. Cooled by mechanical refrigeration machine with capacity of 108,000 B.t.u. per hour, equivalent to about 1200 kitchen refrigerators . . . Ventilation major problem in expanded plants

FLIGHT experiences with the Boeing B-17 Flying Fortress in actual combat have uncovered many strange happenings to materials, equipment and human beings at high altitudes. To illustrate, a Flying Fortress returned from a recent raid with the tire of the tail wheel not *punctured* by an enemy bullet but *shattered* like so much chinaware.

The explanation was simple enough, for the fighting had been at an altitude of several miles where it is so cold rubber tires freeze solid, a change which is presumed to occur at a temperature of about minus 50 degrees Fahr.

To solve problems incident to high altitude flying, Boeing has built a new "cold room" and enlarged a stratochamber at Plant 1 in Seattle. These facilities enable engineers to duplicate the low temperatures of the stratosphere, also to combine low temperatures with the low pressures found at high altitudes, and even to provide the vibrations in equipment which occur in actual flight.

The aeronautical engineer has had to raise his sights since the Flying Fortresses have begun carrying the war just about out of this world. Though temperature usually remains fairly constant above 35,000 feet, atmospheric conditions and locale can drop it from —60 degrees Fahr. to as low as —100 degrees.

Problems never encountered in everyday flying are met in the perpetual winter of the stratosphere. Lubricating oils become mush. Metals shrink, each with its own degree of contraction. Brittleness is another problem. Every piece of equipment has its own individual operating characteristics throughout the widely varied extremes of both temperature and pressure to which it is likely to be subjected.

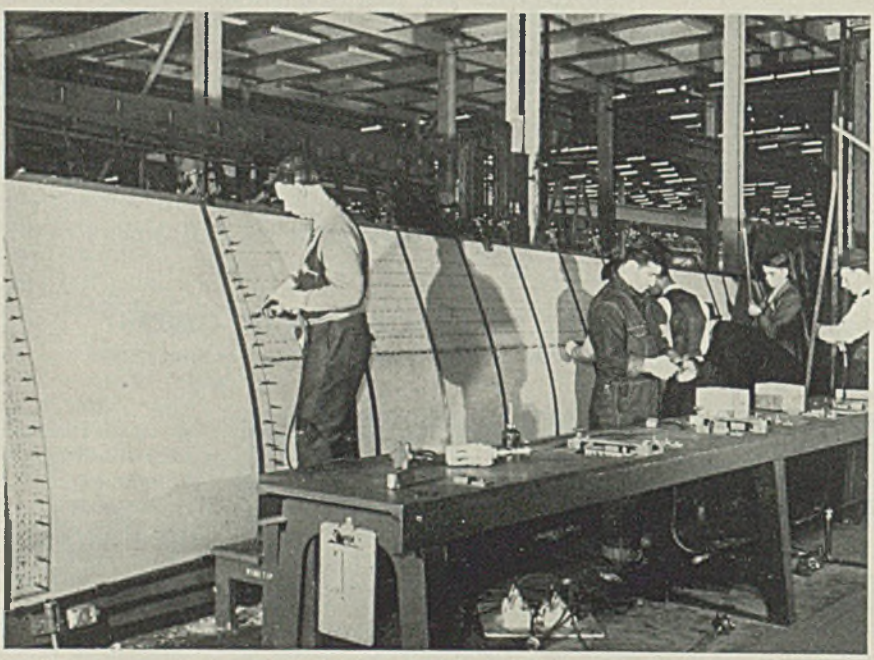
The polar laboratory, designed by the Boeing engineering department's mechanical equipment unit, is operated by the largest mechanical refrigeration machine in use anywhere for atmospheric aviation research. About as many ice cubes can be frozen in this machine as in 1200 kitchen refrigerators. In engineering language the capacity of the new laboratory is 108,000 B.t.u. per hour.

Unorthodox construction practice was followed in building this cold room. Engineers began with the ceiling and worked down. They managed this seeming defiance of gravity by attaching the roof to the ceiling of the larger room in which the laboratory was erected.

Once in operation, it was found that air within the compartment contracted as the temperature dropped, and the relatively low pressure permitted outside air to seep through the cork walls. Moisture in the outside air condensed and froze within the walls. Failure to plug this leak eventually would have caused the walls to disintegrate, like rocks eroded by continuous melting and freezing of water. Two quarter-inch coats of paint on the outside of the walls solved the problem.

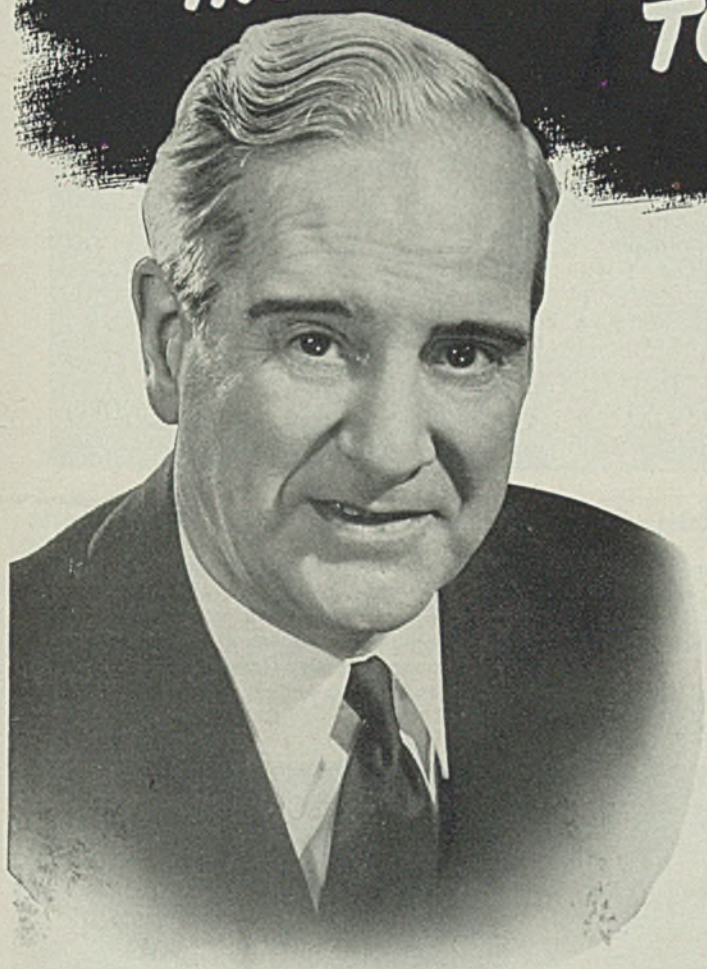
The polar lab presents hazards to operators, so men conducting tests inside are under constant observation from outside by means of a window comprising four layers of glass, each pane separated from the others to provide three dead air spaces. Wearing apparel includes

Pins Hold Bomber's "Skin" in Place for Riveting



WORKMEN here are assembling the aluminum alloy skin on the upper surface of an outer wing at the Willow Run bomber plant of Ford Motor Co., now in its early stages of activity. Small projecting fasteners are known as Cleco pins and are used to hold the assembly firm prior to riveting. As the riveting proceeds, the pins are easily removed through their spring action

Every pound of materials you save .... is a pound more for someone else TO USE!



LET US HELP YOU TO *Save Vital Alloys*

• Either as tools or as raw materials, alloy steels enter into the production of practically all war equipment. *Use these steels wisely; use them well!* That is an infallible way to speed up production; it is also the *only* way to conserve strategic materials . . . to spread the nation's supply of metals and alloys over the greatest possible amount of actual production.

Write us your alloy steel problems—you'll get your answer either in printed form, or in the personal assistance of our Technical and Field Service Staffs.

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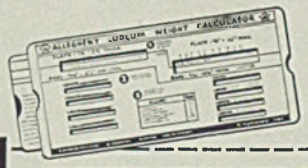

in figuring the weights of alloy steel sections—shapes or flats.

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STEEL CORPORATION — **PITTSBURGH, PA.**
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an electrically heated flying suit, grotesque face mask, helmet and fleece-lined boots. An oxygen mask also is essential, since no air enters the sealed room. Temperature may be controlled either manually or by automatic thermostat outside. Operator and men inside communicate by telephone.

Through a large double door of wood and cork built in one of the long walls, airplane parts and equipment are brought into the room. The personnel entrance is at one end of the structure. Like an air lock on a submarine, it consists of two doors with an "air lock" chamber between.

There is an arctic section, too, in the rebuilt stratochamber, and it is here that the cold and the low pressure of high altitudes are combined. The original Boeing stratochamber was completed early in 1940 and it was the world's first double compartment high altitude chamber. But it was inadequate. Extensive research required even more complete apparatus.

The 1940 chamber had two compartments in a single tank, joined by a hatch that looked a great deal like a manhole cover. Now a third compartment has been added to operate in connection with the cold room. This can be joined to the others or operated separately.

The new compartment is insulated by a cork blanket and a portable cork-end panel rolled into position and clamped in place when low temperatures are required. With its cold supply originating in the same huge refrigeration machine that keeps the cold room going, it is possible to run the scale of temperatures for all conditions found at high altitudes. One or two of the "rooms" can be used as the cabin, with the remaining space simulating the great outdoors of the stratosphere. Or all three compartments can be operated together under identical conditions.

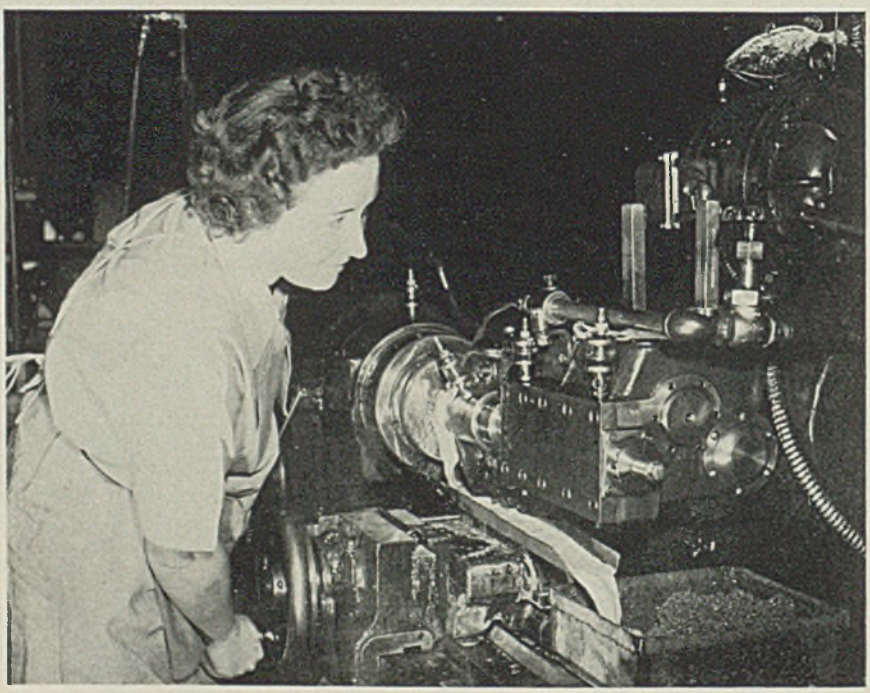
The laboratory is large enough to test complete heating, supercharging or hydraulic systems. It is equipped for dual operation, both from outside and inside. Two Ford V-8 engines drive centrifugal supercharging units which circulate air between compartments, while an electrically driven vacuum pump draws air out to create low-pressure conditions.

Tests already completed in the stratochamber have shown many items of purchased equipment, and even entire systems, often must be redesigned for more efficient operation at high altitudes.

The ground laboratory's success already has been proved conclusively. The first job in 1940 was the testing of Boeing-developed cabin pressure controls on seven Strato-

Women Run Grinders, Millers in Propeller Plant

WOMEN workers are appearing in ever-increasing numbers in war production factories, as a portion of the male labor force is drained off into the armed services and materials requirements grow. In some cases women are forsaking office jobs for work in the factories. Above photo shows a line of women operating grinders in the split gear department of a New Jersey airplane propeller factory. Below, a former clerical worker operates a milling machine in the same plant. NEA photos



liners then being delivered. The job was done so quickly and at such low cost that the saving in flight test time more than paid for the chamber and all equipment.

Not satisfied merely with hauling the complete set of pressure, temperature and humidity conditions down out of the stratosphere and neatly re-establishing them inside the laboratory, Boeing engineers soon will be able to provide even the cold air blast experienced on high altitude flights. An icing tunnel will do the work. The weather already can be made so cold in both the polar room and the refrigerated end of the stratochamber that the mercury barometers and manometers ordinarily used to indicate absolute and differential pressures respectively, are stopped far short of the bottom.

As an example of what cold does, these products freeze at the following temperatures: Glycol, 11; neoprene artificial rubber, —15; glycerine, —40; aircraft hydraulic fluid, —50; light machine oil, —50; pure para rubber, —65; kerosene, —70. The best grade of antifreeze compound mixed with water, the combination ordinarily used in automobiles, will succumb at —40 while even gasoline will freeze at —90, which matches the lowest termepature ever recorded at ground level, a record set at Verkhoyansk, Russia, in 1892. The Boeing laboratories can reproduce all these levels.

Tests Humans Too

The laboratory is adaptable for experimenting the human "guinea pigs" as well as inanimate ones. Before a person is allowed to take a high-altitude flight in a Fortress he must first try his ability to "take it" in the stratochamber.

* * *

Doubling of the number of machines and employes, plus blackout precautions, threw an extra load on the ventilating system of Boeing Plant 2. Already new ventilation shafts have been installed in the machine shop area, where turret lathes are among the worst offenders in breaking the "no smoking" rule in in the factory. More stacks will be added here and in other parts of the plant. The whole ventilation problem revolves around the matter of expelling foul air. Good air will come in as fast as the bad goes out, but in between these two steps there are many complications.

The first obstacle is that the smoke-laden air is also the air that has been heated. Blow it out and you have to reheat the new air. How fast this can be done depends on the size of the boiler room and fuel oil deliveries. Then there is the difficulty that the air from the tunnels, where smoking is allowed, rises onto the main floor when it is driven off the lowest level. Boost it away from the main floor and it ascends to annoy those working on the balcony. Air exhausting units are planned for installation in the tunnels and in the roof monitors for final riddance, but the over-all problem remains the same; that is, really to freshen the air in one spot, you have to exhaust it all over the plant and replace it with freshly-heated air.

Engineers have worked on the project for several months and it will probably be three months more before a 100 per cent solution is reached. Delays are sure to be encountered in obtaining motors, blowers and control equipment.

Color Film Shows "Inside of Arc Welding" To Speed Training

Expected to play an important part in speeding up the training of arc welding operators is the new six-part, all-color General Electric sound film "The Inside of Arc Welding." The first part is now available to public, private, and industrial welding schools, and other groups, while the other five parts will be ready early in June.

One authority estimates that its use should help cut the training time of new welders 20 per cent, in addition to giving them a better understanding of the principles of arc welding. From the closeup shots showing behavior of the arc and the molten weld metal, veteran welding operators may get a clear explanation of welding phenomena.

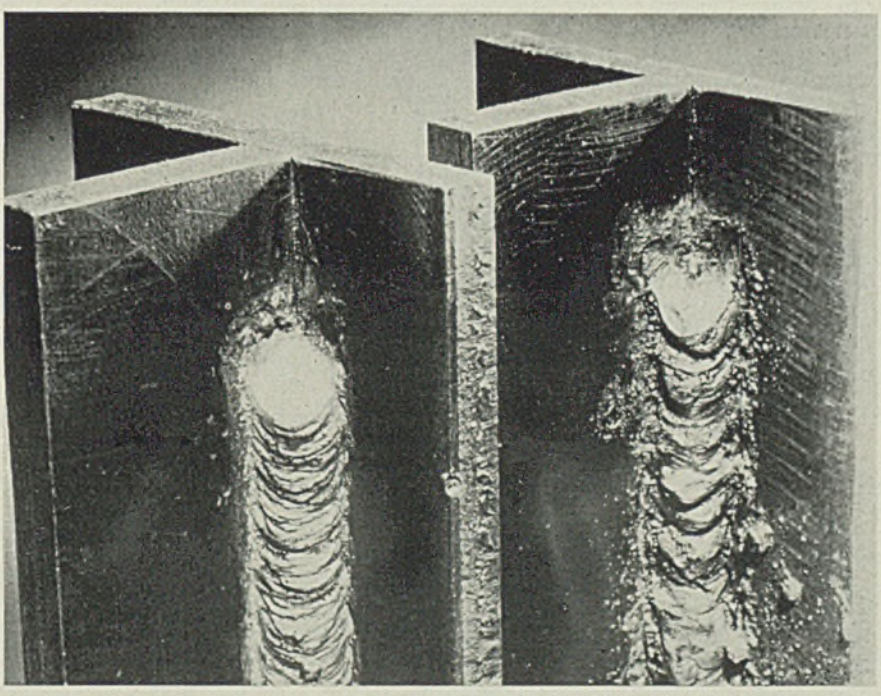
Each of the six parts is complete in itself and covers in full detail one particular phase of arc welding. Each is 400 feet long, 10 minutes in duration, and can be used on sound-equipped 16-mm. projectors only.

Clearly illustrated, explained, and emphasized throughout the six parts are the four principal factors of good welding—(1) current setting, (2) angle of electrode, (3) arc length, and (4) speed of travel, with their effect on control of the molten pool.

All terms, positions and welds, and electrode specification numbers used in the film refer to American Welding Society standards. Technical supervision was by the General Electric Welding Laboratories, with co-operation of government and industry representatives.

The majority of the arc photographs were taken at a General Electric plant where arc welding is used extensively.

New methods permit the filming of the blinding arc through the use of closeup photography with an elaborate lighting system which concentrates more than 1,000,000 candlepower of external illumination on an area approximately 1 inch square.



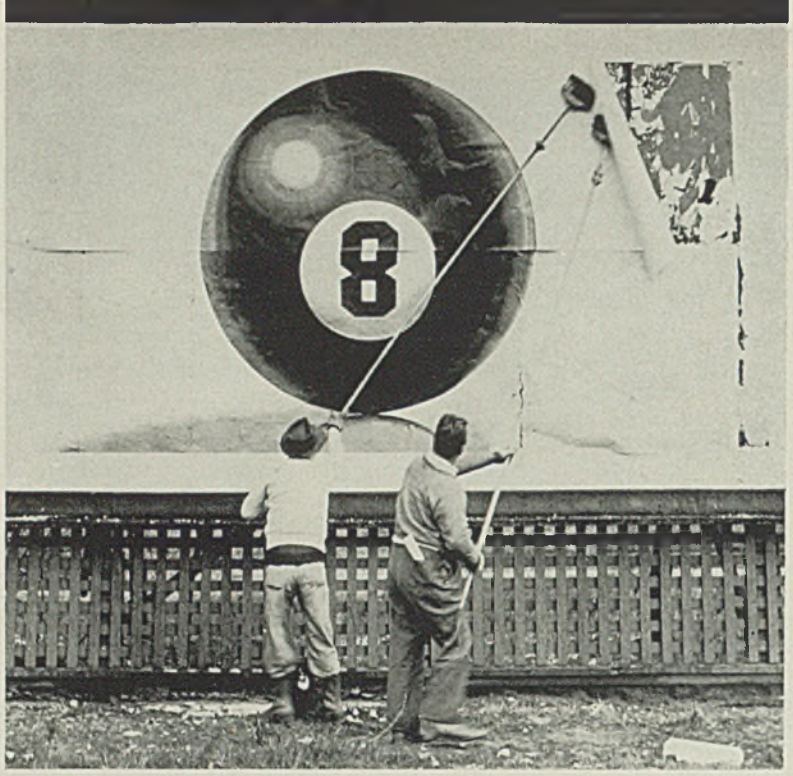
VIEW from General Electric's all-color sound film "The Inside of Arc Welding". Shown are two vertical fillet welds, one good, one bad. Too high current was used on the weld at the right. Note the resultant spatter and rough surface condition

8-Ball Drive In Step with Nelson Idea

✦

How labor-management campaign first puzzled Akron, then spurred pace at aircraft plant

✦



AKRON, O.

A STEPPED-UP production schedule in the plants of Goodyear Aircraft Corp. is under way here as the result of a campaign organized under the direction of a joint labor-management production committee.

Tying in with Donald M. Nelson's program of one plane every eight minutes in 1942, the symbol of the Goodyear campaign is the numeral "8". Newspaper advertising, dramatic radio programs, giant rallies, billboards, house organs, badges and banners were used extensively "to bring the war close to the workers."

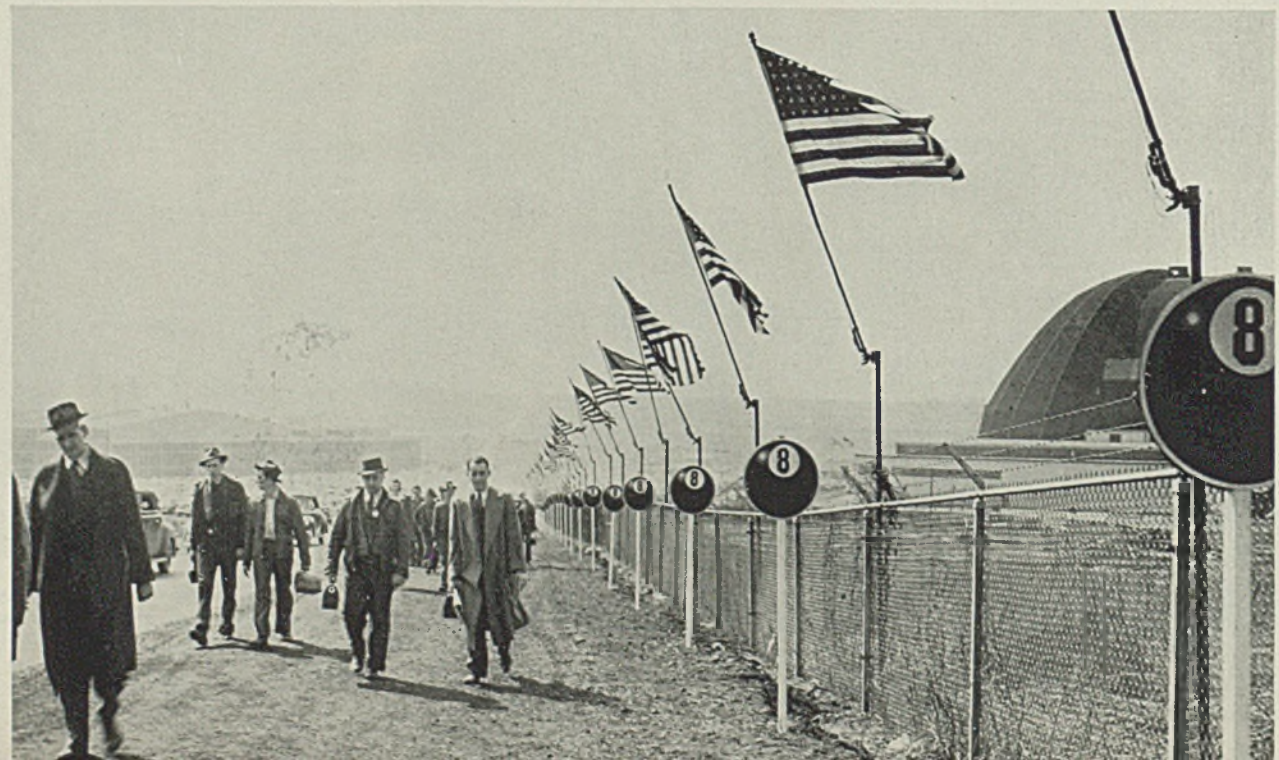
Mayor George J. Harter, the clergy and heads of the local OCD organization joined with the company to give the campaign significance throughout the community.

The "8" campaign started with each aircraft employe receiving by mail at his home a postcard with a big, red question mark and, underneath the question mark, a black pool ball with the figure "8". Next day, small panels containing only the "8" ball appeared in the local newspaper. Cards bearing only an "8" ball blossomed the same day on the city's busses; billboards with only an "8" ball turned up throughout the city, and huge banners—each with an "8" ball—appeared in many places. A series of teaser "spots," keyed to the figure "8", were broadcast over local radio stations. Aircraft workers found the roadway to plants lined with placards on stakes, again displaying the ubiquitous "8" ball. Huge banners and flags, and cards attached to pillers, greeted them at their desks and benches.

After four days of such teaser pro-

✦

ILLUSTRATED above is "the mystic symbol" going up on a billboard. Below, the Avenue of Flags, flanked with Eight-Ball standards, leading to the East Gate



motion, a company publication divulged the purpose of the "8" campaign. The local and other newspapers "broke" the story also. And that night a highly-dramatized radio program emphasized the aircrafters' part in the nation's war effort.

Two employes' rallies were held the following day, each timed between shifts so every employe could attend. Navy and Army representatives, labor leaders and company officials gave inspirational talks. Directed by an aircrafter and accompanied by an aircrafters' band, the employes sang a song written by an employe.

Then the aircrafters voluntarily signed cards pledging co-operation toward a plane each eight minutes —the national production rate termed necessary by President Roosevelt and Mr. Nelson to provide 60,000 planes in 1942.

During each of the plants' three shifts, a coatless "Uncle Sam," his sleeves rolled, strolled through the buildings carrying a bell he tapped each eight minutes. Before that, a loud gong had sounded each eight minutes over the plants' loud-speaker systems.

To encourage employe participation in the campaign, Goodyear offered cash awards for suggestions to speed production. Awards were offered also for quotations to be attributed to a caricatured "Nippo-Natzi," such as: "Tardy workers good to me—Thank you, please."

P. W. Litchfield, president of Goodyear Aircraft, said the basic idea of the campaign is that "management and the employes are combining to put the axis behind the eight-ball." He said details of the plan and the radio program are available to other industries.

✦

After four days of "teaser" publicity the purpose of the Eight-Ball campaign was divulged at huge rallies, above. Uncle Sams tapped bells at 8-minute intervals. Lower photo, joint labor-management committee which planned the "Victory Production" program

✦

MEN of INDUSTRY

H. C. MADSEN has been appointed manager of technical employment and training, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., succeeding **Maj. J. H. Belknap,** who has entered the Army Air Service. Since 1940 he has been identified with the industrial relations department where he was responsible for administering the company's program of supervisory training.

♦

J. A. Fix, general works manager, Oliver Farm Equipment Co., Chicago, has been appointed a vice president.

♦

Roy E. Barr, freight traffic manager, Illinois Central railroad, Chicago, has been made vice president in charge of traffic department, succeeding the late Fred H. Law.

♦

S. J. Horrell has been appointed vice president, Associated Piping & Engineering Co. Ltd., Los Angeles. He formerly was associated with Blaw-Knox Co., Pittsburgh, as vice president, Power Piping Division, in charge of sales and engineering. He was also active for many years with Grinnell Co., Providence, R. I.

♦

Darrell C. Roberts, formerly assistant advertising manager, Chrysler Sales Corp., and recently advertising manager, Willys-Overland Inc., has joined Willard G. Myers Advertising Agency, Philadelphia.

♦

G. W. Fischer, Edison General Electric Appliance Co. Inc., Chicago, has resigned to join the Standard Transformer Co., Warren, O., in charge of New York district sales.

♦

Dean E. McCrory, associated with the Pittsburgh office of the heavy chemical sales division of Pennsylvania Salt Mfg. Co. since 1936, has been transferred to the company's executive offices in Philadelphia.

♦

E. G. Wesson has been appointed assistant to general manager, Chicago, Burlington & Quincy railroad, Chicago, succeeding **E. P. Stine,** who has been made superintendent, Colorado & Southern Railway Co., Burlington subsidiary, at Denver.

♦

Arthur Dressel, since 1938 general sales manager, R. Hoe & Co. Inc., New York, has been elected vice president in charge of sales. **Joseph L. Auer,** heretofore general works manager, has been promoted to vice president in charge of production.

H. C. Madsen

S. J. Horrell

W. C. Buchanan

Who has resigned as president, Allis-Chalmers Mfg. Co., Milwaukee, because of ill health, as announced in STEEL, April 20, page 45. He retains his membership on the board of directors and executive committee

♦

J. Eugene Jackson, until recently metallurgical engineer with the Copper Iron and Steel Development Association, Cleveland, has joined the War Production Board as senior industrial analyst. He is serving in the Copper and Brass Division, Inventory and Requisition Section, Division of Industrial Operations.

♦

Shannon M. Johnson, assistant sales promotion manager, Lighting Division, Hygrade Sylvania Corp., New York, has been granted a leave of absence to take up duties as an ensign in the United States Naval Reserve.

♦

George V. Naze, since 1926 assistant manager, Madison, Wis., branch of Allis-Chalmers Mfg. Co., has been appointed manager there, succeeding the late Charles E. Reinel. **B. W. Lueptow** succeeds Mr. Naze as assistant manager.

♦

Robert L. Welborn, former general manager, Lincoln Motor Co., division of Ford Motor Co., has been named vice president in charge of manufacturing, Cleveland Pneumatic Tool Co., Cleveland. He resigned from Ford in 1935 and since that time had lived on his ranch near Los Angeles.

♦

J. A. Riley, district manager at New York for Marion Steam Shovel Co., Marion, O., has been named export manager. His headquarters will be Graybar building, 420 Lexington avenue, New York, after May 1, and this will supersede the present address which is now in the Chrysler building. Mr. Riley will remain district manager.

♦

James F. Ednie, formerly associated with the metallurgical and research department of Federated Metals Division, American Smelting & Refining Co., has become chief metallurgist, technical and metallurgical department, Duquesne Smelting Corp., Pittsburgh.

♦

Harry B. Markle, Harris-Seybold-Potter Co., Cleveland, has been named president, Purchasing Agents Association of Cleveland Inc., Cleveland. Other officers are: First vice president, **William F. Avery,** Elwell

Parker Electric Co.; second vice president, **J. M. Stadter,** Glidden Co.; secretary-treasurer, **J. R. Stevens,** Harshaw Chemical Co.

♦

J. C. McQuiston will resign May 1 as secretary-manager, American Gear Manufacturers Association, Wilkinsburg, Pa., after serving ten years in that position. Mr. McQuiston has long been identified with industry, and before his connection with the association he was for more than 30 years general advertising manager, Westinghouse Electric & Mfg. Co.

Newbold C. Goin, formerly sales manager of the gearing division, Nuttall works, Westinghouse Electric & Mfg. Co., succeeds Mr. McQuiston as secretary-manager of the American Gear association.

♦

Harry H. Burris, associated with the National Association of Flat Rolled Steel Manufacturers, Pittsburgh, since 1917, has been elected president. He succeeds the late Neil Flora.

♦

Dr. D. D. Ewing, since 1912 a member of the staff of the school of electrical engineering, Purdue University, West Lafayette, Ind., has been appointed head of that school, succeeding the late Dr. C. Francis Harding.

♦

Prof. G. A. Young, former head of the school of mechanical engineering, Purdue University, West Lafayette, Ind., will retire June 30. He has been on leave of absence the past year because of ill health. **Prof. Harry L. Solberg** was named his successor as head of the school a year ago.

♦

L. J. Whitlock Jr., in charge of the coal bureau, Norfolk & Western railroad, Detroit, has been made district manager of the carrier's coal bureau, Chicago, succeeding **D. J. Howe,** who has been made assistant to the coal traffic manager, Roanoke, Va. **F. L. Donaher,** heretofore district manager of the coal bureau, Winston-Salem, N. C., succeeds Mr. Whitlock in Detroit.

♦

Thomas Drever, president, American Steel Foundries, Chicago, has been elected to the board of trustees, Armour Research Foundation of Illinois Technological Institute, Chicago.

♦

Guy T. Avery, works manager of the Riverdale plant, and **W. Sheridan Huss,** sales manager of the central district, Acme Steel Co., Chicago, have been elected directors. They fill vacancies created by resignation of **James E. MacMurray,** Pasadena, Calif., former chairman of the board, who retired after 54 years' service with the company, and **F. C. Gifford,** former vice president in charge of sales, who retired because of ill health.

Newbold C. Goin

♦

Herbert J. French, in charge of alloy steel and iron development, International Nickel Co. Inc., New York, recently was appointed senior technical consultant in charge of the metallurgical and specifications section, Iron and Steel Branch, War Production Board. Mr. French is national vice president, American Society for Metals.

♦

John S. Marsh, for 12 years physical metallurgist and associate editor, and since June, 1941, editor of the *Alloys of Iron Research,* Engineering Foundation, New York, resigned recently to join the research and development department, Bethlehem Steel Co., Bethlehem, Pa.

♦

A. C. Carlton, curator of fuels and metals, Museum of Science and Industry, Chicago, has been granted temporary leave of absence to assist the War Department in the production of ammunition. His assignment is in the small fuze and primer section, ammunition division, Chicago Ordnance district.

♦

Arden L. Knight, salesman in the Hartford, Conn., office of Latrobe Electric Steel Co., has been called to active service as lieutenant commander, production division, Navy Bureau of Ordnance, Washington.

♦

Carl Hart, Berne, Ind., has been added to the technical staff of Magnavox Co. Inc., Fort Wayne, Ind., as designing engineer. **Ray Yeranko,** former service manager, has been promoted to the engineering staff and his duties are being assumed by **R. C. Groffman,** sales promotion manager.

♦

P. Y. Danley has been named assistant sales manager, Merchandising Division, and **H. F. Hildreth** as manager of commercial refrigeration and air conditioning department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Mr. Danley continues as head of war products, Merchandising Division. Mr. Hildreth, heretofore has been sales development manager of the department he now heads. Both men will continue to make their headquarers at the Springfield, Mass., plant.

♦

Walter O. Briggs Jr. has been elected treasurer, Briggs Mfg. Co., Detroit, to succeed **Robert Pierce,** who resigned last February. Mr. Pierce also was a member of the board of directors. **A. D. Blackwood** has been named secretary, to succeed the late H. W. Griffith.

♦

Daniel P. Murphy has been appointed general manager of Symington Gould Corp.'s plant in Depew, N. Y., succeeding **Charles H. Schaffer.** Associated with the firm 20 years Mr. Murphy formerly was assistant superintendent of the corporation's Rochester, N. Y., plant.

♦

Robert C. Barton, Oliver building, Pittsburgh, for many years Pittsburgh sales agent for Central Iron & Steel Co. and Champion Rivet Co., has been commissioned a Major by the War Department. Major Barton is a former World War officer.

DIED:

John C. Wattleworth, 48, the past six years vice president, Cleveland Automatic Machine Co., Cleveland, April 19, in that city. A graduate of Case School of Applied Science, Cleveland, he later became a teacher of mechanical engineering there, and resigned in 1932 to become general manager, Vichek Tool Co.

♦

J. Thomas Hay, 59, metallurgist, Republic Steel Corp., Cleveland, at his home in Canton, O., recently.

♦

Thomas J. Reynolds, 53, secretary-treasurer, George D. Roper Corp., Rockford, Ill., in that city, April 16.

♦

Robert F. Vogt, 62, chief consulting engineer, Allis-Chalmers Mfg. Co., Milwaukee, April 17, in that city. He had been with Allis-Chalmers 36 years.

♦

William M. Ziegler, 61, owner, W. M. Ziegler Tool Co., Detroit, in that city, April 13. He was a member, American Society of Tool Engineers.

♦

Fred J. Maeurer, associated with the oxyacetylene industry nearly 33 years, the past 13 years identified with the Applied Engineering Department, Air Reduction Sales Co., as specialist, April 13, in New York.

Activities of Steel Users and Makers

SYMINGTON Gould Corp., Rochester, N. Y., will soon start a $1,400,000 expansion program at its Depew, N. Y., plant. The Ordnance Department has leased land from the company and when the expansion is completed the plant will be leased back to the firm. Armor plate castings for tanks will be made at the new unit.

♦

Plating laboratories of the Hanson-VanWinkle-Munning Co., Matawan, N. J., were enlarged recently to accommodate the increased volume of research necessary under present conditions. Feature of the expansion is an experimental electroplating room and control board to make bent cathode tests on plating solutions.

♦

Conforming to a government order, Chicago manufacturers producing 60,200 dog licenses annually for consumers in many states will save 75,000 pounds of brass for war purposes in switching to fiber, the Illinois Manufacturers Association, Chicago, estimated last week. Change will save 1000 pounds in Chicago alone.

♦

Since an order for $12,900,000 worth of gun mounts is sufficient to occupy only a fraction of the industry's capacity, the American Washer and Ironer Manufacturers' Association, Chicago, is seeking to aid its members in obtaining further war contracts, it was stated last week. Headquarters of the association, now at 80 East Jackson boulevard, Chicago, will be moved May 1 to Newton, Iowa, to enable W. Neal Gallagher, executive secretary, and president, Automatic Washer Co., Newton, to more evenly divide his time between the two organizations.

♦

Edward A. Lynch Machinery Co. will move May 1 from Walnut street at Thirty-sixth, Philadelphia, to new quarters in the Times Medical building, Ardmore, Pa.

♦

Aaron E. Carpenter, president, E. F. Houghton & Co., Philadelphia, announced that effective May 1 retail Cleveland, has assigned its interests to the Houghton organization which henceforth will manufacture, sell and service Lubri-Zol lubricants.

♦

Metal & Thermit Corp. will build a $50,000 warehouse for storage of raw materials at its East Chicago, Ind., plant, to provide 18,000 square feet of floor space.

♦

"The Sellers Diamond," a new house organ issued this month by William Sellers & Co. Inc., Philadelphia, tells the story of employe activities in behalf of war production, safety and service efforts.

♦

Paying tribute to the job employes are doing "in the production line which backs up our soldiers in the front line," Henry H. Straus, vice president, Inland Steel Co., in charge of Chicago Heights Works, last week presented gold lapel buttons to 29 veteran workers. Service records ranged from 25 to 40 years.

♦

Morey Machinery Co., New York, presented the one-hundredth vertical shaper completed in its shop to the War department April 18. The shaper, design for which was perfected by Sigmund Morey, president of the company, is used chiefly to make breech block mechanisms for guns up to 75 mm.

MEETINGS

Gearmakers' Convention Date Changed; Program Features

Date for the annual convention of the American Gear Manufacturers Association, originally scheduled for May 11-13, has been changed to May 10-12, in Hotel Hershey, Hershey, Pa. Features of the program:

Sunday, May 10

2:00 p.m.

Address by W. P. Schmitter, president A.G.M.A. and committee meetings and reports.

Monday, May 11

9:00 a.m.

"Physics of Metal Cutting," by Dr. E. M. Martelotti, Cincinnati Milling Machine Co., Cincinnati.

"Gear Production by the Hobbing Process," by L. W. Falk, Falk Corp., Milwaukee.

1:30 p.m.

"Cutting and Other Parts with a Reciprocating Tool," by G. H. Sanborn, Fellows Gear Shaper Co., Springfield, Vt.

"Cutting Gears in Farrel-Sykes Gear Generators," by H. E. Kitchen, Farrel-Birmingham Co., Buffalo.

6:30 p.m.

Informal dinner. "Skills and Satisfactions," by Dr. Lillian M. Gilbreath.

Tuesday, May 12

9:00 a.m.

Committee meetings.

2:00 p.m.

Recommended practices.

1943 Chemical Exposition To Be Held in Chicago

Next year's National Chemical Exposition and National Industrial Chemical Conference will be held in Stevens hotel, Chicago, Nov. 17-22. The exposition committee through its chairman, Victor Conquest, 110 N. Franklin street, Chicago, is offering its service to other scientific groups who may wish assistance in arranging for convention facilities during that week in Chicago.

Convention Calendar

April 27-30—Chamber of Commerce of the U. S. of America. Thirtieth annual meeting at Washington. Ralph Bradford, 1615 H street, Washington, is secretary.

April 27-May 1—American Mining Congress. Nineteenth annual coal convention and exposition, Cincinnati. J. D. Conover, 309 Munsey building, Washington, is secretary.

May 1—Associated Machine Tool Dealers of America. Spring meeting, Hotel Cleveland, Cleveland. Thomas A. Fernley, Jr., 505 Arch street, Philadelphia, is executive secretary.

May 4-6—Southern Supply & Machinery Distributors Association. Thirty-seventh triple convention at Hotel Traymore, Atlantic City, N. J. Alvin M. Smith, P. O. Box 1353, Richmond, Va., is secretary.

May 4-6—National Supply and Machinery Distributors Association. Thirty-seventh triple convention at Hotel Traymore, Atlantic City, N. J.; H. R. Rinehart, 505 Arch street, Philadelphia, is secretary.

May 4-6—American Supply and Machinery Manufacturers Association. Thirty-seventh triple convention at Hotel Traymore, Atlantic City, N. J. R. Kennedy Hanson, 1108 Clark building, Pittsburgh, is general manager.

May 4-7—American Gas Association. Nineteenth annual distribution conference, St. Charles hotel, St. Louis. E. D. Milener, 420 Lexington Ave., New York, is secretary.

May 4-7—Natural Gas Convention. Thirty-seventh annual meeting, Roosevelt hotel, St. Louis.

May 10-12—American Gear Manufacturers Association. Fifty-first annual meeting, Hotel Hershey, Hershey, Pa. J. C. McQuiston, 602 Shields building, Wilkinsburg, Pa., is manager-secretary.

May 11-13—American Institute of Chemical Engineers. Semiannual meeting at Statler hotel, Boston. S. L. Tyler, 50 E. 41st. street, New York, is secretary.

May 12-13—American Steel Warehouse Association. Annual meeting, Drake hotel, Chicago. Walter S. Doxsey, 442 Terminal Tower, Cleveland, is president and executive secretary.

May 13-14—American Management Association. General management conference at Hotel Astor, New York. H. J. Howlett, McGraw-Hill building, 330 W. 42nd. street, New York, is secretary.

May 15—Porcelain Enamel Institute. Eleventh annual meeting, Hershey hotel, Hershey, Pa. Charles S. Pearce, 919 New York avenue, Washington, is managing director.

May 19-20—National Metal Trades Association. Forty-fourth annual convention, Biltmore hotel, New York. Harry S. Flynn, Room 1021, 122 S. Michigan avenue, Chicago, is secretary.

May 21—American Iron and Steel Institute. Fifty-first meeting, Waldorf-Astoria, New York. George S. Rose, 1829 Empire State building, 350 Fifth avenue, New York, is secretary.

May 25-28—National Association of Purchasing Agents. Twenty-seventh annual convention, Waldorf-Astoria, New York. George A. Renard, 11 Park Place, New York, is executive secretary.

Two-Year Gain in U. S. Steel Capacity Equal to Japan's Total, Engineers Told

INCREASE in steelmaking capacity in the United States in 1940-41 was approximately equivalent to total steelmaking capacity in Japan.

This fact was disclosed by C. R. Hook, president, American Rolling Mill Co., Middletown, O., speaking at the annual Fellowship Dinner of the National Open-Hearth Steel, Blast Furnace and Raw Materials committees, American Institute of Mining and Metallurgical Engineers, Netherlands Plaza hotel, Cincinnati, April 16-17.

The steel business, Mr. Hook pointed out, " is just as much in the service of the American people making armaments as it was in making consumer goods. Failure of management and labor to co-operate will mean that civilization will slip backward hundreds of years. Citizens must work as teams, not individuals; there must be constructive criticism of administration, War Production Board, Army or Navy policies, but otherwise it is our patriotic duty to comply as whole-heartedly as if we were in complete agreement with it."

The national government is undertaking its task seriously and deserves the best advice and counsel Americans have to give, Mr. Hook said in praising the work of Donald M. Nelson.

Dr. C. H. Herty, Bethlehem Steel Co., Bethlehem, Pa., emphasized that "careful husbanding of manganese resources alone will insure the nation an adequate supply of this metal." Dr. A. Leith, War Production Board, Washington, pointed out that there is no shortage of manganese at present but warned that if the war lasted longer than three years, steelmakers will have to use inferior grade of ferromanganese. A Pittsburgh operator cited two ways that open-hearth operators can conserve manganese, namely, by operating on higher manganese residuals and obtaining higher furnace efficiency.

Discusses Use of Active Mixer

W. C. Buell, Jr., engineer, Arthur G. McKee Co., Cleveland, in speaking on active mixers explained that they have been employed in England during the past 30 years for reducing silicon content of pig iron, thus allowing open-hearth basic slags to work more actively on phosphorus, which is high.

While it is possible to obtain a 14 per cent reduction of metalloids on 700,000 B.t.u.'s per net ton of mixer metal, uniform composition and temperature of the mixer metal is the practice followed by the English operators rather than the maximum reduction in the mixer. Each mixer melts an average of 165 tons a day of various grades of dirty scrap such as mold, runner, ladle, and pit scrap which decreases the processing time in the open hearth.

The mixers are essentially long, tilting-type open hearths having a bath of about 6 feet deep and holding from 450 to 650 tons of iron. Fuel gas combustion ranges from 100 to 240 B.t.u.'s per cubic foot. Little refining and practically no scrap is melted in the small type mixers. However, with the large-type vessels more work is done on the pig iron and larger quantity of plant scrap is melted. The throughput varies from 12 to 20 hours.

American iron differs from English in that the phosphorus is lower and the silicon higher thus making it difficult for our open-hearth shops to swing to high-iron charges.

Production of basic pig iron suitable for high-iron charges is a difficult problem for blast furnacemen but if the active mixer is employed, much of the difficulty is eliminated, Mr. Buell said.

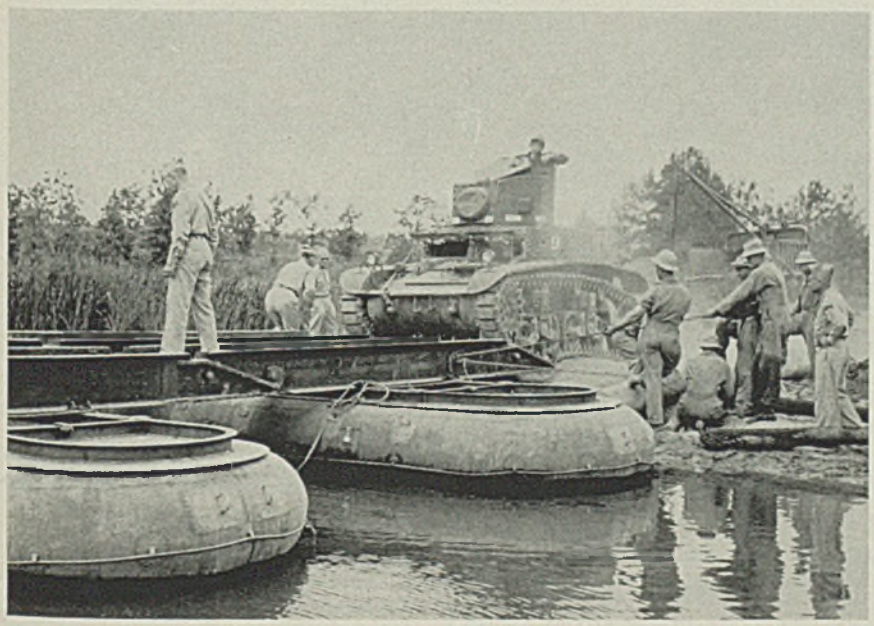
With an active mixer affording uniform iron at a constant temperature only a minimum amount of flux is required, the time of heats is reduced, fewer bottom repairs are necessary and a better quality of steel is tapped.

Mr. Buell in presenting the relative cost of metal process in active and conventional type mixers showed a total cost of $16.37 per net ton for the active mixer and $15.94 for the conventional type or a difference of 43 cents.

In conclusion he cited a saving of 75 cents per net ton of ingots made from "trade-heat" charges by the use of active mixer practice compared with conventional open-hearth practice. He pointed out that the capital cost of an open-hearth shop served by an active mixer is 88 per cent of the cost of conventional open-hearth plants with similar output. Six conventional furnaces and one active mixer is equivalent to an ordinary 8-furnace shop. Moreover, blast furnacemen would only be required to control the sulphur content thus reducing the number of off-casts.

This year's McKune awards were presented to H. B. Emerick and S. Feigenbaum, metallurgical department, Jones & Laughlin Steel Corp., Aliquippa, Pa., joint recipients of a certificate and $100; J. T. Mauer, Wisconsin Steel Co., Chicago, winner of a $50 war bond for second place; and R. W. Tindula, Republic Steel Corp., Buffalo, $25 war bond for third place. Awards are made for the best papers on open-hearth problems written by operators less than 35 years of age.

Steel Tracks Keep Tanks on Rubber Pontoon Ferry



STEEL tracks mounted on rubber pontoons provide a high and dry ride for 11-ton tanks of the Army's First Armored Division on this new ferry designed by its officers. The track-mounted pontoons, displacing 12 tons each, are used instead of boats as in earlier models. Signal Corps photo

Scrap Clinic Unifies Salvage Effort; "Ceiling Prices Not To Be Increased"

CO-ORDINATION of wartime salvage activities, including ferrous and nonferrous metals, rubber, paper and other materials, was discussed last week at a four-day clinic in Cleveland. Salvage Branch, Industrial Conservation Bureau, has designated the Cleveland ordnance district as a clearing house through which the other 12 ordnance districts will unify efforts at collection, thus relieving pressure on Washington offices. The districts will serve Army, Navy and Maritime Commission needs.

More than 400 representatives of metal, paper and rubber industries, war agency officials and ordnance officers from other districts were present. Addresses were followed by question and answer periods in which various questions were discussed.

Roswell Whitman of the Office of Price Administration, defined the price policy of that agency, stating no general change in price schedules is contemplated. Present ceilings are well understood and no suggestions have been made for a change, he said. The government position is that so long as the industry is satisfied present prices will remain in effect. If a progressively increasing price would be the solution to the scrap problem, ceilings would not have been established. This gave notice that hoarding of scrap in anticipation of higher figures would be of no avail.

Mr. Whitman called attention to an experimental increase of $2.50 per ton for steel scrap on the Pacific Coast, which had not resulted in material enlargement of supply.

Conservation Effort Succeeds

Paul C. Cabot, deputy chief, Bureau of Industrial Conservation, described the salvage functions of the bureau, which operates under the War Production Board. He has been working on the project for a year and has found that regular channels of collection must not be by-passed, the campaign must not be divided into commodities and that salvage must be sought in both plants and homes, but kept separate. He outlined development of the automobile wrecking program and the success now being attained. He emphasized need for full co-operation of all ordnance districts to avoid confusion.

The decentralization program, designed to relieve Washington of details, was described by Bruce Burroughs of Cleveland ordnance district. This project is aimed at aiding industry and speeding production through better supply of raw materials.

Charles M. White, operating vice president, Republic Steel Corp., Cleveland, explained why scrap is a major problem to the steel industry. Taking his own company as an example he said that current supply of scrap and pig iron for steel production is sufficient for only two or three days, while normally stocks for more than a week are carried. Scrap scarcity has caused his company to lose about 150,000 tons of steel production he said. The industry will be short "more than 3,000,000 tons of scrap this year," but he believes full effect of the scrap shortage will decrease by December when new blast furnaces supplement the supply of pig iron and scrap drives bring out larger tonnages.

For the benefit of those present from ordnance districts less industrialized than at Cleveland and other eastern points Capt. Charles Miller pointed out sources of scrap, including abandoned street railway tracks, bridges, obsolete water standpipes, coal mine equipment, old oil well equipment and similar material. George T. Weymouth, chief, Industrial Salvage Section, WPB, called attention to the fact that the board has skilled salvage technicians in various industries whose services can be furnished when required.

In a program specializing requirements for scrap the clinic heard from William W. McMillen, purchasor, National Malleable & Steel Co., Cleveland, on need of scrap for electric steel foundries; from Walter Seelbach, Forest City Foundries, Cleveland, on general foundry requirements; from S. Urdang, A. Shaw Co., Cleveland, on segregation of scrap for foundry use.

Part to be played by WPA in scrap salvage was outlined by R. L. McDougall, who stated that organizahad had been assigned the task of aiding collection from rural areas. OPA has been organized, equipped and financed to perform this part of the work.

OPA Sues Illinois Scrap User and 24 Dealers for Alleged Price Violations

SIGNALING a concerted drive to end violations of price ceilings on iron and steel scrap, Price Administrator Leon Henderson has announced the filing of civil action in Chicago against Northwestern Steel & Wire Co., Sterling, Ill., its broker, and 24 dealers.

The company and its broker, M. S. Kaplan Co., Chicago, were charged with buying and accepting delivery of iron and steel scrap at prices in excess of those established in OPA's Revised Price Schedule No. 4.

The 24 dealers were charged with selling and delivering at prices above the established maximums. OPA charged all 26 defendants with "upgrading". They also were charged with failing to keep complete and accurate records.

The OPA request for an injunction was set for hearing April 28 before United States District Judge William H. Holly.

The 24 dealers named in the civil action are: Advance Steel Salvage Corp., Chicago, Alter Co., Davenport, Ia. Max Falk, doing business as American Auto Parts Co., Sioux City, Ia. Atlas Iron and Metal Co., Joliet, Ill. Morris Pollock, doing business as Aurora Auto Wrecking Co., Aurora, Ill. Morris Max Blum, doing business as Blum Iron and Metal Co., Dubuque, Iowa. Central Paper Stock Co., Chicago, Ill. Consumers Steel & Supply Co., Racine, Wis. I. W. Kaufman, Kansas City, Mo. General Iron and Metal Co., Chicago, Ill. Henry M. Cohen, doing business as Co-Henry Company, Kansas City, Mo. Mary Bodow, doing business as Southwest Iron and Metal Co., Kansas City, Mo. Abe L. Pekarsky, doing business as Kishwaukee Auto Parts and Wrecking Co., Rockford, Ill. Light Bros. and Co., Sioux Falls, S. D. John A. Robinson, doing business as Norfolk Hide and Metal Co., Norfolk, Neb. J. H. Krause, Inc., Rockford, Ill. Marmis and Solomon, Dubuque, Ia. Miller Bros. Iron and Metal Co., Milwaukee, Wis. Miller Iron and Metal Co., Chicago, Ill. Newtson Iron and Metal Co., Ottawa, Ill. H. Pitts and Co., Sioux Falls, S. D. Rothstein Iron and Metal Co., Freeport, Ill. Southern Illinois Scrap Iron and Metal Co., Harrisburg, Ill. Wolf Bros., Inc., Mason City, Ia.

Segregation of Tin from Scrap Ordered by WPB

Segregation of tin plate and tin alloy scrap from other scrap for delivery to steel mills has been ordered by the WPB.

Order M-24-b, which takes effect immediately, prohibits mixture of any tin component in a bundle or car of scrap or delivery of a mixed car or bundle.

Shortage of scrap has resulted in increasing amounts of tin can scrap and other tin material reaching steel mills. If more than small and controlled amounts of tin go into steel, the product is brittle. Tin also cuts through the bottoms of steel furnaces.

"Zinc Production To Be Adequate For All War Requirements in 1942"

ST. LOUIS

ZINC production will be increased further this year to assure continued full coverage of war needs. Output for 1942 is estimated at 1,000,000 tons, highest on record and representing a substantial gain over the 1941 rate.

This was reported at the twenty-fourth annual meeting of the American Zinc Institute, here April 20-21.

Howard I. Young, institute president, said output during the first quarter was 17 per cent ahead of the like 1941 period and 3000 tons, or 1.5 per cent, above previous estimates.

While all military needs will be satisfied, projected increase in requirements for high-grade zinc in new brass plants will leave only a small amount of metal for civilian users during the second half of the year, according to M. L. Trilsch, chief, Allocation Unit, WPB Zinc Section.

Mr. Trilsch also revealed that WPB will issue soon an amendment to the present zinc order, M-11, under which users must present allocation certificates before producers can make deliveries. Dealers will be prohibited from delivering more than 20 tons to any one consumer in a single month. Zinc remelters must file applications by June 15 to produce after July 1.

Full allocation will be ordered in the face of satisfactory operation of the present pool arrangement because the supply outlook after 1942 is uncertain. W. C. Page, Zinc Branch, WPB, told delegates that his unit is primarily interested in how much can be produced, rather than in ore reserves, and that it is not a question of price. In stressing the latter point, he said the Tri-State district received premium payments totaling $700,000 during February and March.

Even more ore could be turned out in the Tri-State district if premiums are stepped up, according to Evan Just, secretary, Tri-State Zinc and Lead Ore Producers Association. Output now is actually under last year at 8500 tons a week, due to depletion of ore reserves, to absorption of price increases by wages, and to general uncertainty. The industry cannot work ore producing less than 5 per cent concentrate recovery and break even on the present concentrate price of $55.28 a ton, Joplin, Mo.

The 50 mine mills in the district could produce 15,000 tons of concentrates a week with a 4 per cent recovery by working 160 hours a week. "Output depends upon government policy," Mr. Just said.

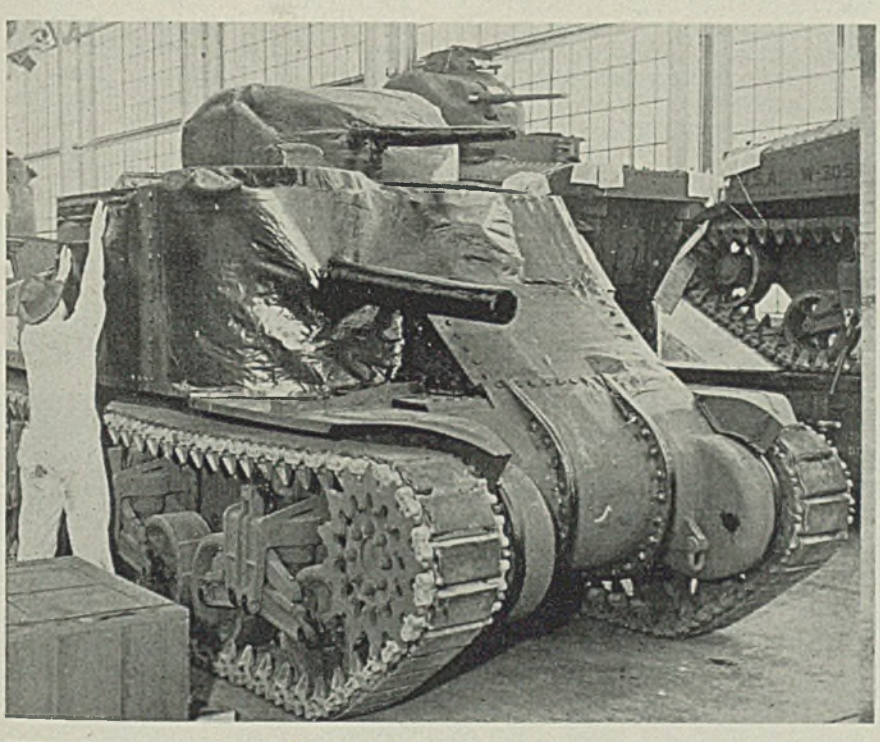
E. W. Pehrson, chief, Economics and Statistics Branch, United States Bureau of Mines, said the United Nations still maintain a substantial superiority in mineral resources, although Axis acquisition of valuable producing districts has greatly prolonged the war. Loss of Australia would be serious, he said, since the United States smelters must draw on it for zinc concentrates.

J. D. Conover, secretary, American Mining Congress, predicted lower permanent tariffs on zinc, lead, antimony, molybdenum, quicksilver and graphite under the pending treaties with Mexico and Bolivia.

Directors whose terms expired this year were re-elected. They are S. A. Easton, J. O. Elton, Clarence Glass, J. E. Hayes, J. W. Hegeler, H. W. Lohman, G. W. Potter, A. L. Queneau, J. G. Starr and Howard I. Young.

The new board of directors re-elected officers of the institute as follows: Howard I. Young, president; C. Merrill Chapin Jr., John A. Robinson, and James O. Elton, vice presidents; John L. Good, treasurer; and Ernest V. Gent, secretary.

M-3 Tank Gets Grease Coat For Sea Voyage



PREPARING an M-3 medium tank for foreign shipments at the Chrysler Tank Arsenal in Detroit is no simple task. Vulnerable moving parts are specially greased and sealed as protection against salt air and moisture. Tape 2 to 14 inches wide is used, in addition to paraffin wax, silica jell and much heavy grease. Silica jell is placed in certain places inside the tank to absorb moisture. Doors are greased and waxed before being closed and sealed. All oil, gas and other liquids are removed and rust preventive material substituted. Even the bottom of the tank is sprayed with a soft wax to keep out moisture. The top turret or cupola is removed and crated separately

Automotive Engineers Name Board Members

Society of Automotive Engineers' seven-man engineering board has been expanded by the addition of six new members. They are: L. R. Buckendale, vice president and chief engineer, Timken-Detroit Axle Co.; Arthur Nutt, vice president in charge of engineering, Wright Aeronautical Corp.; Don Berlin, aircraft engineer, General Motors Corp.; C. G. A. Rosen, director of research, Caterpillar Tractor Co.; Ralph R. Teetor, vice president, Perfect Circle Co., and Earl H. Smith, executive engineer, aircraft engine division, Packard Motor Car Co.

Important project now being undertaken by the S. A. E. board is a systematic study of critical materials used in motor and armored service vehicles.

Foundry Convention Features Ways To Increase War Production

"SPEEDING War Production" was the theme of the forty-sixth annual convention of the American Foundrymen's Association last week in Public Auditorium and Hotel Statler, Cleveland, in conjunction with the first Western Hemisphere Foundry Congress and the Foundry and Allied Industries Show.

Reflecting the important part taken by the foundry industry in the war program, 15,000 visitors viewed the more than 200 exhibits of foundry equipment, supplies and products —including many ordnance items. This attendance is considerably more than the number visiting the show two years ago.

Pointing out the industry's role in war production, H. S. Simpson in his annual address as association president stated that 15,000,000 tons of castings were produced in 1942, with some 750,000 men employed in the foundry industry, practically all of this output for war. In making this address at the annual business meeting Wednesday, Mr. Simpson emphasized the progress along the two lines of cupola research and castings promotion.

C. E. Westover, executive vice president, reported that association membership had increased from 4168 to 4846, bringing the goal of 5000 members within sight. He reported a new chapter had been added at Toledo and another, the 23rd chapter in the association, formed in eastern Canada and Nova Scotia. A total of 91 committees were reported active, involving 416 members. A book on core practice and theory was completed this year, as well as a code on recommended practice for protection of life, property and production in the foundry industry during war. Both of these are now available.

The J. H. Whiting gold medal was presented to Alfred L. Boegehold, chief metallurgist, General Motors Research Laboratories, Detroit, in recognition of his outstanding contributions to the field of metallurgical research in cast iron and malleable iron.

To John E. Galvin, president, Ohio Steel Foundry Co., Lima, O., was awarded the John A. Penton gold medal for his unfailing helpfulness and generosity, which have contributed to the general advancement of many others in the steel casting industry.

Life Memberships Awarded

Retiring association president, H. S. Simpson, president, National Engineering Co., Chicago, was made an honorary life member of the association, as were Roy M. Allen, consulting metallurgical engineer, Bloomfield, N. J., and Pat Dwyer, engineering editor of *The Foundry*, Cleveland. The former was honored in recognition of his services in conducting the first of the association's annual convention lecture series (the material presented at that course later being published in book form under the title *The Microscope in Elementary Cast Iron Metallurgy*), and the latter in recognition of the immense good he has contributed to the foundry industry through his writings on all phases of foundry practice.

The board of awards of the association, established in 1923, is composed of the last seven living past presidents. Chairman of the board this year is Lester N. Shannon, Stockham Pipe Fittings Co., Birmingham, Ala. Others serving on the board are Henry S. Washburn, Plainville Castings Co., Plainville, Conn.; Marshall Post, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.; Hyman Bornstein, Deere & Co., Moline, Ill.; James L. Wick Jr., Falcon Bronze Co., Youngstown, O.; Dan M. Avey, Tulsa, Okla.; and Frank J. Lanahan, Ft. Pitt Malleable Iron Co., Pittsburgh.

Nominations for officers and directors of the association, which were made Jan. 11 by the nominating committee, were approved by the convention. New officials for the year are: President, D. P. Forbes, president and general manager, Gunite Foundries Corp., Rockford, Ill.; vice president, L. C. Wilson, general manager, Reading Steel Casting division, American Chain & Cable Co. Inc., Reading, Pa.

Directors elected for the next three years are: H. S. Simpson, president, National Engineering Co., Chicago; J. E. Crown, master mechanic, United States Naval Gun Factory, Washington, and vice chairman of the A.F.A. Chesapeake chapter; I. R. Wagner, general manager, Electric Steel Castings Co., Indianapolis, Ind., and first chairman of Central Indiana chapter; S. V. Wood, president and manager, Minneapolis Electric Steel Castings Co., Minneapolis, Minn., member of steel division advisory committee and member of board of directors, Twin City chapter; W. L. Woody, manager, National Malleable & Steel Castings Co., Sharon, Pa., and first chairman of Northeastern Ohio chapter. Vaughn Reed, president, City Pattern Works, Detroit, was elected to fill out the unexpired term as association director of W. J. Corbett, vice president and works manager, Atlas Steel Casting Co., Buffalo, who died early in February.

The holding of the first Western

REGISTRATION on opening day of American Foundrymen's Association convention. Estimated attendance at exhibition halls Monday was 8000

Hemisphere Foundry Congress in conjunction with this annual convention marks an important milestone in the efforts of the association to build up relations with Central and South America. It was pointed out in papers presented at the Western Hemisphere Foundry Conference that foundry practice in both Brazil and Mexico is complicated not only by problems related to raw materials but also by the absence of co-operation and exchange of ideas between foundrymen, such as is followed in this country. Mexican foundries are now called upon to furnish new machinery and spare parts to local industry—items formerly obtainable from Europe or the United States but now difficult or impossible to obtain from usual sources.

In Brazil, blast furnaces are small and pig iron shipments generally are made up of many heats, thus contributing to lack of uniformity in foundry products. Two Brazilian institutions, the National Technological Laboratory in Rio de Janeiro and the Institute of Technological Research in the city of Sao Paulo are attempting to promote the technical aspects of the foundry industry. The Brazilian foundry industry consists of not more than 400 plants, according to Dr. Miguel Siegel, Instituto de Pesquisas Technologicas, and H. A. Hunnicutt, Industrias Chimicas Brasileiras, both of Sao Paulo, Brazil. Most coke is imported from England and is preferred to American coke. Both molds and cores generally are made by hand.

Of the 43 technical sessions, two were devoted especially to war production problems. In one of these, Rear Admiral George Pettingill, Ret., commandant and superintendent of the Naval Gun Factory, Washington, said the Navy is attempting to stabilize design of castings and other ordnance parts as much as possible and to minimize changes after production starts. Demands of modern warfare make it necessary to change the design of castings in some instances, but the Navy is more than anxious to cooperate in eliminating red tape and production delays.

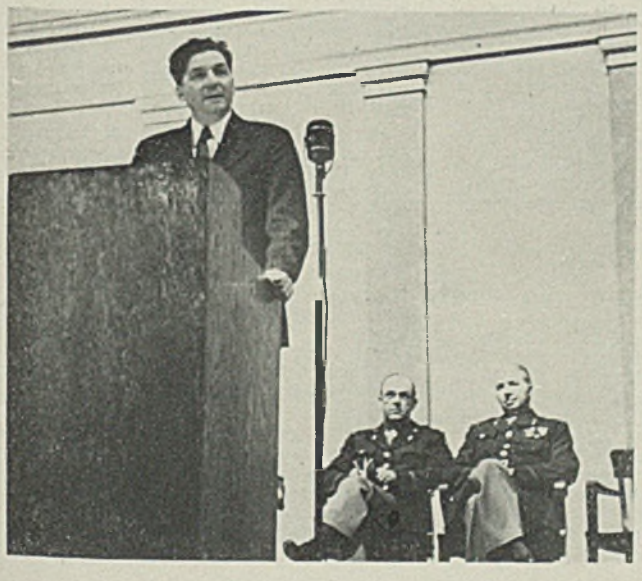
Duncan P. Forbes
Elected president, American Foundrymen's Association

It was pointed out that the facilities of the Navy's research laboratories are available to foundries filling both prime and subcontracts. In addition, the department is open to suggestions regarding changes in specifications for materials and castings design. Foundrymen were asked to be patient with Navy inspectors for it was emphasized the need for training large numbers of new inspectors causes difficulties to arise in perfecting a smooth-working organization. The Navy's attitude was stated as being that the inspector is not always right, even though the basic system of inspection is correct.

In praising activities of the steel foundries with respect to standardization of specifications, the admiral expressed regret that the nonferrous group had not effected similar results. Various grades of cast metal are already being widely employed in ordnance work, and malleable iron is being considered for a number of additional ordnance uses.

Another feature of this year's technical program was the four sessions given over to the gray iron shop course. At one of these George Timmons, Climax Molybdenum Co., Detroit, in discussing the practical theory of shrinkage, pointed out that shrinkage as usually encountered in foundry work referred not only to volume change or contraction but to a type of defect which also is called porosity, sponginess, or draws. He demonstrated the latter type of shrinkage using a 4-inch cube made in dry sand without feeding. It was pointed out that shrinkage voids may be controlled or eliminated by reducing elements which tend to increase the freezing range such as phosphorus; reduction of pouring temperatures to obtain uniform freezing through decrease in temperature gradients; gating through light sections and risers; proper control of pouring rates; and use of chills during freezing.

At 4:30 p. m. each day of the convention, Harry W. Dietert, president of the Harry W. Dietert Co., Detroit, presented one of a series of lectures on core practices dealing



MAKING rotary files by hand—one of the several action demonstrations at the exposition (above)

MAYOR Frank J. Lausche welcomed the convention visitors to Cleveland. Maj. Gen. L. H. Campbell Jr., chief of production, Ordnance Office, Washington, and Col. H. M. Reedall, Cleveland Ordnance District, also participated in the opening ceremonies

with all phases of the subject from the sources of various types of sand used to defects caused by faulty cores.

At the opening meeting of the convention, Maj. Gen. L. H. Campbell Jr., chief of production, Ordnance Office, Washington, stated that the foundry industry's contributions to the war effort are of the highest importance. While the Ordnance Department's attention had in the past turned to other methods of fabrication, the foundry again is coming into its own. He said this country is in for the fight of its life and that the next few months will be of utmost importance for everyone would be called upon to make sacrifices and stop playing politics.

The highlight of the patternmaking sessions was an extemporaneous chalk talk by M. J. Gregory, foundry superintendent, Caterpillar Tractor Co., Peoria, Ill., following a discussion of core boxes and driers for core blowing. According to Mr. Gregory, one of the mistakes made by many foundrymen is to put too few holes in the box and to use too high an air pressure in blowing the sand through the core. Mr. Gregory then proceeded to show the audience by means of sketches what was being done at Caterpillar.

He declared the best practice in blowing is to put plenty of holes in the core box. He explained how it is possible to blow 1000 cores in one core box simply by making sand go around a corner.

Prize Winners

The apprentice training program is one of the most important activities of the Foundrymen's Association. Thus great interest attended the contests staged in the Cleveland Auditorium during the convention. Winners in each group were (with first-prize winner listed first):

Gray Iron: Neal B. Hamilton, Caterpillar Tractor Co., Peoria, Ill.; Edward Drebus, Universal Foundry Co., Oshkosh, Wis.; James Nowickar, Sheboygan Foundry Co., Sheboygan, Wis.

Steel: Robert Bina, Crucible Steel Castings Co., Cleveland; Richard Bareh, Crucible Steel Castings Co., Cleveland; Arthur Tazalla, Wisconsin chapter, A.F.A., Milwaukee.

Nonferrous: Ferd Sevenz, Ampco Metals Co., Milwaukee; Dan Mrotek, Wisconsin Aluminum Foundry Co., Manitowoc, Wis.; John Jasso, Wellman Bronze & Aluminum Foundry Co., Cleveland.

Patternmaking: Cassimer Skrocki, Falk Corp., Milwaukee; Walter Zernechal, Hill-Acme Foundry & Machine Co., Cleveland; Richard Kiloh, Miehle Printing Press Mfg. Co., Chicago.

Patterns and castings in all cases showed excellent workmanship, making it difficult for the judges to choose the winners.

Committees Named For Industries

War Production Board last week named the following industry advisory committees in the metalworking field:

Pipe, Wire Products, Galvanized Sheet

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

Committee members: Henry J. Allison, Glasgow-Allison Co., Charlotte, N. C.; Wakefield Baker, Baker-Hamilton & Pacific, San Francisco; A. J. Becker, Ohio Valley Hardware & Refrigerating Co., Evansville, Ind.; Thomas A. Fernley Jr., National Wholesale Hardware Association, Philadelphia; Henry A. Hoeynk, Shapleigh Hardware Co., St. Louis; Charles Igoe, Igoe Brothers, Brooklyn, N. Y.; A. C. Rankin, Teague Hardware Co., Montgomery, Ala.; M. W. Denison, Braman-Dow & Co., Boston; William French Sr., Moore-Handley Hardware Co., Birmingham, Ala.; S. C. Hinkle, Mine & Smelter Supply Co., Denver; N. J. Higginbotham, W. A. Case & Son Mfg. Co., Buffalo; Lucien W. Moore, Crane Co., Chicago.

Bicycle

Government presiding officer, M. D. Moore.

Committee members: H. Clyde Brokaw, Shelby Cycle Co., Shelby, O.; Frank Carlton, Arnold, Schwinn & Co., Chicago; N. R. Clarke, Westfield Mfg. Co., Westfield, Mass.; Jack Dougherty, Monark Silver King Inc., Chicago; F. J. Hannon, Murray Ohio Mfg. Co., Cleveland; Horace Huffman, Huffman Mfg. Co., Dayton, O.; James S. Manton, Manton & Smith Co., Chicago; Homer L. Mueller, Cleveland Welding Co., Cleveland; A. H. Myers, Iver Johnson's Arms & Cycle Works, Fitchburg, Mass.; Neely Powers, The Colson Corp., Elyria, O.; S. K. Pruett, Excelsior Mfg. Co. Inc., Michigan City, Ind.; E. S. Van Valkenburg, H. P. Snyder Mfg. Co., Little Falls, N. Y.

Builders' Hardware

Government presiding officer, J. L. Haynes.

Committee members: J. J. Meyer, Independent Lock Co., Fitchburg, Mass.; William C. Habbersett, Russell & Erwin Mfg. Co., New Britain, Conn.; R. T. Mitchell, Yale & Towne Mfg. Co., Stamford, Conn.; L. W. Oakes, Sargent & Co., New Haven, Conn.; Duncan Shaw, Reading Hardware Corp., Reading, Pa.; Charles Kendrick, Schlage Lock Co., San Francisco; E. F. Lawrence Jr., Lawrence Brothers Inc., Sterling, Ill.; A. L. Hager, Hager & Sons Hinge Mfg. Co., St. Louis; E. J. Tower, Master Lock Co., Milwaukee; Johann Frohlich, Bommer Spring Hinge Co., Brooklyn, N. Y.; A. H. Schleicher, Oscar C. Rixson Co., Chicago; W. A. Heizmann Sr., Penn Hardware Co., Reading, Pa.

Combat Instruments

Government presiding officer, Charles L. Saunders.

Committee members: F. G. Vaughen, Meter Division, General Electric Co., Schenectady, N. Y.; Ray R. Simpson, Simpson Electric Co., Chicago; H. L. Olesen, Weston Electrical Instrument Co., Newark, N. J.; H. P. Sparkes, Meter Division, Westinghouse Electric & Mfg. Co., Newark, N. J.; D. J. Angus, Esterline-Angus Co. Inc., Indianapolis; R. H. Isaacs, Bendix Aviation Corp., Pioneer Instrument Division, Bendix, N. J.; W. P. Loudon, Electric Auto-Lite Co., Toledo; Victor Carbonara, Kollsman Instrument Division, Square D Co., Elmhurst, N. Y.; A. D. Hickok, Hickok Electric Instrument Co., Cleveland.

Warehouse Groups Elect Officers

Chapters of the American Steel Warehouse Association, Cleveland, have elected officers for the coming year as follows:

BALTIMORE: President, George J. Parke, Eagleston-Parke Inc., Norfolk, Va.; vice president, Henry A. Lowry, Seaboard Steel & Iron Corp., Baltimore; secretary, Joseph D. Boan, Scully Steel Products Co., Baltimore. Mr. Parke was also named national director.

CENTRAL STATES: President, A. J. Kueber, Steel Warehousing Corp., Chicago; vice president, L. B. Kidwell, General Steel Warehouse Co. Inc., Chicago; vice president, E. G. Fisher, National Steel Co., Chicago; treasurer, M. O. Hjortland, Steel Supply Co., Chicago; secretary, T. B. Daniels, Jones & Laughlin Steel Corp., Chicago; national director, C. H. Bradley, W. J. Holliday & Co., Indianapolis.

DETROIT: President, E. W. Lynch, Union Drawn Steel Division, Republic Steel Corp.; secretary-treasurer, J. Ivan Fiscus, Huron Steel Co. Inc.; national director, L. S. Roehm, Jones & Laughlin Steel Corp., all of Detroit.

NEW ENGLAND: President, J. B. McIntyre, Scully Steel Products Co., Allston, Mass.; vice president, Quincy W. Wales, Brown-Wales Co., Boston; vice president, G. A. Putnam, George F. Blake, Inc., Worcester, Mass.; secretary-treasurer, C. S. Harvey, Arthur C. Harvey Co., Allston, Mass.; national director, G. M. Congdon, Congdon & Carpenter Co., Providence, R. I.

NORTHERN CALIFORNIA: President, R. D. Cortelyou, San Francisco; vice president, J. C. Hickinbotham, Hickinbotham Bros. Ltd., Stockton, Calif.; vice president, Curtiss Hayden, of Dunham, Carrigan & Hayden Co., San Francisco; Mr. Cortelyou was also named national director.

NORTHERN OHIO: President, R. M. Beutel, Paterson-Leitch Co.; vice president, F. A. Michell, S.A.E. Steels; secretary-treasurer, J. J. Halloran, Edgar T. Ward's Sons Co.; national director, W. O. Kurtz, Peninsular Steel Co., all of Cleveland.

PACIFIC: President, R. P. Mercer, Jacobs & Gile, Inc.; vice president, David Robertson, Robertson Heavy Hardware Co.; secretary-treasurer, H. F. Morrow, Pacific Metal Co.; national director, William A. Haseltine, J. E. Haseltine & Co., all of Portland, Oreg.

ST. LOUIS: President, A. L. Peterson, Jos. T. Ryerson & Son Inc.; vice president, Bruce Haines, E. E. Souther Iron Co.; secretary-treasurer, H. G. Thompson, Scully Steel Products Co.; national director, L. H. Jostes, Beck & Corbitt Co., all of St. Louis.

SOUTHERN CALIFORNIA: President, E. Jungquist, Percival Steel & Supply Co.; vice president, J. L. Robertson, A. M. Castle & Co.; vice president, Donald Priest, Los Angeles Heavy Hardware Co.; secretary-treasurer, L. B. Yeaton; all of Los Angeles; national director, Mr. Jungquist.

WISCONSIN: President, George W. Smith, Joseph T. Ryerson & Son Inc.; vice president, John Pritzlaff, John Pritzlaff Hardware Co.; secretary-treasurer, Fred O'Dell, Edgar T. Ward's Sons Co.; national director, George Gibbs, Gibbs Steel Co.; all of Milwaukee.

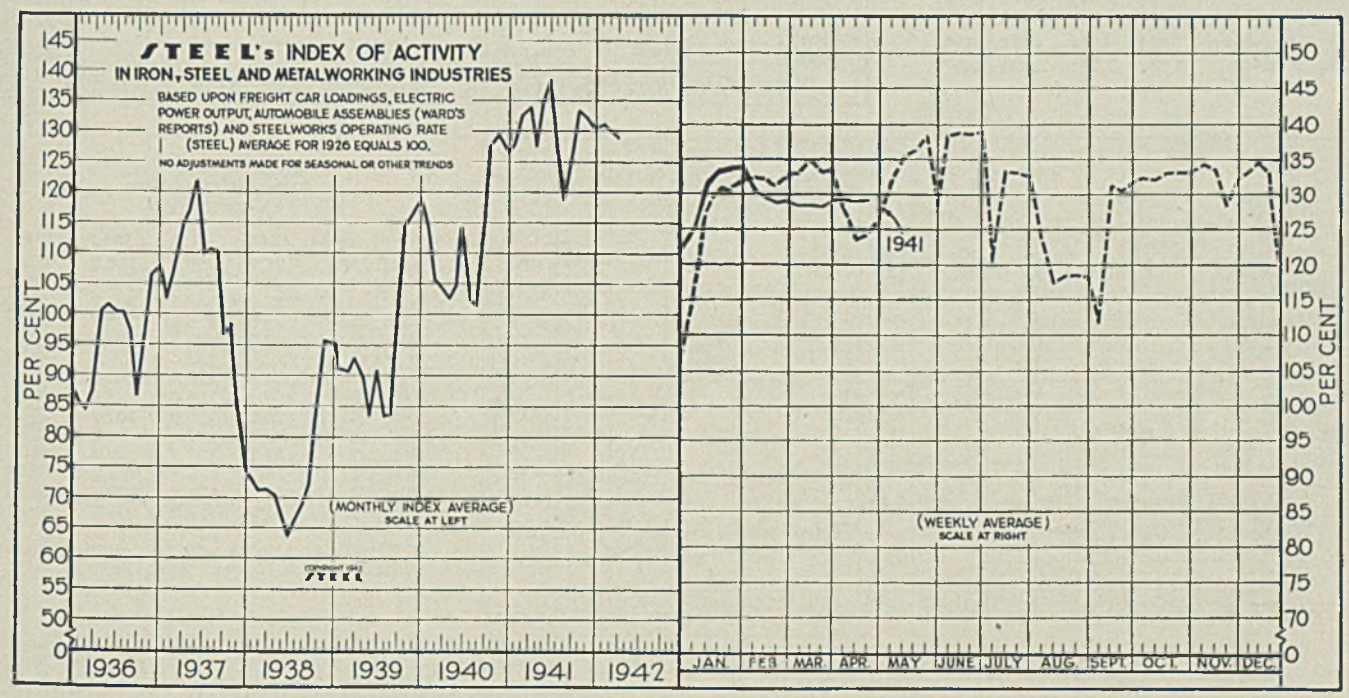
The BUSINESS TREND

Activity Index Declines Slightly

RAPID plant conversion to military goods output is vividly illustrated in the Detroit area. The number of workers employed in this now very diversified industrial center rose 22,000 during March to continue the steady upward trend of recent weeks. It is estimated that when automobile plants get into full war production, 50 per cent more people will be employed than during the peak peacetime period.

STEEL's index of activity advanced to 129.4 during the week ended April 18. This compares with 129.2 recorded in the preceding period, while in like week a year ago the index stood at 124.2. The highest level recorded by the index to date this year was 133.9 in the week ended Jan. 31.

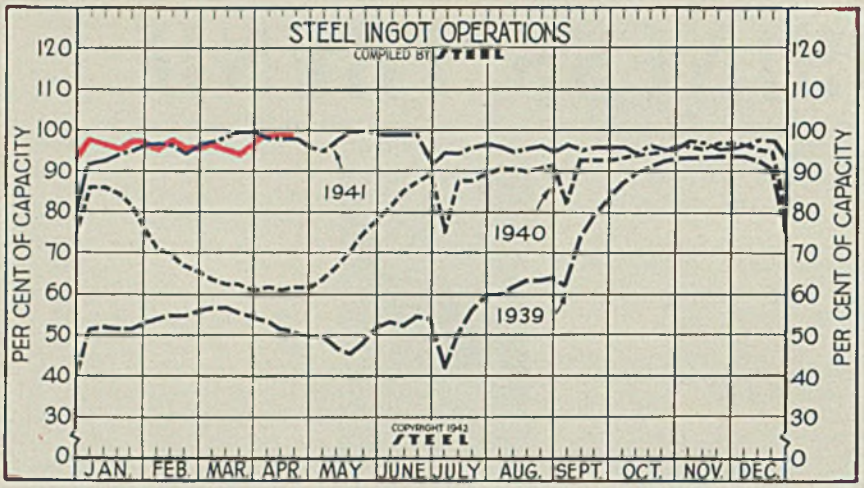
The national steel rate held unchanged at 98.5 per cent of capacity during the week ended April 18. On a tonnage basis this is the highest on record. Revenue freight carloadings advanced sharply to 846,562 cars during the latest period. This represents a gain of 4 per cent over the preceding week and was the largest for any week since Nov. 29 last. Electric power consumption eased to 3,307,700,000 kilowatts.



STEEL'S index of activity advanced 0.2 point to 129.4 in the week ended April 18:

Week Ended	1942	1941
Jan. 31	133.9	132.0
Feb. 7	130.6	132.7
Feb. 14	129.8	132.3
Feb. 21	129.0	131.2
Feb. 28	129.1	133.0
Mar. 7	128.3	133.1
Mar. 14	128.3	135.0
Mar. 21	128.1	133.5
Mar. 28	129.1	133.9
April 4	129.6	128.9
April 11	129.2	123.8
April 18	129.4	124.2

Mo. Data	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931
Jan.	131.3	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1
Feb.	129.6	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5
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
April	.....	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0
May	.....	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6
June	.....	138.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1
July	.....	128.7	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3
Aug.	.....	118.1	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4
Sept.	.....	126.4	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3
Oct.	.....	133.1	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2
Nov.	.....	132.2	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4
Dec.	.....	130.2	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3



Steel Ingot Operations

(Per Cent)

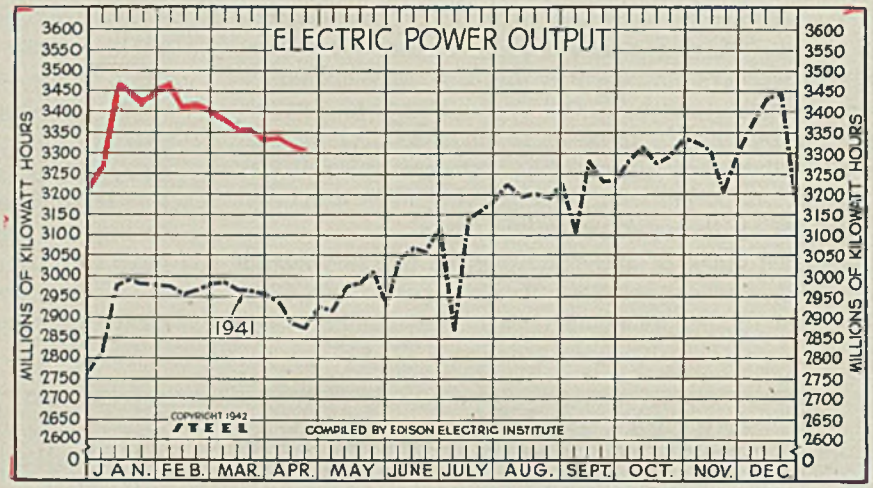
Week ended	1942	1941	1940	1939
April 18...	98.5	98.0	61.5	50.5
April 11...	98.5	98.0	61.0	51.5
April 4....	98.0	98.0	61.5	53.5
Mar. 28....	97.5	99.5	61.0	54.5
Mar. 21....	95.5	99.5	62.5	55.5
Mar. 14....	95.5	98.5	62.5	56.5
Mar. 7.....	96.5	97.5	63.5	56.5
Feb. 28....	96.0	96.5	65.5	56.0
Feb. 21....	96.0†	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

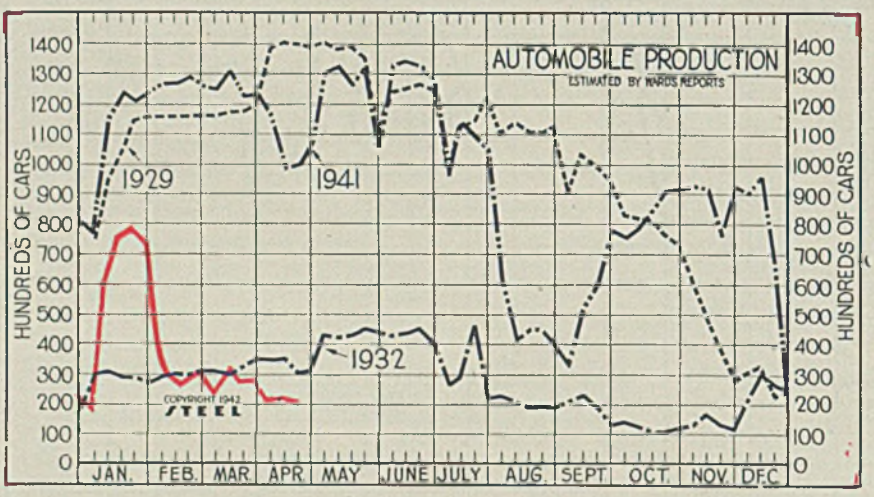
†Since Feb. 21 rate is based on new capacity figures as of Dec. 31 last.

Electric Power Output

(Million KWH)

Week ended	1942	1941	1940	1939
April 18.....	3,308	2,874	2,529	2,265
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
Week ended	**1941**	**1940**	**1939**	**1938**
Dec. 27.....	3,234	2,757	2,465	2,175





Auto Production

(1000 Units)

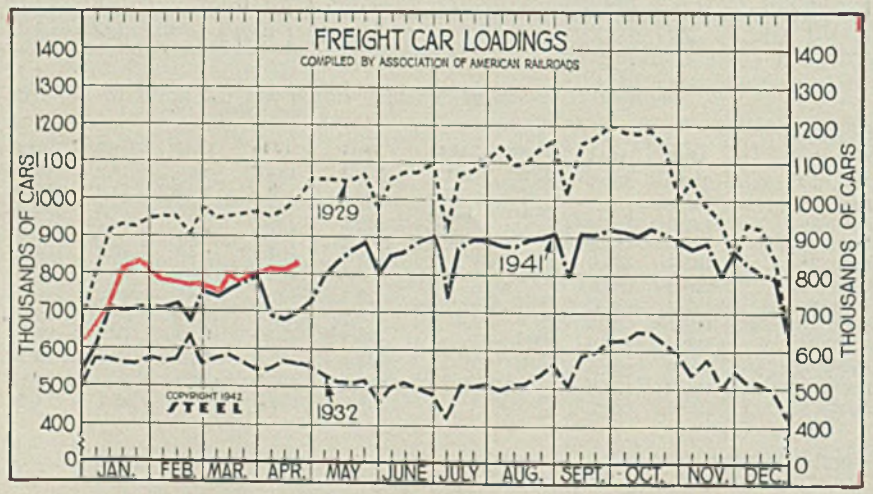
Week ended	1942	1941	1940	1939
April 18...	21.7	99.3	103.7	90.3
April 11...	23.0	99.3	101.9	88.1
April 4....	22.3	116.3	101.7	87.0
Mar. 28....	28.9	124.2	103.4	86.0
Mar. 21....	28.9	123.8	103.4	89.4
Mar. 14....	30.6	131.6	105.7	86.7
Mar. 7.....	24.5	125.9	103.6	84.1
Feb. 28....	30.1	126.6	100.9	78.7
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

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

Freight Car Loadings

(1000 Cars)

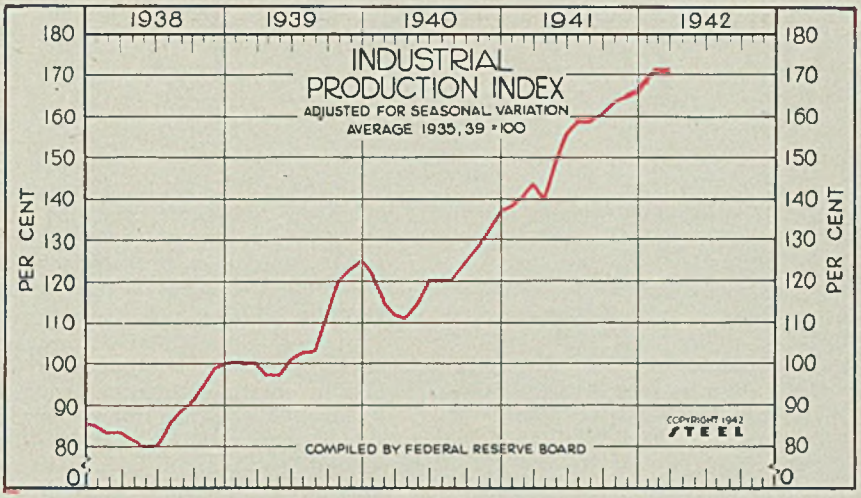
Week ended	1942	1941	1940	1939
April 18.....	847	709	628	559
April 11.....	814	680	619	548
April 4.....	829	683	603	535
Mar. 28.....	805	792	628	604
Mar. 21.....	797	769	620	605
Mar. 14.....	799	759	619	595
Mar. 7.....	771	742	621	592
Feb. 28.....	781	757	634	599
Feb. 21.....	775	678	595	561
Feb. 14.....	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

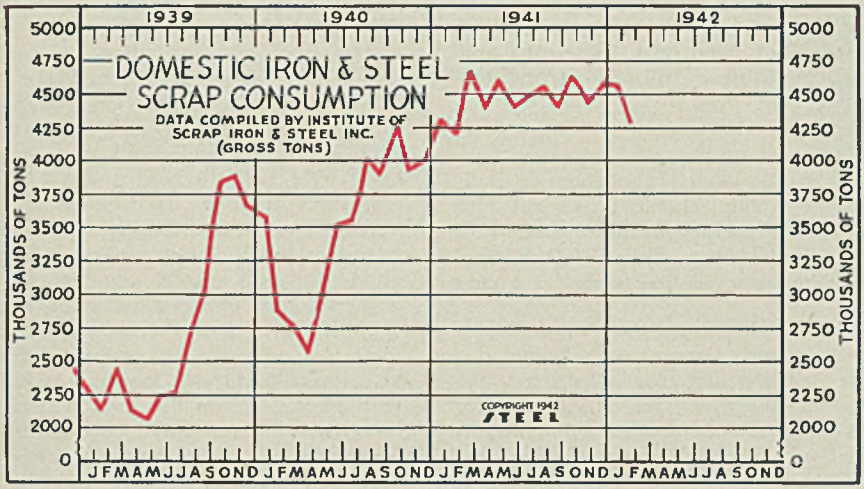


Industrial Production
Federal Reserve Board's Index

(1935-39 = 100)

	1942	1941	1940	1939	1938
Jan.	.171	139	122	102	86
Feb.	172	141	116	101	84
March	172	143	112	101	84
April	...	140	111	97	82
May	...	150	115	97	80
June	...	157	121	102	81
July	...	160	121	104	86
Aug.	...	160	121	104	90
Oct.	....	163	129	121	95
Nov.	...	168	133	124	100
Dec.	...	167	138	126	101
Year Ave	....	154	122	108	88





Iron and Steel
Scrap Consumption

(Gross Tons)

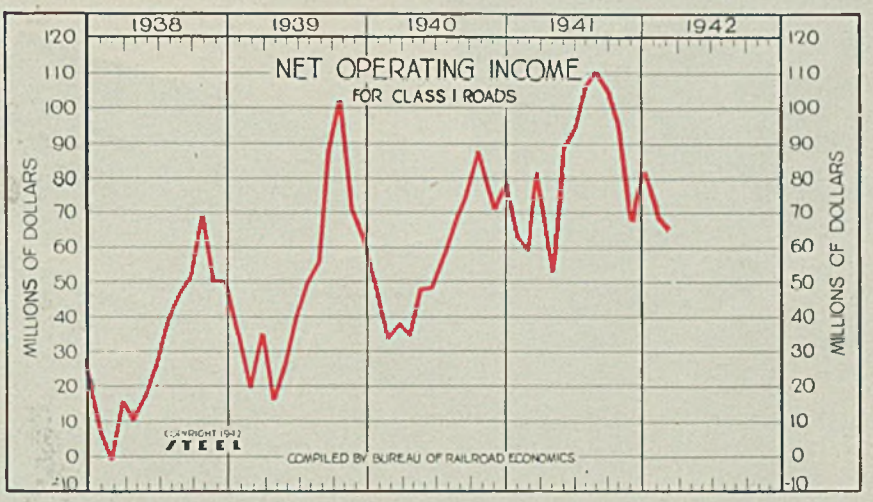
	1942	1941	1940	1939
		(000 omitted)		
Jan.	4,590	4,278	3,581	2,257
Feb.	4,276	4,172	2,812	2,124
Mar.	.....	4,662	2,728	2,419
Apr.	.....	4,406	2,548	2,114
May	.....	4,609	3,061	2,079
June	.....	4,406	3,482	2,221
July	.....	4,415	3,526	2,247
Aug.	.....	4,518	3,968	2,675
Sept.	.....	4,392	3,876	3,018
Oct.	.....	4,649	4,233	3,809
Nov.	.....	4,482	3,922	3,858
Dec.	.....	4,634	3,950	3,613
Total	.....	53,623	41,687	32,434
Mo. Av.	.....	.....	3,474	2,703

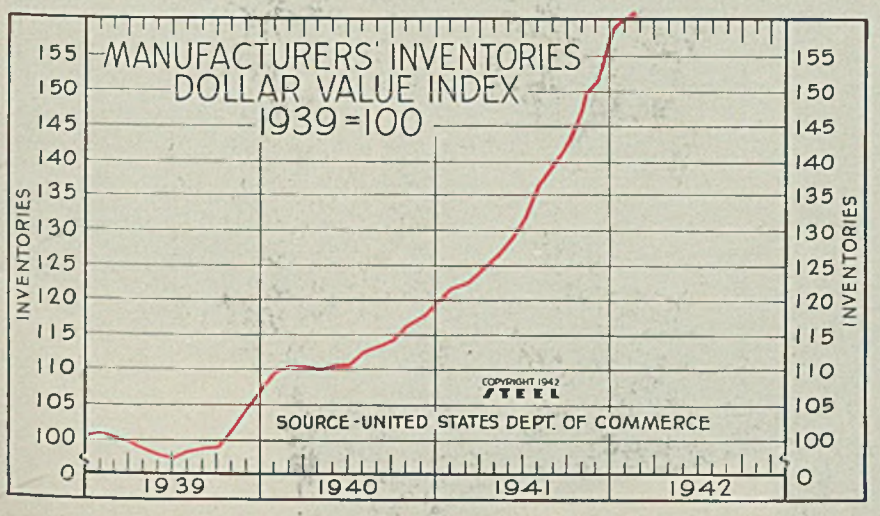
Class I Railroads
Net Operating Income

(Unit: $1,000,000)

	1942	1941	1940	1939
Jan.	$68.97	$62.02	$46.01	$32.95
Feb.	66.49	58.48	32.86	18.64
Mar.	.....	80.63	37.03	34.38
April	.....	52.57	34.12	15.32
May	.....	88.63	47.41	25.17
June	.....	93.26	48.09	39.17
July	.....	106.31	57.73	49.00
Aug.	.....	111.32	66.53	54.57
Sept.	.....	104.07	74.72	86.53
Oct.	.....	93.66	87.64	101.72
Nov.	.....	68.76	72.00	70.41
Dec.	.....	80.55	78.79	60.95
Average	.....	$83.29	$56.84	$49.02

*Indicates deficit.





Manufacturers' Inventories
Dollar Value Index

1939 = 100

	1942	1941	1940	1939
Jan.	162.0	121.8	109.5	100.9
Feb.	.....	122.7	110.6	100.4
March	.....	124.1	110.5	99.5
April	.....	126.0	110.0	98.5
May	.....	128.7	110.5	97.9
June	.....	132.0	110.6	97.4
July	.....	136.4	112.2	98.1
Aug.	.....	140.0	113.3	98.8
Sept.	.....	143.4	114.1	98.9
Oct.	.....	148.3	116.2	101.3
Nov.	.....	152.7	117.7	104.5
Dec.	.....	158.5	119.9	107.2
Mo. Ave.	.....	136.2	113.0	100.3

WELDED SCRAP

WITH WARTIME allocations and other restrictions making it increasingly difficult to obtain steel replacement parts, many companies are breaking this bottleneck wide open by fabricating their own replacements by welding scrap steel.

Such fabrication in most cases is extremely simple. If old riveted scrap is being used, all that is necessary is to cut off the part with the holes and then go into the welding operation. The torch can readily cut out almost any shape needed and the arc will quickly join the sections permanently. The precision obtainable depends only upon the accuracy with which the operations are handled.

While such work is a time-saver for the war industries, it is also of vital importance to all private industry, including the small foundry operator, fabricator, machine shop, etc. Specific examples of arc welding's advantages to such types of business are seen in the accompanying illustrations.

In these times of all-out war production, original equipment is difficult to obtain without, at least, extensive delays. In many cases it just cannot be obtained at all! Firms having equipment problems may find their solutions suggested in the examples described. Too, these examples show the great scope of items that need only ingenuity and resourcefulness to arise from the scrap pile.

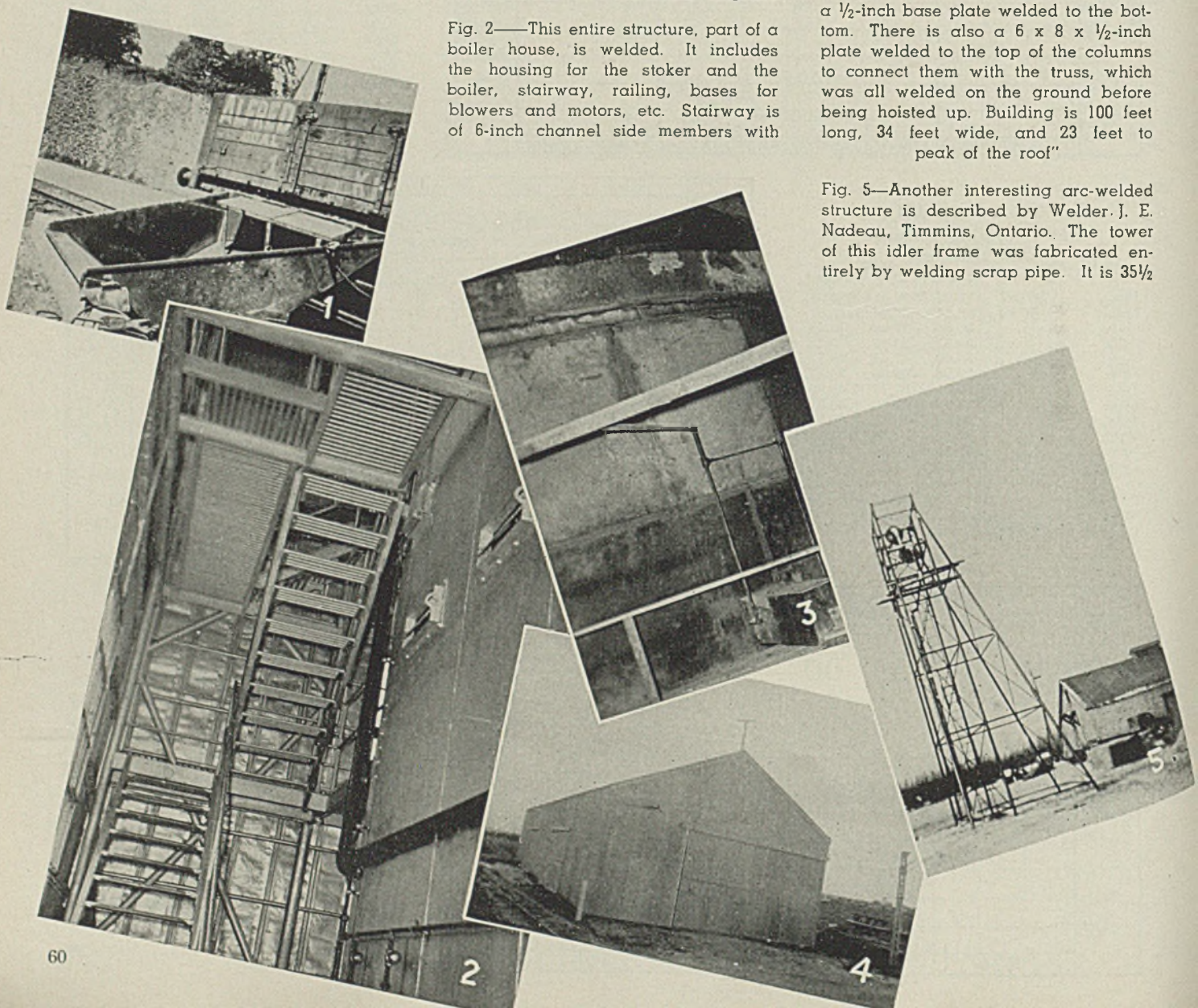
Fig. 1—All-welded coal hopper built from old ship plates, flame cut and welded in position inside and out with 1/8-inch electrodes. Courtesy G. H. Gee, Kidderminster, Worcestersire, England

Fig. 2——This entire structure, part of a boiler house, is welded. It includes the housing for the stoker and the boiler, stairway, railing, bases for blowers and motors, etc. Stairway is of 6-inch channel side members with old 1-inch water pipe for steps, supported on 2 x 2-inch angles welded to side channels. All material is scrap iron—even pipe for the steps. Where necessary, pieces of scrap are welded together to provide the necessary length

Fig. 3—A portion of one of 12 leaching tanks made by Golden Cycle Corp., Colorado Springs, Colo. All are of arc-welded steel construction, built entirely of scrap plate. Each tank is 50 feet in diameter, 15 feet deep

Fig. 4—Old boiler tubes form frame of this large warehouse for storing empty sugar bags. P. W. Howard, Napoleonville, La., who welded all the joints, says, "Old boiler tubes are of 4-inch diameter. There are 18 columns made up of two tubes and 6 columns of three tubes welded together, making a total of 24. Columns are 14 feet high with a 1/2-inch base plate welded to the bottom. There is also a 6 x 8 x 1/2-inch plate welded to the top of the columns to connect them with the truss, which was all welded on the ground before being hoisted up. Building is 100 feet long, 34 feet wide, and 23 feet to peak of the roof"

Fig. 5—Another interesting arc-welded structure is described by Welder J. E. Nadeau, Timmins, Ontario. The tower of this idler frame was fabricated entirely by welding scrap pipe. It is 35 1/2



Vice President
Lincoln Electric Co.
Cleveland

feet high. Legs are of 3-inch pipe, cross members of 2-inch pipe, "X" bracing employed 1-inch pipe

Fig. 6—Body of this mine car is built entirely of scrap plate 3/16-inch thick, fabricated by arc welding. Bending brake was used to make sides and one end from one piece. Bottom is then welded to this bent piece. Third plate which is the door, hinges in such a way that it slides open easily when the car is tilted on end as shown

Fig. 7—This all-welded pulverized-coal collector and blower was just being fabricated when photographed. It will work in conjunction with five coal pulverizers, blowing the coal particles through a system of 6-inch pipe line to eight roasting ovens. It is welded from ¼-inch thick plate and pipe—all from the scrap pile

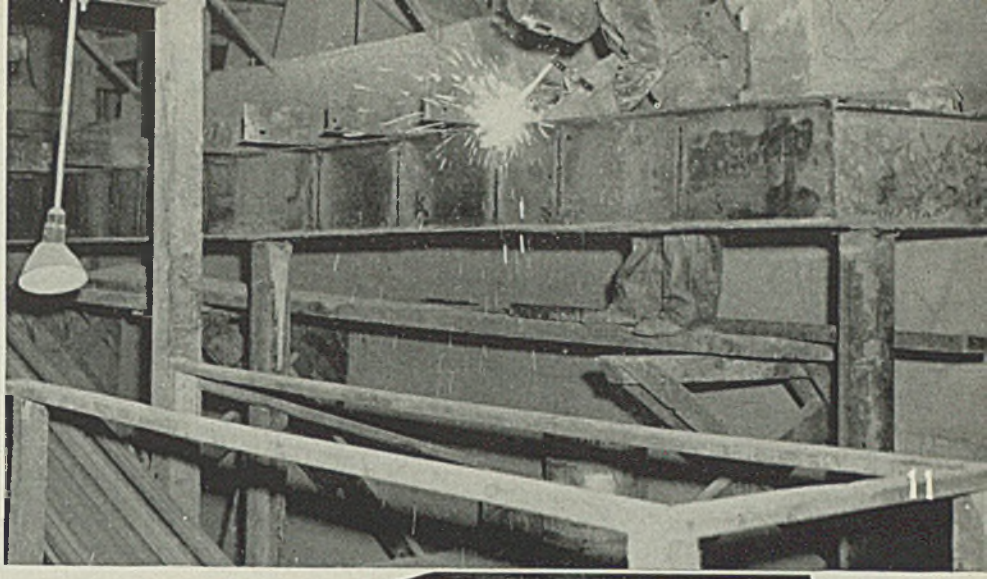


Fig. 8—When building this floor dolly from welded angles and plates, Schaefer's Peter Pan Bakery, Detroit, Mich., was fortunate in having its own welding machine right in its plant. The rollers were reclaimed from old discarded hand trucks

Fig. 9—A most unusual type machine constructed of arc-welded steel salvaged from a wrecked bridge and scrapped auto parts was conceived by Welder George Takomoto, Kalahoo, Kauai, Territory of Hawaii, U. S. A. It is used for bringing boats from anchorage to land, where vessels are repaired and painted. Machine is equipped with used auto engine and operates under its own power. It can leave the beach, pick up a boat and bring it to shore in 20 minutes

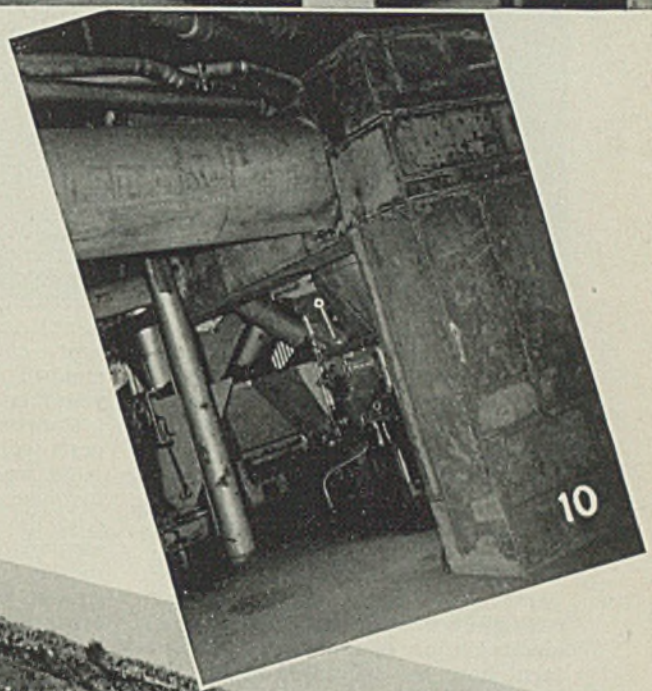
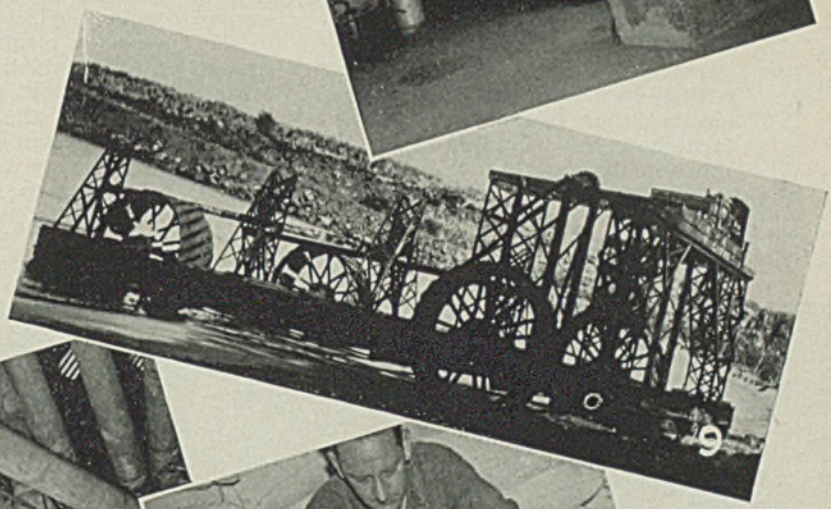
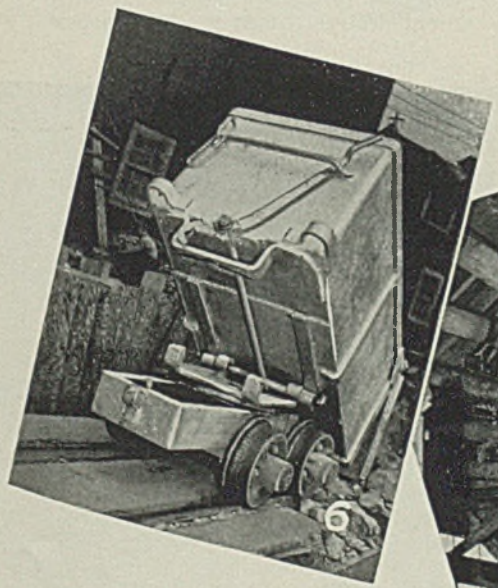
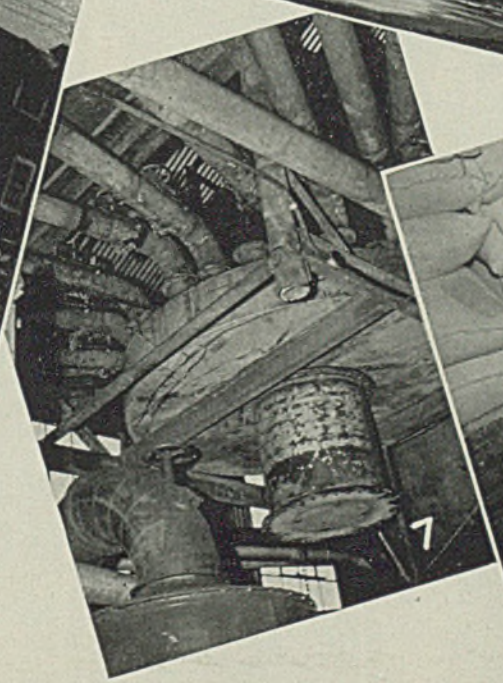


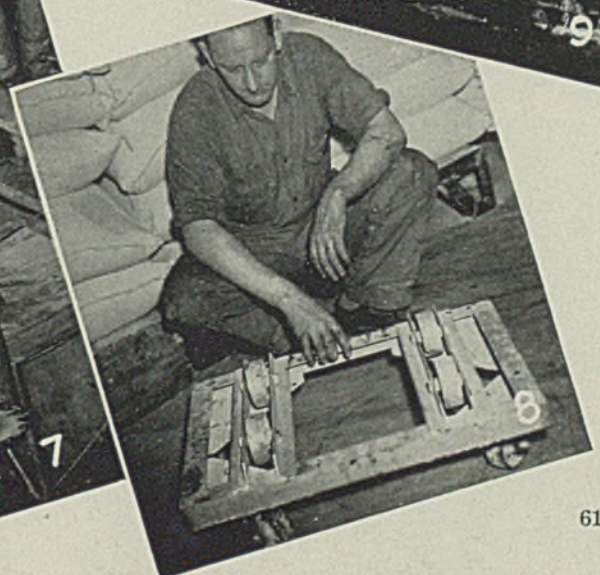
Fig. 10—This hot-air duct is built entirely of pieces of scrap welded together. Duct has not yet been painted so it shows the pattern of various parts as they fit together

Fig. 11—Fabricated foundation for a classifier, showing another interesting use of fabricating scrap iron of various lengths by arc welding. Base comprises 12-inch I-beams with cross members of 6-inch channels, and vertical columns of 6-inch sections. There is a total of 13 welded joints in the 29-foot length of this foundation. Each splice is a straight butt weld









Highly Efficient Heat-Treating Procedure, a Feature of . . . .

TOOL PLANT

Converted to Aircraft Parts Manufacture

By GERALD E. STEDMAN

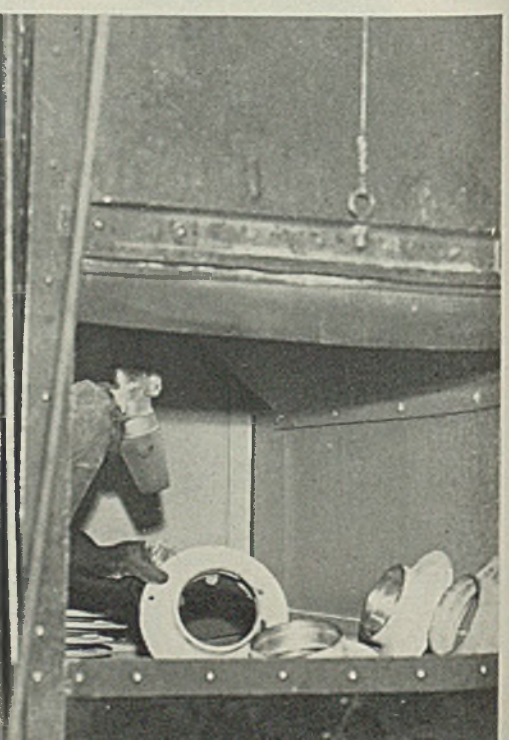
WITHIN the 4 square miles which comprise one of the suburbs in the northern Detroit metropolitan area is found one of the country's outstanding examples of war industry expansion, for industries here have grown from 17 in the summer of 1940 to 43 diversified enterprises, all engaged in war production. Largest industry is a plant organized a few years ago to manufacture precision tools and machines, its entire output now going into aircraft engines. The company now has three connected plants —two of which are devoted to machining precision aircraft engine parts and the third, between the two, given over to heat treating and electroplating operations. Employment here has increased almost 10 times in the past 20 months.

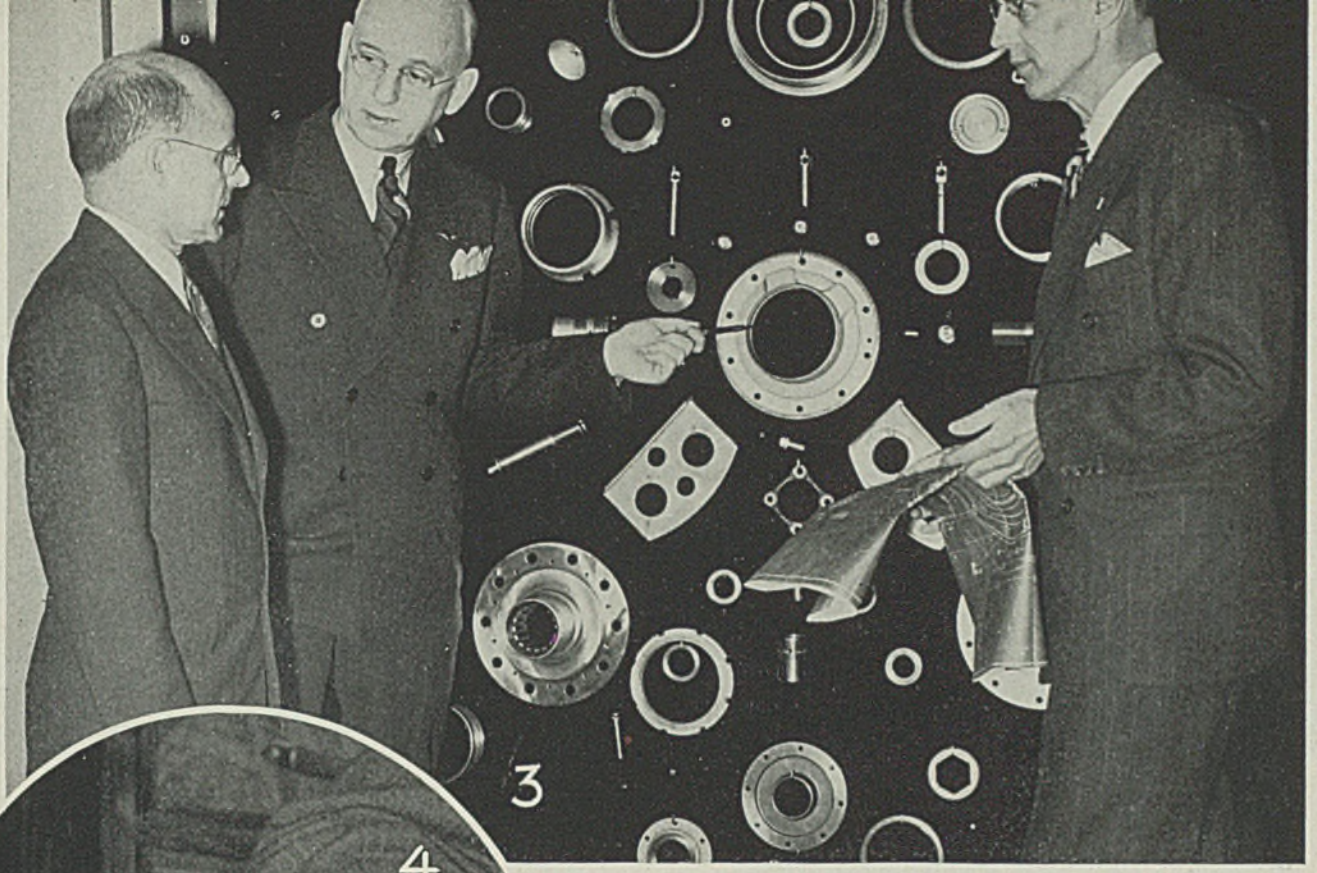
Over 100 different precision parts for airplane engines are produced, the company being a leading supplier to one prime contractor for the Air Corps as well as doing subcontracting for others. And production is still increasing for based on current contracts, output will be stepped up 150 per cent before the year's end.

Conversion of this plant to aircraft work, while most of the equipment was of the very latest types, involved considerable engineering. And the exacting specifications for airplane engine parts have resulted in the company's originating some production kinks which not only increases the output but permit meeting and bettering the greatly increased precision standards.

When the company was organized in 1939, it started to manufacture tools such as drills, reamers, etc., for machine tools. In changing over to aircraft production, it was, of course, necessary to install much new equipment. Instead of ordering special machines particularly suited for the production operations at hand, this company adopted a policy of buying standard machines and of applying special fixtures where necessary to handle the particular operations. By employing standard machines, the serious and difficult job of reconversion at the end of the war has already been whipped. This long view is especially vital to the government for, as the owner of the new machines, it will be faced with the problem of disposing of them at the end of the war.

This machinery, however, stripped of its special fixtures, will be standard for any post-war production requirements and therefore will find a ready market when the government desires to sell it. This policy





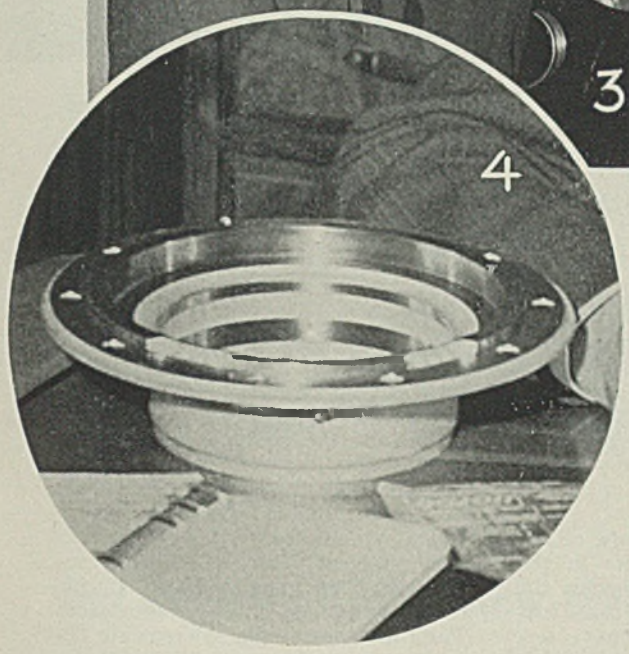


Fig. 1—Retainer rings are charged into Homocarb carburizing furnace. Note opposite page

Fig. 2—Retainers are cleaned by sandblasting with a fine banding sand in a Pangborn blast cabinet, door of which is open to show technique

Fig. 3—Here plant executives talk over production problems in connection with one of their aircraft parts. Left to right, Wallace Huscher, N. A. Woodworth and E. W. LaMonte. Display board shows a few of the aircraft engine parts made in this converted tool plant

Fig. 4—Closeup of the retainer part, the heat-treating procedure of which is detailed here

is the direct opposite of that of many firms facing conversion who have had special machinery designed and built for war production —machinery that will have little or no utility for anything after the war. In other words, this equipment will face the same difficulties in reconverting that confronted the manufacturer in converting to war production.

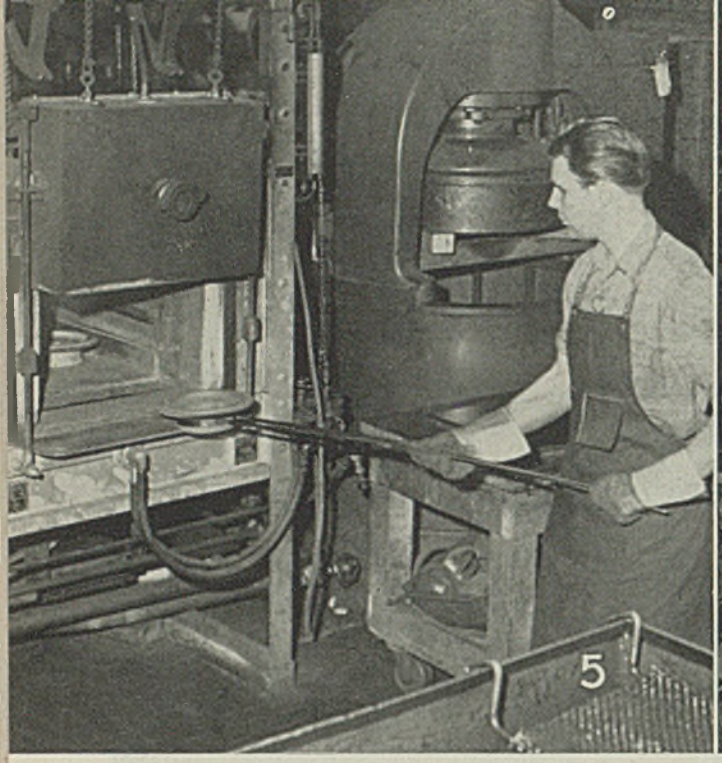
This problem of converting and reconverting equipment thus has been approached in a highly realistic manner for not only is it much easier to buy standard machines, but it also is easier to sell them. This has been the particular difficulty encountered in converting much of the automotive manufacturing equipment, for a good share of these machines were especially designed for their particular job and thus useless for anything else. Now they are being stored under tarpaulins. Obviously it is a mistake to build new war production machinery just as specialized, for it too will rest under tarpaulins awaiting another war at this war's end, and entirely new machinery again will have to be designed and built to fit civilian demands.

The conversion problem at this plant thus has resolved itself into nothing more than the design of special fixtures to apply standard production machines to the particular work at hand.

Converting lawyers, doctors, jewelers, linotype operators and salesmen into skilled operators of precision machine tools in record time is a fascinating story in itself and will be presented in a subsequent issue. Too, inspection methods are particularly exacting and involve some unusual operations. A good portion of the inspection work is handled in a department of 50 women working under the supervision of a former school teacher. While several phases of the operations here thus might be of interest, this article will center upon the plant's heat-treating methods.

The heat-treating and plating departments are housed in the center one of the three plants. Here every aid to scientific control is employed including electric furnaces with automatic temperature controls, improved pyrometers and similar equipment which goes far to eliminate the variations in treatment which prevent precise results.

Of course the more than 100 different parts produced in this plant require a wide variety of heat treatments. Such precision engine parts as the crankcase front section flange, the propeller shaft retainer, the valve clearance adjusting screw, the valve tappet and the knuckle pin each have their particular cycle of operations specially designed to produce the physical properties required in the part. A typical nitriding cycle runs 60 hours, producing a case depth of 0.020 to 0.026-inch, employing ammonia gas. Since high wear resistance, corrosion resistance and retention of hardness at high temperatures are particularly important for many aircraft parts,



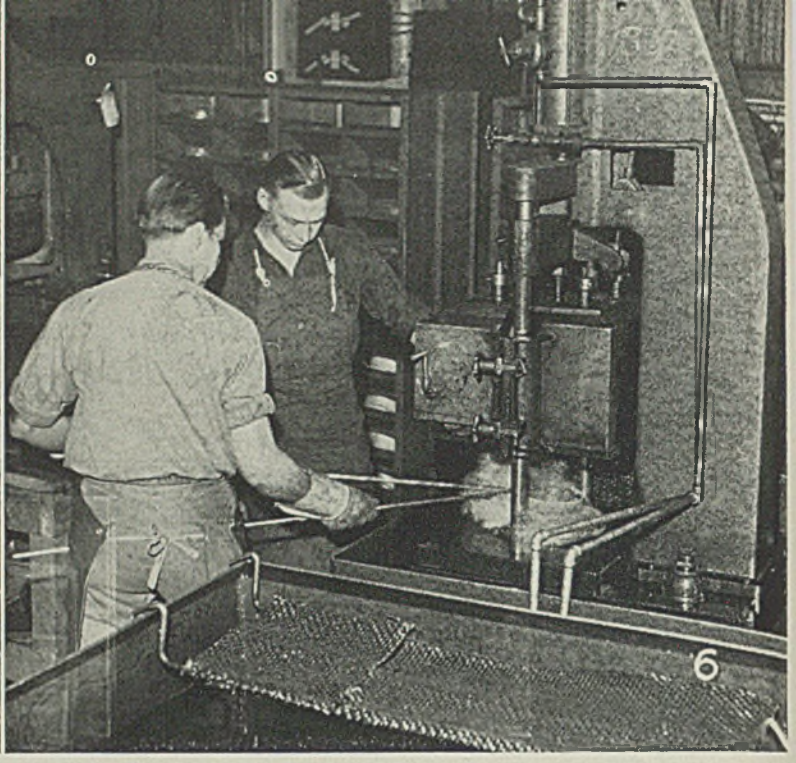


Fig. 5—Here operator is taking a retainer from the C. I. Hayes controlled-atmosphere hardening furnace. He will swing around and place it in between dies of quenching press in Fig. 6

Fig. 6—In this specially designed quenching press, the hot retainer receives a carefully controlled quench. Housing and die shown above retainer here will be lowered over the work, followed by a heavy stream of oil which will gush up and over the part

a good portion of them receive a nitriding treatment. To center this discussion on a particular item, the procedure employed in heat treating, the rear propeller-shaft thrust-bearing retainer will be described.

The contour of this part is shown near the center of the display board in Fig. 3. A closeup is shown in Fig. 4. It is a circular part consisting of a 10-inch flanged collar with a neck about 2½ inches in depth. Overall outside diameter is 10 inches, with an inside diameter of about 5½ inches. The material is SAE 3312 steel. This is a high-chromium-nickel alloy intended primarily for case-hardening heat-treating cycles where a core possessing extremely high strength and toughness is desired. It analyzes 0.12 per cent carbon maximum, 0.30 to 0.60 manganese, 0.04 phosphorus maximum, 0.04 sulphur maximum, 3.25 to 3.75 nickel, 1.25 to 1.75 chromium. The chromium, with suitable heat treatment, functions to produce fineness of structure and provide added strength without reducing the toughness or ductility. Such a steel is suited to bearing and tool applications for it provides greater depth of hardness and increasing austenite sluggishness, while the percentage of carbon required for the eutectoid ratio is lower. The position of the critical ranges also is changed by the chromium content, permitting a lower critical rate of cooling because of the increased tendency toward a split transformation. Too, corrosion resistance is increased. SAE 3312 is thus an excellent material for the rear propeller-shaft thrust-bearing retainer as viewed from every functional standpoint.

The part is furnished to the shop as a rough forging. Inspection practice is extremely rigid, each part being inspected before and after each cycle of operation as it enters or leaves the heat-treating and electroplating departments. In fact, about three times as much inspection as normally is employed to meet the high standards.

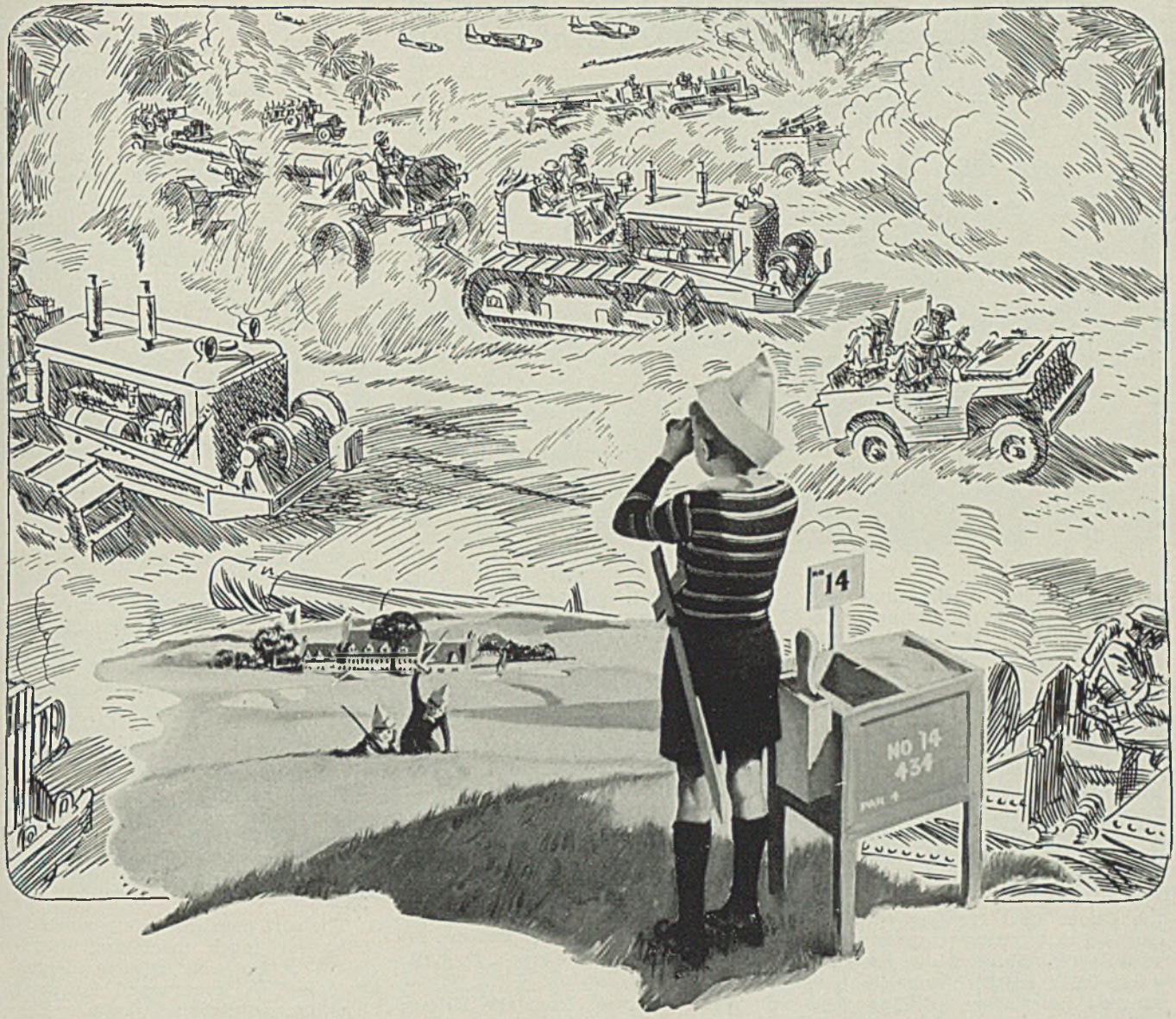
A control laboratory is one of the most essential departments in the plant, for it not only checks the analysis of all materials and supplies but makes the ferroxyl test which will be described later as well as microscopic metallurgical checks of occasional sectioned pieces. Other tests include a drop test for cadmium plate thickness and exhaustive checks on all plating solutions. Fig. 7 is a view in the laboratory.

The rough forgings are first normalized at 1690 to 1710 degrees Fahr. Since box carburizing is done in these same furnaces at a temperature of 1680 degrees Fahr., the normalizing can be done between the carburizing cycles with no loss of time or heat. After the forgings have been normalized to a hardness rating of 21 to 27 rockwell C (225 to 277 brinell), the forgings are air quenched to decrease the effect of ingotism and austenite growth.

After normalizing and cooling, the forgings are rotoblasted in a 3½-cubic-foot barrel using No. 20 shot. This effectively removes all forging scale. Now the forgings are rough machined, after which they are ready for copper plating. A coating of copper 0.0007 to 0.0009-inch thick is deposited over the entire surface of the forging in a Du Pont Hi-speed bath. The copper then is machined off the surfaces to be hardened. The purpose of the copper deposit is to prevent the absorption of carbon on all surfaces except those which are to be carburized. The surfaces from which the copper has been machined will absorb carbon and can thus be hardened. The thickness of the electroplate deposited is checked by a Magnagauge which is calibrated against the plant's own standards as well as to the type of surface running.

The electroplating work is done with unusual care and accuracy. Since even the best types of copper plating can be porous, the ferroxyl test is used as a check on porosity. This involves painting a ferroxyl gel on the surface of the work, the formula for the solution being: 5 grams potassium ferricyanamide, 0.5 grams potassium ferrocyanamide, 10 grams sodium chloride, 5 grams agar. Sufficient distilled water is added to make 1 liter of solution.

This is painted on the copper-plated surface in a thick layer. Any discolored spots that develop indicate holes in the plating deposit. Checking the plating in this manner is done on a percentage-of-run basis which permits leaks so fine as not to be discovered by any other method to be detected positively. Seldom



The Country Club's new tractor is protecting the Panama Canal

If the fairways of the Country Club are a little rough in spots, members can add a stroke or two and blame it on the Japs. For the materials to produce the new tractor that was going to pull the club's gang of lawn mowers are now in a tractor somewhere in Panama, hauling a heavy gun. Either there or on our farm lands, helping a farmer grow bigger crops. Between them, Private Brown and Farmer Brown get all the new tractors there are.

In this war of blitz and counter-blitz, big guns must have the mobility of tanks. That means a tractor for every heavy gun. Add to these the thousands of tractors our farmers must have, and it is easy to see why the tractor manufacturers must strain every resource to fill the need.

In doing so, they smoothed out important production tasks in cooperation with the Revere Technical Advisory staff. For in all problems of copper and its alloys Revere provides a service, as well as metals, that can make manufacturing operations quicker and easier.

Every ounce of copper and brass our country can produce is needed to win the war. None can be spared for any other use. But Revere is especially well equipped with new plants, improved machines, advanced processes to supply a heavy share of these vital metals. And more facilities are rapidly being added to help get the war won *soon*.

The Revere Technical Advisory Service functions in (1) developing new and better Revere materials to meet active or anticipated demands; (2) supplying specific and detailed knowledge of the properties of engineering and construction materials; (3) continuously observing developments of science and engineering for their utilization in production methods and equipment; (4) helping industrial executives make use of data thus developed. This service is available to you, free.

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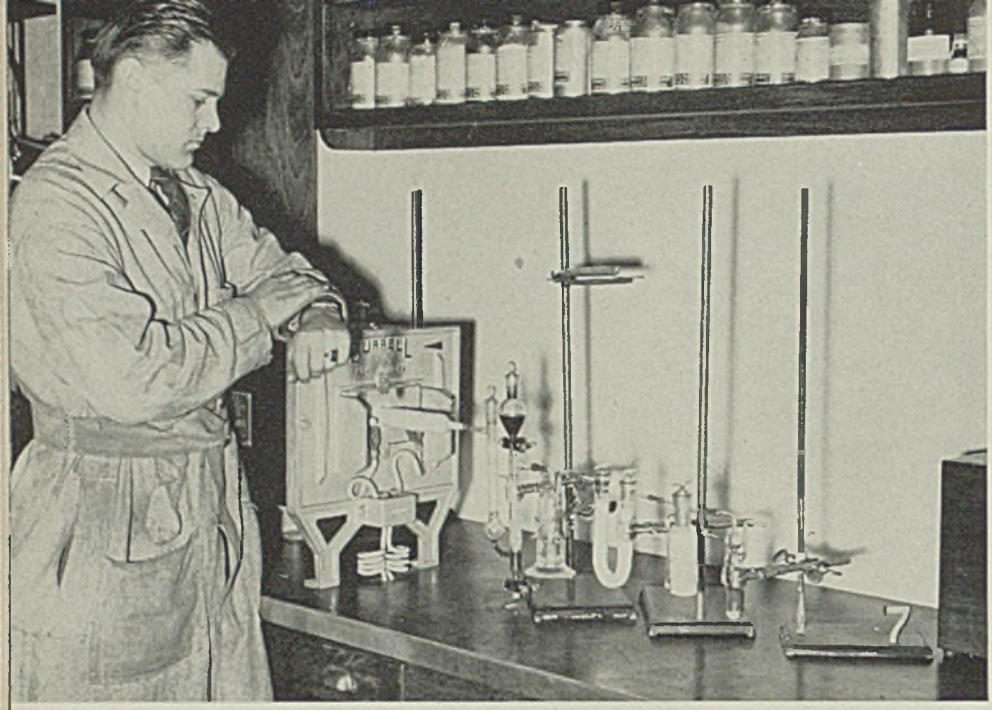

Fig. 7—Miniature combustion furnace is part of complete control laboratory facilities. This unit is testing carbon content of steels for vital aircraft engine parts. Other tests conducted in laboratory include control analysis of electroplating baths, plated deposits, and heat-treating work

is any defective work found, and when it is the entire plating procedure is carefully rechecked and the defective work replaced or discarded.

With all surfaces of the work now covered with copper, the next step is to machine the copper from those surfaces which are to be hardened. Then the work is degreased and loaded into trays for charging into a Leeds & Northrup Homocarb furnace. A furnace charge consists of four trays totaling 48 pieces. See Fig. 1. For carburizing the work, the 6-hour heat treating cycle includes a carburizing temperature of 1680 degrees Fahr., which produces a case 0.0039 to 0.0045-inch deep. The finished part after grinding then will have a case measuring between 0.0025 and 0.0035-inch in depth.

To check carbon penetration, test pieces are hung in the top of the furnace. At the end of 4 hours the first test piece is pulled, quenched, polished, etched and the case depth measured. Subsequently, other test pieces are pulled at short intervals and checked also. This allows the case depth to be controlled accurately. One of the main objects is to hold the case low in hypereutectoid, keeping the carbon content under 0.9 per cent. This results in maximum physical properties without developing excessive brittleness.

At the end of the heating cycle the work is pulled from the furnace and placed in a brick-lined cooling furnace. A protective atmosphere is employed to prevent scaling. Here the part cools 5 to 6 hours or until the temperature has fallen below 600 degrees Fahr., at which time it is pulled out and allowed to cool in air.

Now the work is given a light sandblast to remove any particles that may be adhering to it, thus assuring that it will be clean and fit accurately in the quenching die. The sandblast setup is shown in Fig. 2. After this carburizing cycle, the work is loaded into a Hayes electric furnace for hardening. See Fig. 5. Five parts are charged into the furnace at a time. They are submitted to a 25-minute cycle at 1440 to 1475 degrees Fahr. in a controlled atmosphere. This unit is equipped with recirculator to provide scale-free heat, Pyrofax gas being used to generate the protective atmosphere. In general, the heat toward the higher end of the range is used, but there are times when the temperature is dropped lower to get a specific core hardness.

When removed from the Hayes furnace, a part is placed immediately in the quenching die press shown in Fig. 6. This press differs from the typical Gleason press in that here the oil is brought around the die rather than the die being submerged in the oil. In this manner a drastic quench is avoided. Much attention was given in designing this quenching press to achieving maximum results by correct proportioning of such factors as temperature, volume and velocity of the cooling medium as these greatly affect the cooling rate and thus directly influence the result attained.

In the press shown in Fig. 6, one operator places the hot retainer from the Hayes furnace under the die of the quenching press, while the second operator exerts pressure on a foot pedal to bring down the top section of the die and housing over the work, at the same time causing a heavy stream of oil to gush up and over the die and the part. At the same time the work is clamped securely between the sections of the die.

Quenching period in the die is 2½ minutes, after which the parts can be removed and handled with the bare hands. Quenching-oil temperature is held within the range of 100 to 110 degrees Fahr. A paraffin oil furnished by E. F. Houghton Co. is employed, fortified with a 5 per cent additive to increase the speed of quench. A low uniform oil temperature is important in working a high-nickel steel such as this SAE 3312 because of the danger of retaining an austenite skin. Since the quenching dies confine the part to certain limits, distortion is prevented.

After quenching, the part is drawn in another furnace at a temperature of 250 degrees Fahr. Then it is washed, copper electrolytically stripped from the work and the part checked 100 per cent for runout. Any slight corrections necessary are made at this time. A hardness check is next made on a standard Wilson-Rockwell machine, the case requirements being a maximum of 62 rockwell C with the core coming within the range of 32 to 40 rockwell C with 36 rockwell C being preferred.

The part then goes to the machine shop for finish machining operations. After being given a magnaflux test, it is returned for sand blasting and cadmium plating. The blasting is done with a fine grade of white banding sand and is for appearance only. The cadmium plating is applied to a thickness of 0.0001 to 0.0003-inch. A spot test by the drop method is employed in checking the cadmium deposit. After final inspection operations, the work is buffed preparatory to shipment.

In addition to the inspections mentioned, this rear propeller shaft thrust bearing retainer is given a number of other checks at various points along the line. Thus tests include the Magnagauge for copper thickness, a deadweight brinell hardness test after normalizing, a rockwell hardness test for case hardness, a Magnagauge test again for cadmium thickness, and a spot test by the drop method to check percentage of cadmium to plating specifications. Precision work and exacting inspection produce a part which easily meets the high precision standards for aircraft work. It is such standards that today make American aircraft engines second to none.

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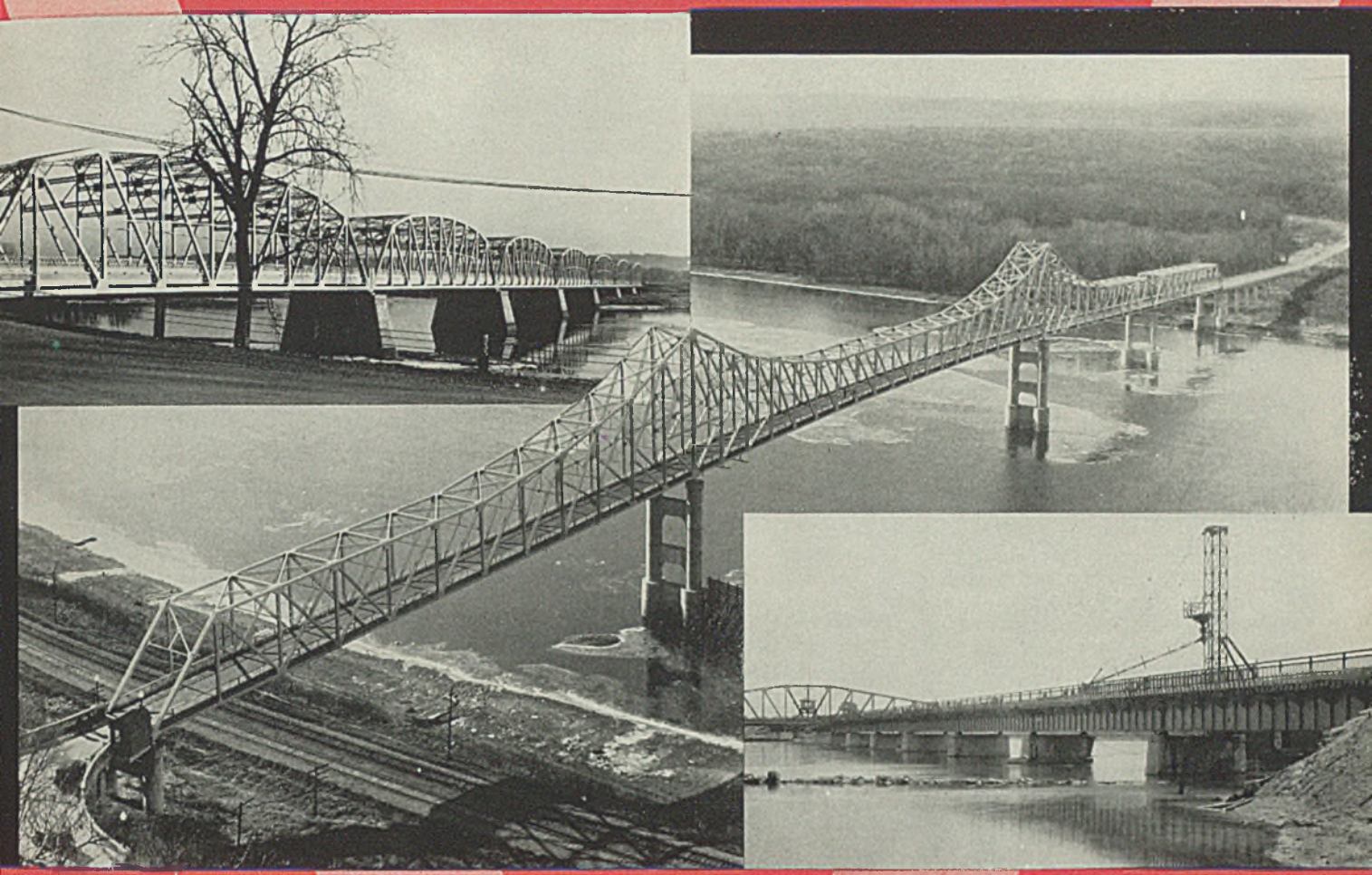

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BRONZE IMPURITY LIMITS

. . . . are holding back our war production effort. Suggestions are made for easing the situation without lowering the important qualities of the bronze itself

By GORDON J. LeBRASSE
Metallurgical Department
Federal-Mogul Corp.
Detroit

DEMANDS of our war production program are making serious shortages in many materials. It is the purpose of this article to point out some of the factors that can alleviate this situation as it pertains to the use of the bronzes. With civilian use curtailed or ended completely, it becomes a matter of determining which type of bronze demands the greater preference—a matter of getting the most out of the supplies we have. To this end, every pound of secondary as well as virgin metals must be utilized to the utmost for our military needs will tax all sources of supply to the utmost.

Everything that moves requires bearings of a certain type, and the demand is ever increasing for bronzes in the form of cast bearing bushings. But first let us examine the good work that has been done in the field of substitutions. Plastic bushings have appeared, and their field of use may be expanded, especially for civilian uses. Steel-backed bushings lined with white metal are in considerable use, and their field can be more fully developed.

Both the tin and lead-base babbitts have enjoyed long application as bearings, tin-base bearings generally being preferred over the lead-base types. However, many improvements have been made on lead-base alloys, and these alloys should be considered carefully. The demand for steel-backed bushings with thin linings of bronze or copper-lead is increasing, and greater incorporation of this type of bushing in ordnance specifications may somewhat relieve the copper and tin situation. These types of bushings were developed to sustain more severe operating conditions than would be possible with the white-metal-lined bushings.

Also increasing is the use of steel-backed bearings with sintered bronze linings. These may be used to considerable advantage where the load requirements are not extreme. An inherent property of these powdered metal bearings is that they can be used with much greater safety in places where oiling is difficult or impractical. These bearings are also the most economical to manufacture from the standpoint of raw materials as the applied thickness of the lining material closely approaches the finished size. Thus there is an exceptionally small loss due to unusable secondary metal from machining operations.

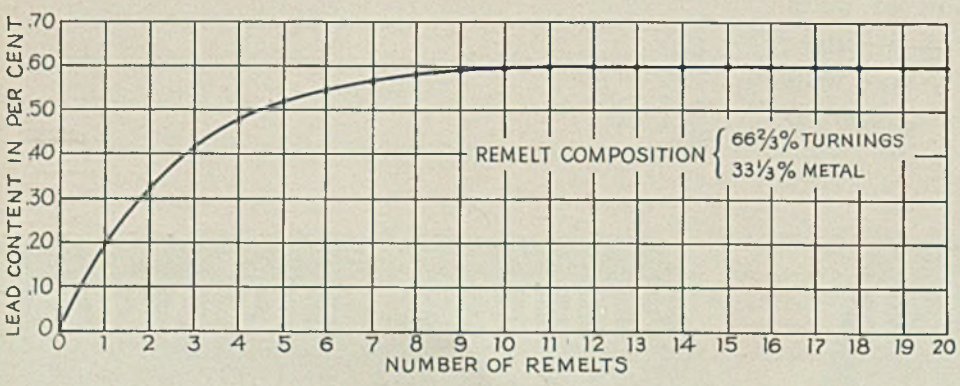
Obviously a careful scrutinizing of all types of bearings and bushings is in order to determine whether any conservation of raw materials can be accomplished by substitution.

However, our military equipment has always contained the best precision and engineering work in the world, and we shall uphold these standards. No substitutes are possible for many of the present demands on cast bronze bushings. Therefore every possibility of conserving what bronze we have deserves the utmost attention for every pound of raw material saved can be speedily utilized in the production of more bushings or released for other vital requirements.

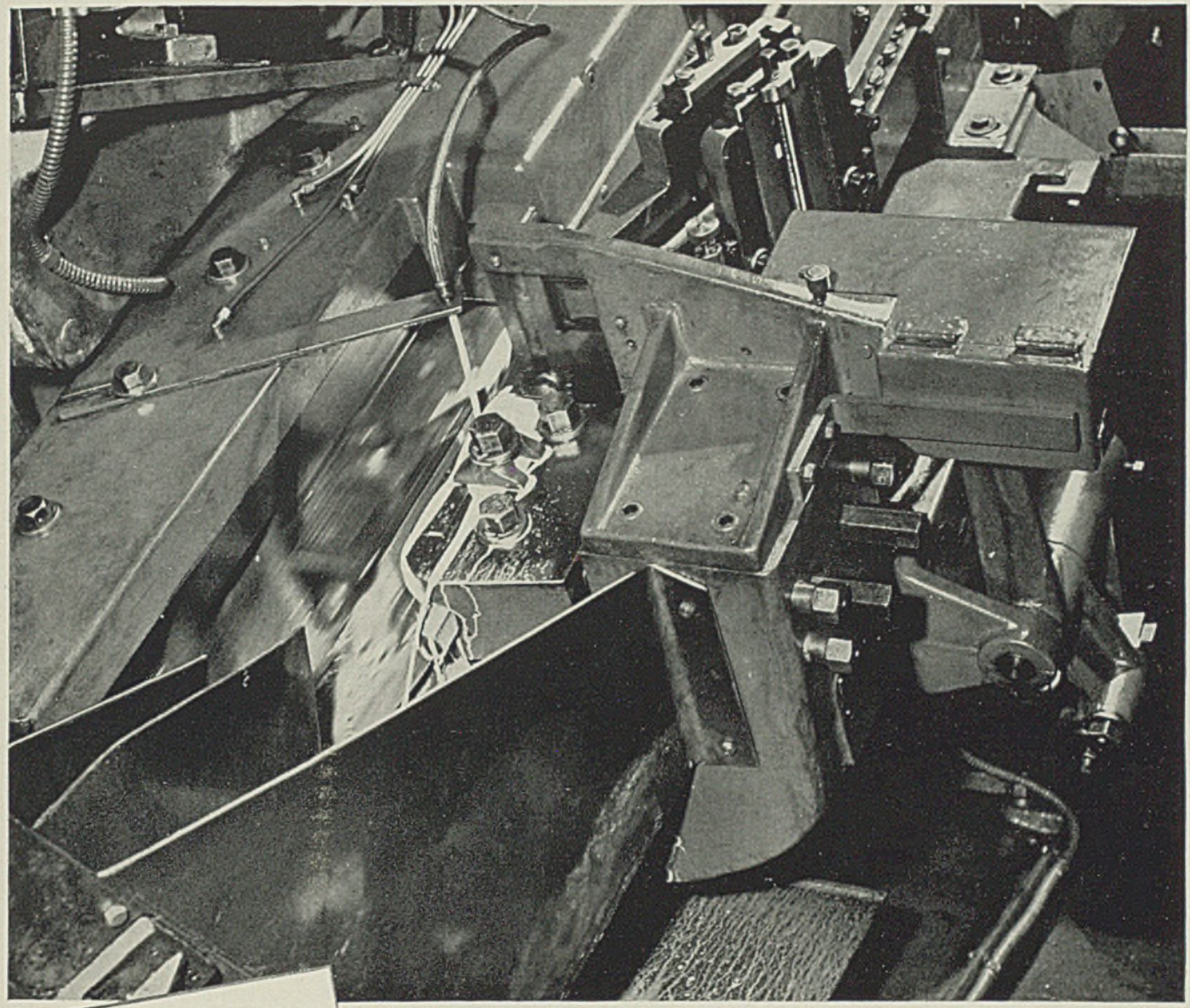
Throughout the years, there has been an ever increasing accumulation of specifications dealing with similar types of materials. In average times a bronze foundry could meet these requirements by the use of all virgin metal or by the casting of selected purchased ingot. These multiple specifications are still in use and are demanded by many manufacturers of extremely essential ordnance equipment. At the same time, there is an encouraging movement under way which should yield drastic simplification.

But again, speed is the essence. Even now some foundries may be unable to meet required specifications on minor impurities due to their inability to obtain virgin metal, or its ingot metal equivalent. *The restricted production which would naturally follow must not be allowed to take place. It may once have been to some particular advantage to have varying minor impurity limits, but a general view of the entire situation at this moment fails to reveal any necessity for continuing to specify virgin metals only.*

The most important aspect at the present time is that almost none of the turnings from the machining operations on castings can be returned for remelting. Despite the most careful control of these turnings, they invariably become contaminated, particularly by a small content of lead. This follows from the fact that leaded bronzes are a companion product to the lead-free bronzes throughout the particular industry. Basing manufacturers are



This curve shows the self-limiting effect of machine shop contamination by lead upon the quality of Navy bronze. Note that based upon a remelt composition which includes 66 2/3 per cent of turnings containing 0.3 per cent lead, the total lead contamination in the remelt does not rise over 0.6 per cent regardless of the number of remelts



Cold forged full threads of R B & W bolts are clean and sharp, with accurate lead and pitch, giving uniform load distribution and preventing stripping. Nuts, faced or semi-finished, have the bearing face at right angles to the hole, assuring stud alignment . . . with lead end countered-bored, after tapping, for quick start.

How much hangar can a finger-flick build?

HOW IMPORTANT is a *single* bullet in a machine gun cartridge clip? How vital is *one* out of 2000 incendiary bombs dropping from a single Yankee plane over Tokio? How much faster can a hangar be built by *quick*-assembling bolts and nuts?

A nut with a cranky thread . . . a bolt with a badly-formed head . . . are like bullets that miss, bombs that are duds. War industries want nuts that run on smoothly with a flick of the fingers, bolts that take wrench-tightening without injury.

High on the list of suppliers to the builders of fighting equipment — the airports, the tanks, the battleships, tractors and big guns — is R B & W, whose service to America is one bolt, one nut multiplied by millions . . . tons . . . carloads. The men who know best what quick assembly means, specify R B & W's Empire brand for bolts and nuts that are clean-threaded, accurately-matched and sturdy.

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in close agreement that *it requires 2.5 to 4 pounds of virgin or selected ingot metal to ship out a single pound of finished machined casting.*

The bushing industry concerns itself chiefly with three general specification groups. The first covers the nominal composition of 38 per cent copper, 10 tin and 2 zinc. The second covers the composition 88 per cent copper, 8 tin and 4 zinc. The third covers the well-known bearing alloy of 80 per cent copper, 10 tin and 10 lead. The second group has limits wide enough to be a straddle alloy whose physical properties and chemical compositions overlap those of the first group. All of these alloys in the first two groups could easily be classified under the general composition of 86 to 89 per cent copper, 7.5 to 11 per cent tin and 1.5 to 4.5 per cent zinc. To a somewhat lesser extent, these variations exist in alloys of the third group.

The situation certainly is needlessly complicated by the fact that *a half-dozen separate melting techniques might be required to produce one general specification.* This statement can be fully realized by a study of Table I, which lists specifications of the first and second groups. The difficulties confronting a foundry are quite manifold for the casting of Navy bronze.

For instance, one alloy will only permit a lead content of 0.2 per cent while others vary up to 1 per cent, or greater. In the case of phosphorus, a common deoxidizer, some specifications allow only 0.03 per cent maximum with the majority allowing 0.05 per cent. In isolated cases, the upper limit may rise to 0.5 per cent.

The case of nickel, a helpful agent against segregation, shows that some alloys will permit up to 1.0 per cent while others make no mention of it. The same conditions somewhat apply to sulphur and antimony, which have maximum limits in some cases, but in others any amounts would be objectionable due to low impurity limits.

Physical property specifications are usually expressed in terms of minimum tensile strength and elongation values. In some cases, a minimum hardness is specified, and this can usually be met in average sand castings without difficulty. However, to insure a specified hardness, higher tin contents are used, and in specific applications the bushings are poured into chill molds. It would be of considerable service to know exactly which parts require a hardness superior to average values above 60 to 70 brinell.

Values of 40,000 pounds per square inch tensile strength and 20 per cent elongation are specified with high-purity bronzes. When larger impurities, particularly lead, are allowed, these required values drop considerably. For instance, values of 30,000 pounds per square inch tensile strength and 12 per cent elongation are the minimum requirements with a lead content of 1 per cent maximum. *Yet these figures are not at all consistent with experience obtained over a period of years in commercial foundries where* 40,000 *pounds per square inch tensile strength and* 20 *per cent elongataion have been repeatedly obtained even with lead contents up to* 1 *per cent. Thus the necessity for stringent impurity limits, especially with respect to lead, are groundless with proper foundry practice.*

The narrow impurity limits previously mentioned make the production melting situation quite complicated, even with respect to gates and risers. Keeping each individual specification separate could easily tax the available space in any metal room. The problem of lead contamination in returned secondary metals due to machining operations has already been mentioned. No machine shop can handle the great variety of specified compositions simultaneously without some contamination.

It is possible to plot an empirical curve showing the increase of impurity content of the finished product against the number of times the returned metal has been remelted. Figuring a constant contamination of 0.3 per cent lead and constant additions of 66 2/3 per cent of turnings, the total impurity content cannot rise over 0.6 per cent lead. The accompanying chart illustrates this graphically. See page 68.

The first melt is considered to be of virgin composition and therefore 0.0 per cent lead. This melt picks up 0.30 per cent lead in machining operations and this empirical value is in excess of that usually encountered. Under these conditions, the first remelt will therefore contain 2/3 x 0.30 per cent or 0.20 per cent lead as cast. The turnings from this melt will then contain 0.50 per cent lead and the second remelt will be poured with 2/3 x 0.50 per cent or 0.333 per cent lead. Figuring the constant machining pickup of 0.30 per cent lead, the third remelt will only contain 2/3 x 0.633 per cent or 0.422 per cent lead. The curve is already tapering off, and following the values out to infinity reveals that the fears of pyramiding are entirely groundless.

The problem of handling turnings directly back into the average bronze melting equipment is quite involved but within the scope of

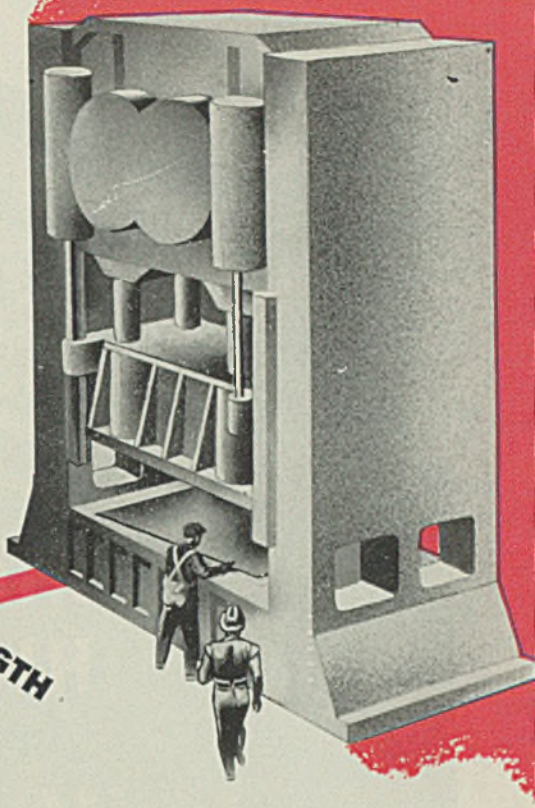
TABLE I—Bronze Specifications, in Per Cent

Specification	Copper	Tin	Lead	Zinc	Iron	Nickel	Phosphorus	Sulphur	Antimony	Aluminum	Silicon	Other Impurities
Group 1												
A	87-89	9.5 -11.5	0.25 max.	1.5 -2.5	0.1 max.	1.0*-0.75	0.03 max.	0.05 max.	0.25 max.	0.00	0.005 max.	0.25 max.
B	86.5-88.5	9.25-10.50	0.75-1.25	1.25-2.50	0.15 max.	1.0*-0.75	0.03 max	0.05 max.	0.25 max.	0.00	0.005 max.	0.25 max.
C	86-89	9.00-11.00	0.20 max.	1.00-3.00	0.03 max.	.....	.....	.....	.....	....	.....	.....
D	86-89	8.00-11.00	1.00-2.50	.....	.....	.....	0.25 max.	.....	.....	....	.....	0.50 max.
E	86-89	9.00-11.00	0.20 max.	1.0 -3.0	0.06 max.	.....	0.05 max.	.....	.....	....	.....	.....
F	86-89	9.00-11.00	0.30 max.	1.0 -3.0	0.10 max.	.....	0.05 max.	.....	.....	....	.....	.....
G	86-89	9.00-11.00	0.20 max.	1.0 -3.0	.....	.....	.....	.....	.....	....	.....	.....
H	86-89	9.00-11.00	0.20 max.	1.0 -3.0	0.06 max.	.....	.....	.....	.....	....	.....	.....
Group 2												
A	86-89	7.5 -11.00	0.0 -0.3	1.5 -4.5	1.0 max.	0.75 max.	0.05 max.	0.05 max.	0.25 max.	....	.....	0.15 max.
B	87-89	7.75- 8.50	0.25 max.	3.5 -4.5	0.1 max.	1.0 max.*	0.03 max.	0.05 max.	0.10 max.	0.00	0.005 max.	0.25 max.
C	86-89	7.5 -11.0	0.3 max.	1.5 -4.5	0.25 max.	1.00 max.	0.05 max.	.....	.....	....	.....	.....
D	86-89	7.5 -11.0	0.0 -0.3	1.5 -4.5	0.10 max.	0.75 max.	0.05 max.	0.05 max.	0.25 max.	....	.....	0.15 max.
E	85-89	7.5 -11.0	1.0 max.	1.5 -4.5	0.25 max.	0.75 max.	0.50 max.	0.05 max.	0.25 max.	....	.....	0.35 max.
F	86-89	7.5 -11.0	0.3 max.	1.5 -4.5	0.10 max.	1.00 max.	0.05 max.	.....	.....	....	.....	.....
G	85-89	7.5 -11.0	1.00 max.	1.5 -4.5	0.25 max.	1.00 max.	0.5 max.	.....	.....	....	.....	.....
H	85-89	7.5 -11.0	1.00 max.	1.5 -4.5	0.25 max.	1.00 max.	0.50 max.	.....	.....	....	.....	.....
I	86-89	7.5 -11.0	0.0 -0.30	1.5 -4.5	0.10 max.	0.75 max.	0.05 max.	0.05 max.	0.25 max.	....	.....	0.15 max.
J	85-89	7.5 -11.0	1.00 max.	1.5 -4.5	0.25 max.	0.75 max.	0.5 max.	0.05 max.	0.25 max.	....	.....	0.35 max.
K	85-89	7.5 -11.5	1.00 max.	1.5 -4.5	0.25 max.	1.00 max.	0.5 max.	.....	.....	....	.....	.....
L	85-89	7.5 -11.5	1.00 max.	1.5 -4.5	0.25 max.	1.00 max.	0.5 max.	.....	.....	....	.....	.....
M	86-89	7.5 -11.0	0.0 -0.30	1.5 -4.5	0.10 max.	1.00 max.	0.05 max.	.....	.....	....	.....	.....
*Plus or minus 0.15% by agreement with manufacturer.												
Suggested Specification												
All	86-89	7.5 -11.0	1.00 max.	1.5 -4.5	0.25 max.	0.75 max.	0.05 max.	.....	.....	....	.....	.....

"PHOENIXLOY"

Cast Alloy Iron Roll

FOR COLD REDUCTION AND TEMPER ROLLING



GREAT STRENGTH

GREAT STRENGTH AND DEPTH OF HARDNESS—RESISTS SPALLING

REMARKABLE RESISTANCE TO ABRASION DUE TO STICKERS

GREAT COMPRESSIVE STRENGTH

Pittsburgh Rolls are made for every rolling operation and every variety of mill.

Pittsburgh ROLLS

properly controlled conditions. It has been reported frequently that the most advisable procedure is to send this secondary material to an outside source for refining. But here, also, is another repetition of the same pressing problem if the refiners are held to narrow specification limits.

Thus as our victory program tends to make the copper and tin situation increasingly more acute, the users and producers of bronze alloys should get together for an immediate simplification of general specifications. Higher impurity limits, especially on lead, are clearly indicated. Two or three general specifications with sufficiently adequate physical properties can easily be made available for making the precision bronze parts so vitally required in the mechanisms of our growing war machine.

Proposed Emergency Action To Save Steel

In order to conserve steel and other critical metals still further during the war, the standing committee of the Division of Simplified Practice, National Bureau of Standards, Washington, is presenting before manufacturers concerned a proposed emergency supplement to simplified practice R 101-40 to simplify still further, sizes and designs of metal partitions for toilet and dressing room enclosures.

This latest emergency action would eliminate all brass hardware saving material to the extent of about 3½ pounds per enclosure. Also, by substituting panel-type partitions and doors in installations ordinarily constructed with flush type, and by use of partitions smaller than those heretofore recommended as stock sizes, it is estimated that from 18 to 33 per cent of steel would be saved.

To make the lighter panel-type construction more acceptable in permanent buildings where it might be desired later to obtain a more suitable appearance, provisions have been added to the supplement which enable the later substitution of flush partitions and doors without dismantling posts, head rails or other braces, and without defacing floors or wall. Copies of this proposal can be obtained from the Division of Simplified Practice.

Issues Three Manuals On Steel Products

American Iron and Steel Institute, 350 Fifth avenue, New York, issued recently three Steel Product Manuals dealing with hot rolled carbon-steel bars, alloy steels and hot-rolled carbon-steel wire rods. These also are identified as section 8, 10 and 15 respectively.

The manual on hot rolled carbon-steel bars is a revised edition as is the one on hot-rolled carbon-steel wire rods. All three booklets contain general definitions and manufacturing practices of the products discussed.

Offers War Plants Free Safety Advisory Service

A free safety advisory service for industrial plants is being made available by American Optical Co., Southbridge, Mass., in order that plant managers and safety engineers, by taking advantage of the company's years of experience in the safety field, can keep war production at high levels.

The service includes: First a survey of industrial plants by a trained American Optical representative to locate those hazardous jobs that require protection. Then, a definite program to prevent accidents —a plan to enlist the co-operation of foremen and workers. Next, personal detailed check-ups of the entire program to insure best results. And finally, posters and other literature conveying constructive messages regarding safety.

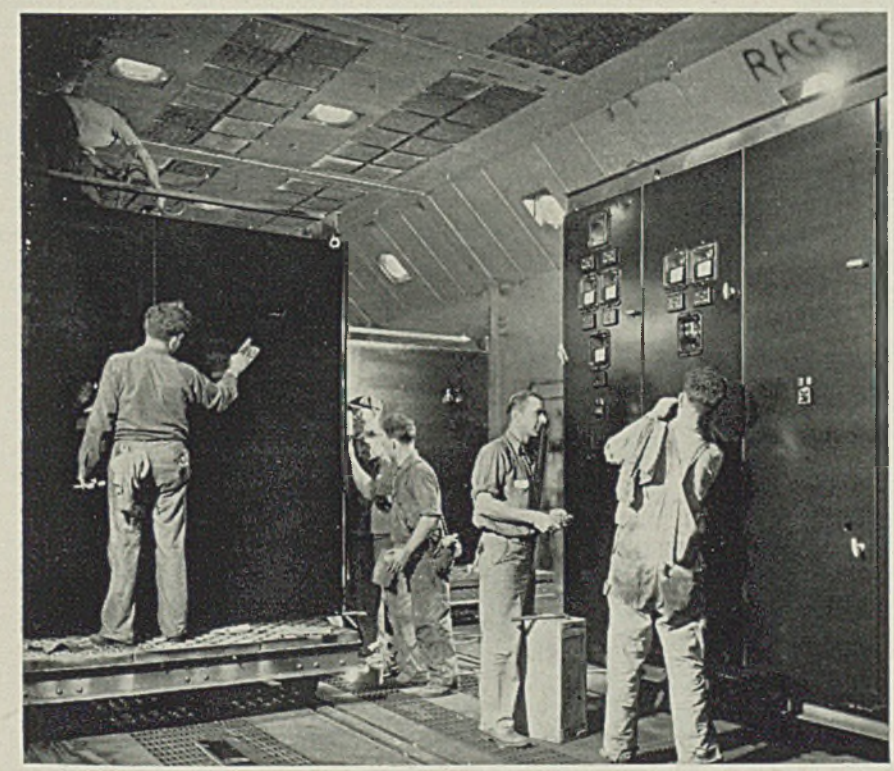
Eliminates Nickel in New Welding Rod

A new manganese steel welding rod, V-Mang, which is said to aid in the conservation of nickel has been developed by American Manganese Steel Division, American Brake Shoe & Foundry Co., Chicago Heights, Ill.

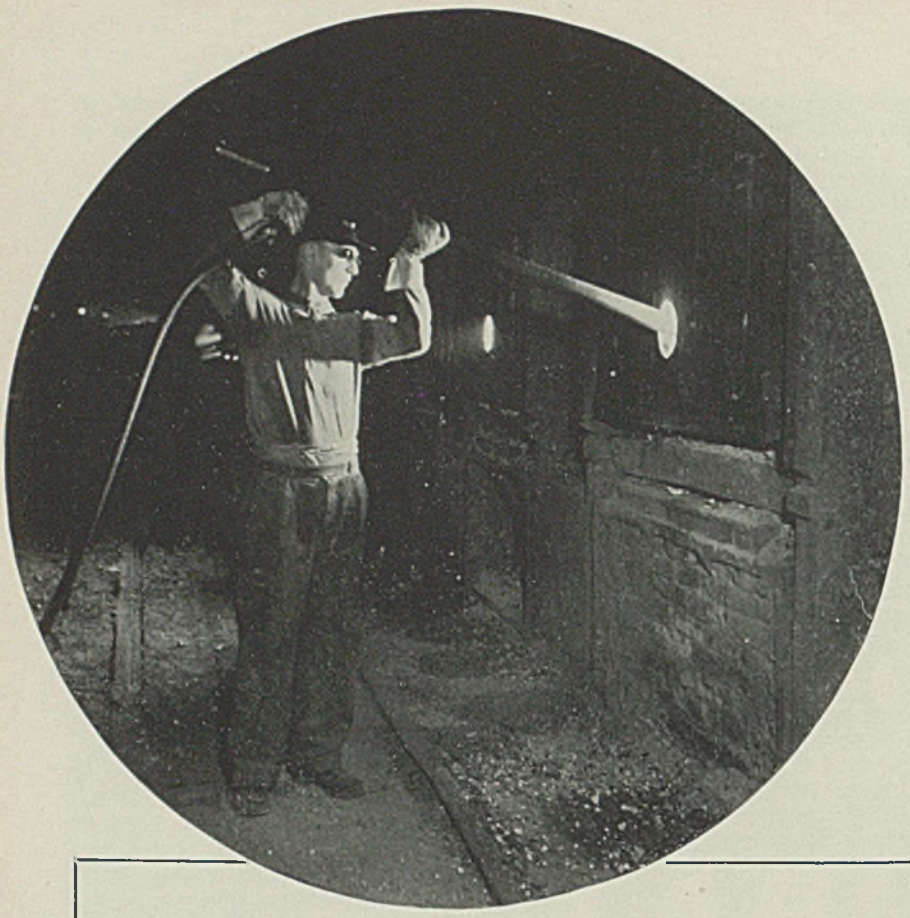
An alloy steel containing 12 to 14 per cent manganese, molybdenum and other elements, it will replace the company's nickel-manganese steel electrodes, except in a few exceptional cases, according to the report.

Thorough tests have shown the new rod can be applied as readily as the "nickel rod", and that it has ductility and tensile strength equal to or better than the older electrode. It can be used to repair fractures in manganese steel parts, as well as for build-up work, depositing a uniform bead. The rod is available bare and coated in ⅛, 5/32, 3/16 and ¼-inch diameters in 18-inch lengths.

Clean Air for the Painters



BOTH STRAIGHT-LINE production methods and clean air aid considerably in "rolling out" switchgear panels and switchboards in the recently completed paint shop at the Westinghouse East Pittsburgh works. Units travel from assembly aisle to paint shop to shipping area on flat-topped trucks that run on tracks. In the paint shop, shown above, a down-draft system which takes air from the outside through filters in the ceiling keeps the inside air clean continuously. Paint spray is carried downward with the air through open grill work of the floor, and is deposited on a water surface in a pit covering nearly the area of the floor



Determining the temperature of an open-hearth bath by a special-type pyrometer tube which makes contact with the metal

The Manufacture of HIGH-QUALITY LOW-COST STEEL

General Characteristics Of Steelmaking

(Concluded from April 13 issue)

By PAUL J. McKIMM
Cleveland

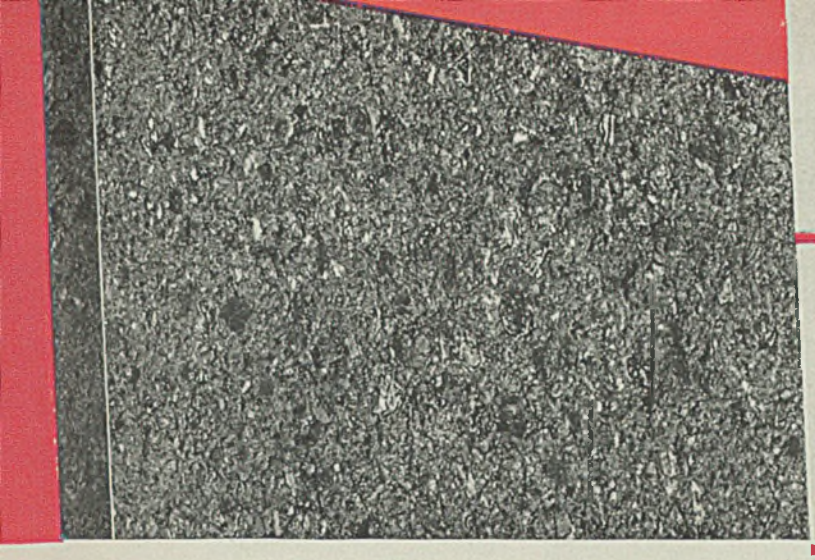
HEATS MELTING "soft," or too low in carbon, may be attributed to one of several reasons, one of which is unbalanced charge. When sufficient carbon is present and the heat melts soft the cause is usually faulty charging. Frequently the ratio of ferric oxide (Fe_2O_3) to ferrous oxide (FeO) is excessive. This type of heat has a tendency to foam and lead to a high percentage of rejections unless properly shaped up. When a heat melts soft, extra iron should be added before the lime reaction is complete, that is, before the lime is up. The best procedure is to add sufficient metal to necessitate a small ore addition, say 2500 pounds. Slag and slag control and the reactions between slag and metal are essentially fundamental factors in the manufacture of quality steel. If slag conditions are correct satisfactory quality steel will result. Practical application of slag control remains a controversial problem for rimmed and the several types of fully-killed steels. Under practical operating methods of slag control the viscosity is determined by the "spoon" test by washing slag from a test spoon and further pouring it in a thin layer on the floor. Temperature is fairly well gaged by similar methods and these are supplemented with chemical analysis for iron oxide and further studied by complete analysis. The data are obtained long after the heat has been tapped and more often after the material has been rolled.

The main objective is to balance the charge so that only a minimum of limestone be added to yield a proper lime-silica ratio, and thus permit corrective additions of lime, or mill scale or sand. When the heat is in the proper condition the phosphorus will always be below 0.01 per cent. The slag should be maintained sufficiently basic for phosphorus elimination. Iron oxide, which may be increased by the addition of mill scale or fine ore, often is helpful in getting large lumps of lime into solution. Lime or oxide can be added with little difficulty when charged early in the heat.

Depends on Charging Technique

Sulphur elimination is slightly different because unless the technique of charging is established for the purpose of reducing this element, little or no reduction will take place. If high sulphur is present, sufficient manganese and lime must be present early in the melting stage; suitable temperatures, fluidity and agitation must be had so that great metal/slag contact occurs. The most practical procedure is to have low sulphur present in the charge. In killed steels the iron oxides are kept low while in the low-carbon rimming varieties it is desirable to maintain higher iron oxides. Heats under 0.10 per cent carbon with the total iron oxide over 20 or 21 per cent yields the best ingot. If too low, corrective measures can be made by adding lime and/or mill scale so that the ideal rimming action can be attained. In case it is desirable to reduce the amount of FeO, sand may be added to the slag in order to reach the desired point. A widely used device in slag control is the viscosimeter. At present considerable research is being done by petrographic analyses. The pancake test also is being used effectively.

An experienced operator can be developed to estimate the basicity and the total iron content of the slag accurately. The lime-silica ratio can be estimated with an accuracy of 0.1 to 0.2 ratio up to 3.0 or thereabouts and the total iron within 1 or 2 per cent. By this arrangement corrective additions may be made at any time desired which is not the



Reduce

CORROSION LOSSES
DEPRECIATION
MAINTENANCE EXPENSE

in Pickling, Plating and Other Processes Involving Electrolytic Action

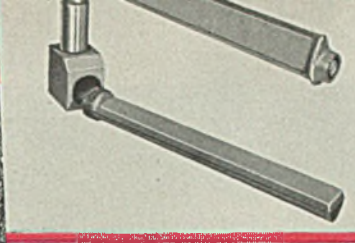
Use NATIONAL and KARBATE
TRADE-MARK TRADE-MARK
CARBON and GRAPHITE PRODUCTS

● Carbon and graphite products are adapted to a wide variety of applications where difficulties are encountered with other materials as a result of thermal shock or reaction with process materials. They are resistant to the action of most acids, alkalies and solvents, possess good mechanical strength and exceptional resistance to thermal shock. Graphite and graphite base "Karbate" products have higher thermal conductivity than most metals. "Karbate" materials are impervious to seepage of liquids and gases. Porous carbon and graphite products, of high permeability, are also available.

Carbon and graphite products are manufactured in a variety of forms and, being easily machined, can be fabricated to meet almost any structural requirement.

Thousands of dollars are being saved in the metal and process industries by the use of carbon and graphite elements in the construction of equipment subject to corrosive action or severe thermal shock. Products shown at right illustrate the versatility of these materials.

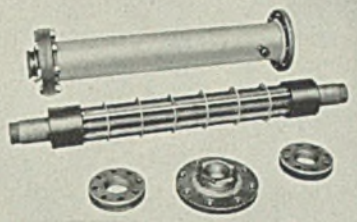
WRITE NEAREST DISTRICT OFFICE FOR INFORMATION ON THESE PRODUCTS

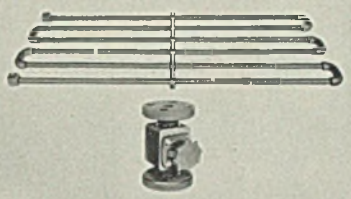


For agitators, steam spargers, gas diffusers and filters. Several grades, differing in degree of permeability, are available. Resistant to both corrosion and thermal shock. Can be fabricated in practically any required form.

HEAT EXCHANGERS

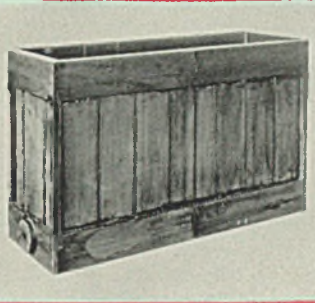
Constructed from "Karbate" tubes and fittings. Bayonet, immersion, cascade, concentric tube, tube bundle and gas flame types. Shell and tube types with either metal or "Karbate" shell. Many installations in successful use for heating, cooling, condensation or absorption of corrosive materials.





PIPE, VALVES, PUMPS AND FITTINGS

For the construction of conveying or circulating systems carrying or in contact with corrosive materials, carbon, graphite and "Karbate" pipe and accessories eliminate corrosion difficulties. Permit construction of complete circulating systems in which solution has no contact with metal.

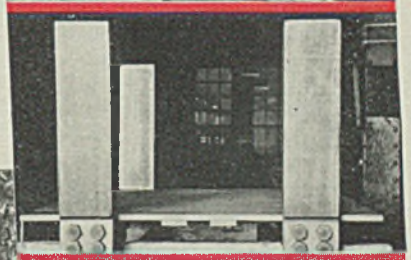


FABRICATED CONTAINERS

Tanks, vats and other containers for corrosive materials can be constructed from carbon, graphite and "Karbate" parts, providing economical and permanent construction.

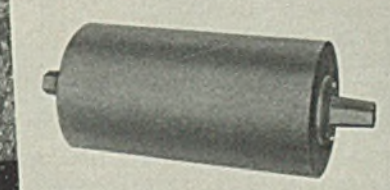
TANK LININGS

Carbon and graphite brick and other special shapes provide a durable lining for pickling tanks and other containers where resistance to corrosion or thermal shock is essential.



GRAPHITE ELECTRODES

In the electrolytic pickling of strip steel, fabricated graphite electrodes provide increased life, ease of installation and freedom from reaction with pickling solution. All parts made of graphite.



CARBON ROLLS

Carbon not attacked by most plating or pickling solutions. Have demonstrated long life and improved performance.

GRAPHITE BEARINGS

Self lubricating. Can be machined to close tolerance. Bearings, bushings and rings of graphite or carbon-graphite composition are used where oilless or corro-

NATIONAL CARBON COMPANY, INC.
Unit of Union Carbide and Carbon Corporation
UCC
CARBON SALES DIVISION, CLEVELAND, OHIO
General Offices: 30 East 42nd St., New York, N. Y.
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case with other methods of slag testing due to the time element. This practice permits lower slag volumes with sufficient basicity, saves time in working the heat, and increases heat transfer to the metal bath. In case the test indicates a too acid condition during the lime boil so as to injure the furnace banks correctives can be added thereby saving delays and materials necessary for bank dressing or repairs.

Slag cakes are made by pouring molten slag into a mold about ¾-inch deep and 5-inch diameter. Many samples obtained over a considerable period of time are observed for varying characteristics, supplemented by chemical analysis. For best results various samples of slag are taken at regular intervals throughout the heat. Solidification and cooling requires about ten minutes and interpretation only a few seconds. Results must be accompanied with the practices employed in the progress of the heat.

Typical chemical analysis of slag samples from heats possessing excellent qualities follows:

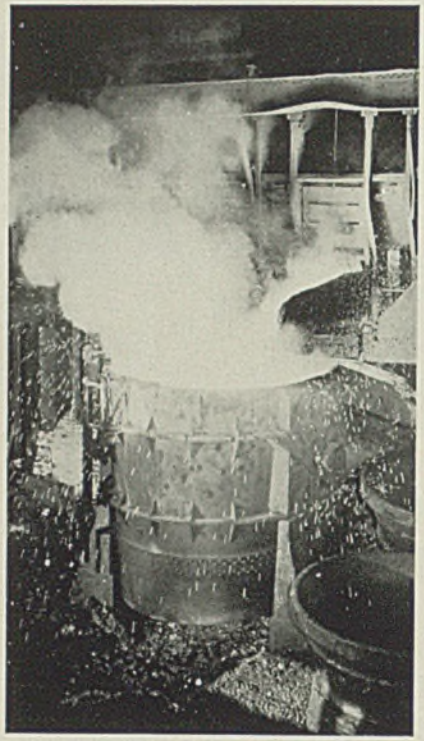
Compound	Per Cent
FeO	22.00
MnO	10.00
SiO_2	12.00
Al_2O_3	2.50
CaO	45.00
MgO	6.00
P_2O_5	2.80

When the SiO_2 is a little high which throws the lime-silica ratio out of normal, the phosphorus increases in the metal. With about 14.00 or 15.00 per cent silica and 0.007 or 0.008 per cent phosphorus, this increase will be about 0.015 per cent while at 17.00 to 19.00 per cent silica, the phosphorus increase will be about 0.025 per cent. A sulphur increase usually is noted.

Comparison of the slag-cake tests showed that with a lime-silica ratio of 1.0 to about 2.5 per cent the slag cakes had a brilliant shiny bottom surface. The basicity is estimated from the creases or furrows and also the color of the top surface. With the lime-silica ratio between 2.5 and 3.0 per cent, the top surface is smooth and even; the bottom surface is more dull with increasing basicity which is estimated from relative dull spot areas. With an iron content between 7 and 13 per cent the content can be estimated from the number of glittering particles of the fractured cake.

At 13 per cent or thereabouts the top surface has an appearance of a silvery iridescent film which increases over the surface area until it is nearly covered with the higher iron content. This is an invaluable aid in iron-oxide control of the slag in rimming steels.

Viscosity tests by the several accepted methods are applicable for a given temperature but when this is exceeded the results decrease rapidly. There also remains the temperature range where the slag changes from high viscosity to fluidity. The degree of fluidity of a slag is related to its basicity and a comparison must be maintained between viscosity and chemical composition. Since the chemistry requires time, the slag cake and viscosity tests are valuable means for studying slag efficiencies. Although the exact relationship between chemical composition and viscosity is little known several salient facts are evident. For example: Increasing the MnO content to a fairly high point causes an increase in fluidity while further increases of this oxide causes a more viscous slag. The exact effect of chemical constituents on viscosity and the relationship between basicity and viscosity of a slag are little known. An increase in the contents of silica, lime, alumina, ferrous oxide sometimes increases or decreases its basicity. Fluorspar may exert a thinning effect or it may reduce the temperature variable between high and low viscosity. Alumina in ranges common to normal practice has no effect. Ferrous and ferric oxides at first increase viscosity but when present in greater quantities the viscosity is decreased.



Tapping a 150-ton heat of basic open-hearth steel into an oval-type ladle

Chemical composition controlling basicity, however, can be varied to obtain any degree of these properties. In open-hearth practice the basic elements are maintained in considerable excess in order that suitable basicity is maintained, especially in rimming grade steels. The relation of acids to bases will depend upon the proper flux charge; if the flux is insufficient, the slag must be kept basic, by further lime-iron oxide control. If such conditions exist the lime and magnesia of the final slag will average approximately twice the amount of the combined silica, aluminum and phosphorus. Of course if the ratio is 2½:1 it is more desirable.

Relationship between acid and base elements of 50 heats that were selected as poor rimming quality is shown in the following table. Good base percentages were maintained but in the acid group the silica was much higher than usual.

Acids	%	Bases	%
SiO_2	21.00	CaO	45.72
Al_2O_3	3.87	MgO	9.34
P_2O_5	5.05	FeO	10.01
S	0.05	Fe_2O_3	6.17
SO_3	0.29	MnO	5.11
Total	30.26	Total	76.35

Alumina, Al_2O_3 is included with the acid group although it can be either considered as an acid or base. It has little influence. Further the addition of ore brings no great changes in constitution except that more MnO may pass to slag. Ferrous oxide merely passes into solution in the slag and metal, and oxidizes manganese and carbon. Sufficient lime must be present or added to satisfy all of the acids present, principally silica and phosphorus pentoxide P_2O_5. All other bases in the slag are in solution with varying amounts of free lime. As long as any iron oxide is present in these working slags, phosphorus removal is rapid with little opportunity for it to return to the metal. Where saturation is being maintained, there is no chance of the slag becoming saturated with phosphorus, which is in direct contact with the melting slags.

Ferrous oxide in basic slags is in solution whereas in acid slags it is in combination. Gas oxidation in the basic furnace is, therefore, more noticeable and effective in increasing the oxygen content of the slag. Toward the end of the heat when the reducing element in the bath is small, the oxide content of the slag increases rapidly, due to the dissociation of ferric oxide (Fe_2O_3). In order to restrict this increase in oxide content it is necessary to stabilize the Fe_2O_3 so that its dissociation temperature is raised. Fortunately, this can be done by an excess of lime present in the slag. The Fe_2O_3 combines with the lime to yield a compound $2CaO, Fe_2O_3$, which is fairly stable at steel melting temperatures and prevents to a great extent the dissociation of the iron oxide.

Use of fluorspar in the slag, besides its fluxing action, brings about a change in the form of combination of the phosphorus. Probably a compound $CaF_2, 3CaO, P_2O_5$ is formed.

61% of all Safety Directors Say— "Use Preformed Wire Rope to Reduce Accidents"

EXCERPT FROM PAGE 62, Dec. 1941 "NATIONAL SAFETY NEWS"

Preformed Rope Reduces Injuries

Preformed rope, according to returns from the questionnaire, has been adopted by many companies in order to avoid barbs caused by ends of broken wires. Preformed rope does this in two ways: first, the wire ends do not stick out from the rope when the wire breaks, but continue to lie in position against the rope body; and second, the high resistance of preformed rope to fatigue results in fewer wire breaks developing in a working rope, all other things being equal.

"Buy only preformed rope," cautions the safety engineer of a large automobile company, "since it is safer and cheaper in the long run." The safety officer of a federal government agency says, "There is far more likelihood of workers receiving puncture injuries while handling non-preformed rope than from the preformed type." A metal mine reports that their injury rate and compensation costs due to hand injuries from handling slusher ropes dropped to almost zero when they changed to preformed rope, and two other mines corroborated this report from their own experience. A rubber company says, "We definitely favor preformed rope." Other companies report similar experience.

AMERICAN CABLE

TRU·LAY *Preformed*

When asked, in a survey, how to reduce accidents to workmen handling wire rope, 61% of all Safety Directors said: "*Use Preformed Wire Rope.*" American Cable TRU-LAY PREFORMED WIRE ROPE means steadier machine operation and greater production. All American Cable ropes made of Improved Flow Steel are identified by the Emerald Strand.

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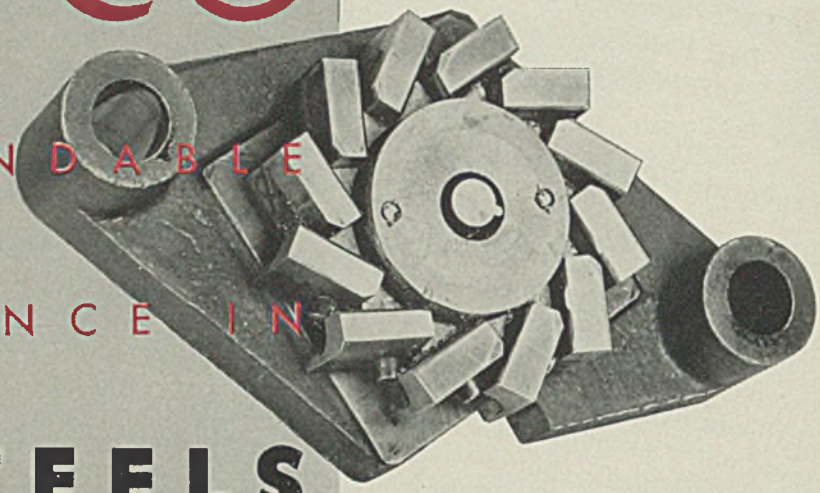
ESSENTIAL PRODUCTS . . . AMERICAN CABLE Wire Rope, TRU-STOP Emergency Brakes, TRU-LAY Control Cables, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Iron Castings, CAMPBELL Cutting Machines, FORD Hoists and Trolleys, HAZARD Wire Rope, Yacht Rigging, Aircraft Control Cables, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses . . . *In Business for Your Safety*

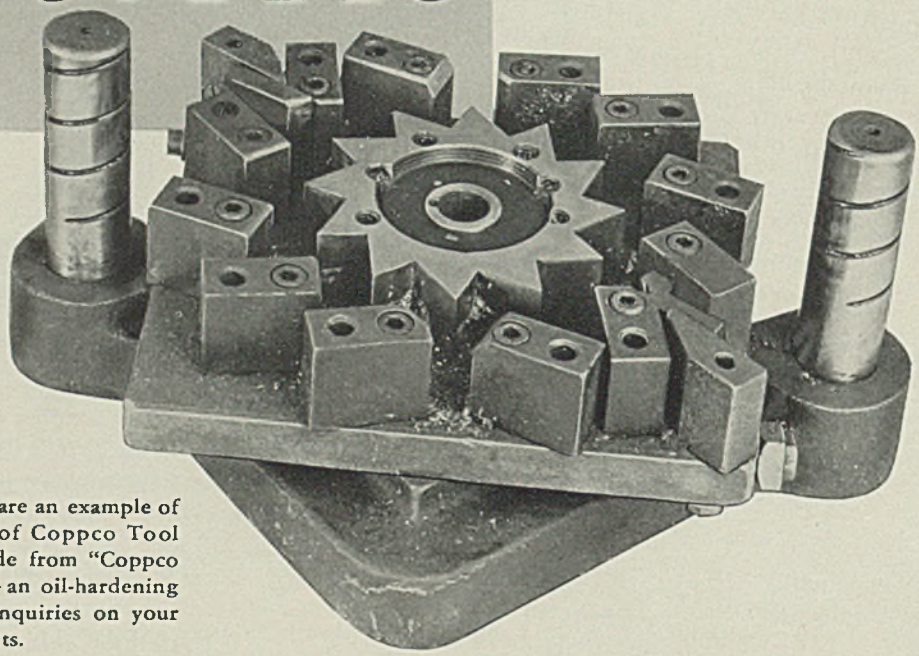
COPPCO

FOR DEPENDABLE

PERFORMANCE IN

TOOL STEELS





These blanking dies are an example of the successful use of Coppco Tool Steels. They are made from "Coppco 200"— black label — an oil-hardening steel. We welcome inquiries on your tool steel requirements.

COPPERWELD STEEL COMPANY WARREN, OHIO

"COPPCO .75"
Hardens to give greater toughness than Coppco Universal or Coppco 1.10

COPPCO UNIVERSAL"
Balanced hardness and toughness
Good cold cutting properties

COPPCO TOOL STEELS

"COPPCO 1.10"
Gives maximum hardness
Holds a keen cutting edge
Resists wear

"COPPCO 200"
Non-deforming · Deep-hardening
Wear resistant

WATER HARDENING
OIL HARDENING

This means that the slag is not only made more fluid but by the liberation of some lime from combination with the phosphorus, it also becomes more basic.

Today manganese conservation is important. The average amount of manganese used per net ton of steel is about 12 pounds. Approximately 15 pounds of the ferromanganese (80.00 to 82.00 per cent manganese) is required per net ton of steel. Therefore at an estimated steel production of 86,000,000 tons the manganese consumption will be about 645,000 net tons. To reduce manganese consumption it is necessary for the producer to automatically reduce his manganese specification to 0.30 to 0.35 per cent where such specifications are within the jurisdiction of the plant; where definite specifications are established by the customer it is necessary to obtain their co-operation in lowering this constituent. The most effective method of saving manganese is to add it to the ladle rather than to the furnace. The yield of manganese when added to the bath of an "open" steel is only about 60 per cent of the contained manganese of the ferroalloy whereas when added to the ladle the yield of manganese will approximate 80 per cent of the actual manganese. The yield varies with depth of the bath, the combustion characteristics and the chemical and physical condition of the slag.

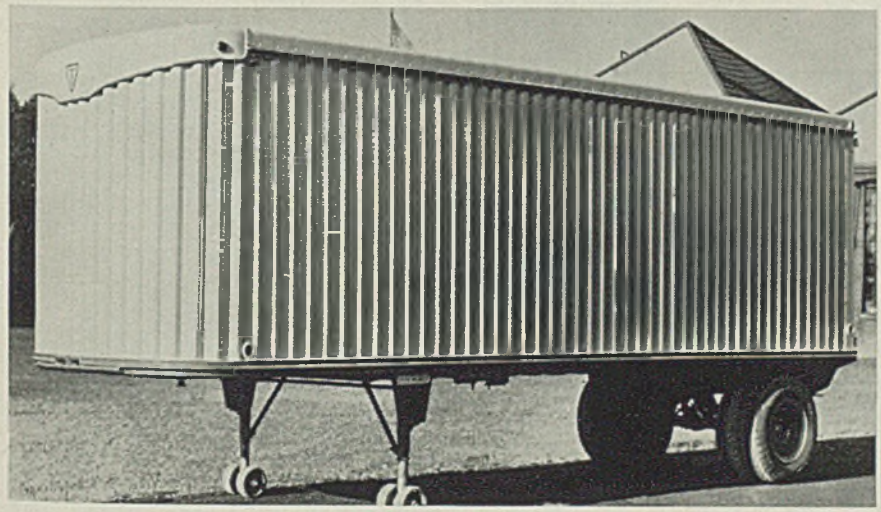
The yield of manganese will be greatly influenced by the silicon content of the ferroalloy, which analyzes from 0.90 to 1.15 per cent silicon in some grades to below 0.25 per cent in others. This makes a difference not only on manganese yield but on aluminum additions as well.

Residual manganese follows a definitely established system, its movement being identical with that of chromium. If the heats shape-up the drop in residual manganese or of chromium is so slight and gradual that it rarely will amount to more than a point in either case. The initial drop, however, is dependent on the general characteristics of the heat during the melting stage and often is influenced by the technique and type of charging. In good shop practice the initial decrease of residual manganese is far less than with poor practices. When the loss of residual manganese during the last several hours of a heat amounts to more than one or two points, this indicates sloppy practice or that the heat is out of equilibrium.

Aluminum practice for the purpose of dexidation is the most important phase of steelmaking. Aluminum or other deoxidizers are considered as "medicine." In these low-carbon steels tapped at 0.03 or 0.04 per cent carbon have a correspondingly high iron oxide (FeO) ranging from 15 to 30 per cent. Many plants follow a system for aluminum addition based on the iron oxide content of the bath. Steel produced according to practices previously described requires about 0.6 ounces of aluminum per ton. The amount necessary to attain exacting deoxidizing quality in the molds ranges from a few pellets to several ounces per ingot. Heats of 150 tons receive 6 to 8 pounds of aluminum to the ladle and ingots from a few pellets to rarely 5 to 7 ounces. There is no remedy for over-deoxidized steel in the ladle which results in thin walled ingots. With proper deoxidization any ladle reaction, which agitates the metal, is avoided, thus preventing any reduction of carbon and manganese toward the end of the pouring process.

Straight carbon steel is the base for all other grades with only slight difference in practice. For example, the usual straight-carbon forging grades ranging from 0.30 to 0.40 per cent carbon are "caught coming down"; that is, it is assumed that all the lime is up and the heat is in suitable condition to tap. The heat is then "blocked off" with 15 per cent silicon pig and after a chemical check for carbon, the final additions are made and the heat is tapped. Many melters tap out heats when the carbon reaches the predetermined point irrespective of the shape the heat is in, but the safest method for high quality is to work the heats down and then recarburize with hot metal.

Corrugations of Column-Like Strength



CORRUGATIONS embodied in this Trailer Co. of America steel truck trailer serve two purposes—they act as columns supporting themselves and the curved roof, and they ultimately conserve metal. Radius of the corrugations and continuous welds increase the trailer's side strength, enabling heavier and larger pay loads to be transported. The sides support much of the body weight and load while the roof holds the sides rigid, resisting twisting forces. Photo by American Rolling Mill Co., Middletown, O.

Jobbers Help To Promote Conservation

Jobbers, according to Manning, Maxwell & Moore Inc., Bridgeport, Conn., are playing an important role in its planned conservation campaign. Each month they are distributing thousands of folders advising how to make the company's products last longer.

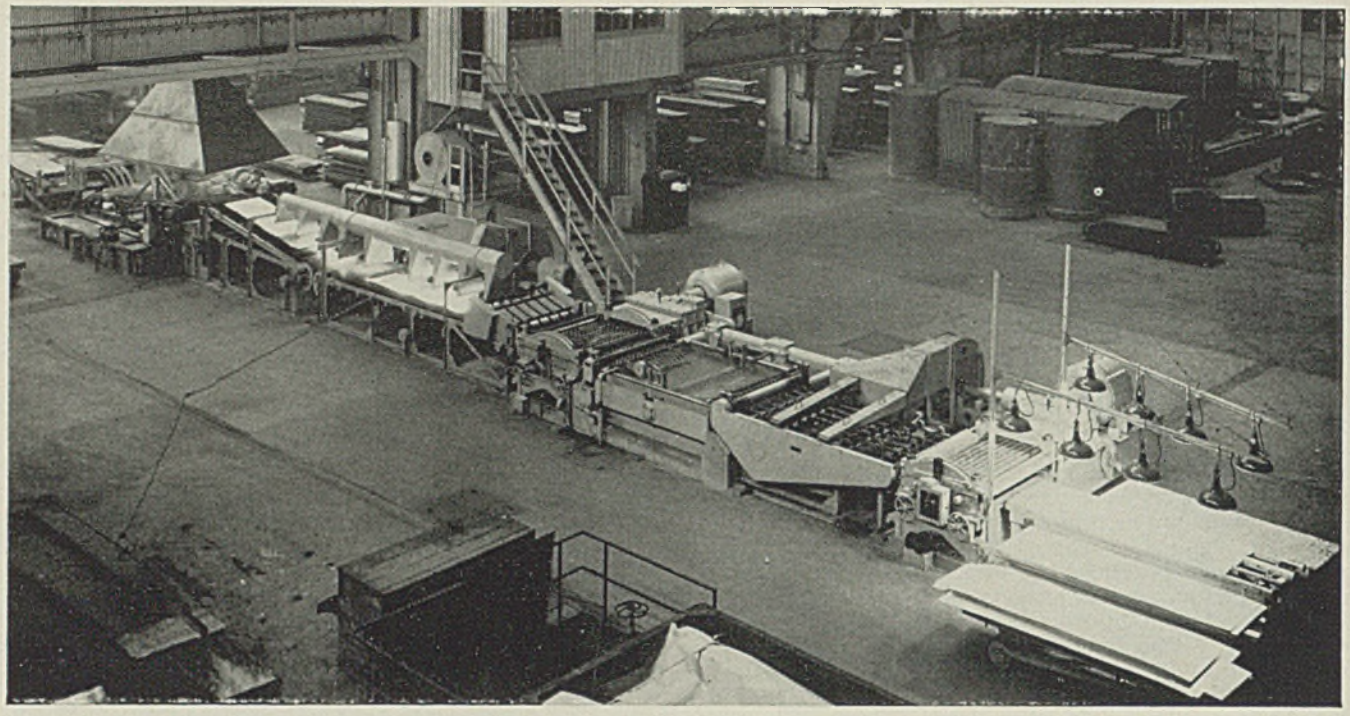
The jobbers, says the company, find that the folders tend to build goodwill in a time when priorities make the products difficult to obtain. Also, another reason why the instruction pamphlets are being received so well is they are impartial—the suggestions embodied are just as helpful when used in conjunction with competitive products.

Copies of Practice on Eaves Trough Available

Printed copies of simplified practice recommendation R29-42, "Eaves Trough, Conductor Pipe, and Fittings, and Ridge Rolls" are now available according to the Division of Simplified Practice, National Bureau of Standards, Washington.

The publications contain the current revision which eliminates double-bead eaves trough in the 4, 5, 6, and 7-inch sizes, together with all accessories, such as miters, end pieces, hangers, etc., in all grades of material and all gages.

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



Complete galvanizing plant of modern design. Delivery end at extreme right. (Courtesy, Aetna-Standard Engineering Co., Youngstown, O.)

Heat Requirements for HOT DIP GALVANIZING

Average radiation loss amounts to 5000 B.t.u. per square foot of bath surface area per hour. Covering the bath when not in service reduces heat loss. Bath temperature ranging from 840 to 860 degrees Fahr. is recommended

By Wallace G. Imhoff
President, Wallace G. Imhoff Co.
Vineland, N. J.

ONE OF THE most difficult of all industrial heating problems is to provide a satisfactory furnace for galvanizing. Years ago furnace construction was left in the hands of the plant bricklayer. Most of his knowledge of furnace engineering and construction was based on operating results of furnaces which he previously had built. The fuel was either soft coal, hard coal, or coke. In limited areas the fuel was natural gas; occasionally oil was used. No electrically-heated galvanizing furnaces on a large practical scale existed.

Finally the building of furnaces was placed in the hands of the newly created engineering department. This transition period was accompanied by an intensive emphasis placed upon combustion engineering, especially from the angle of saving fuel, and a high degree of fuel efficiency. Little thought was given to galvanizing engineering features. As a direct result of this combination there was an epidemic of galvanizing furnace failures. The high degree of fuel efficiency sent too many heat units through the pot side.

There followed a period of intensive sales efforts for new fuels and new methods of heating galvanizing pots. Gas fuel, including city and coke oven gas, replaced coke fuel on a vast scale. Soft coal and hard coal, except for a few cases, disappeared entirely. Then came the increased use of oil fuel, and finally about 1927 and reaching a peak in 1929 the use of electricity for heating galvanizing pots.

The large scale introduction of new fuels was accompanied by many new designs of furnaces and fuel burning equipment. All of these new developments were striving to accomplish three main things, namely, a longer pot life; a higher degree of fuel efficiency; and better operating conditions.

Appreciation of the basic galvanizing prnciples involved makes it necessary to revise some of the earlier ideas about galvanizing fuels and galvanizing furnace designs.

Since the galvanizing pot is destroyed rapidly from the inside out, it is important to know the safe number of B.t.u.'s per square foot that can be put through the sides of the galvanizing pot without setting up rapid corrosion conditions. All of the side cannot be heated because of the brickwork, so the first thing is to determine what percentage the heating area is to the total area. Galvanizing pots never are heated on the bottom, and a large proportion of them only on the two sides. An average percentage of heating area to total area is 60 per cent.

A pot with a total side area of 36 square feet has a 60 per cent heating area of 21 square feet. Coke used is roughly 18 pounds or 216,000 B.t.u.'s per hour. A total heating area of 21 square feet gives about 10,000 B.t.u.'s per square foot of heating area surface that can be used with safety, expecting at least a 3-year pot life.

Another pot which gave 14,500 B.t.u.'s per square foot of surface heating area showed an average life of only about 18 months. The increase in the number of B.t.u.'s

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A prominent manufacturer doing war production installed 95 G-E alternating-current arc welders having built-in power-factor correction. By using a-c welders, instead of d-c, this company is saving power at the amazing rate of 140,000 kw-hr a month. It has also avoided demand charges to such an extent that the total saving in its power bill is at the rate of some $30,000 a year. Moreover, much vitally needed power is released for other war effort.

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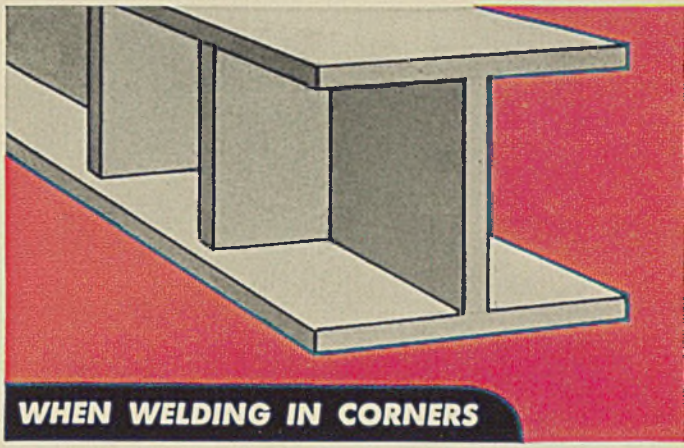
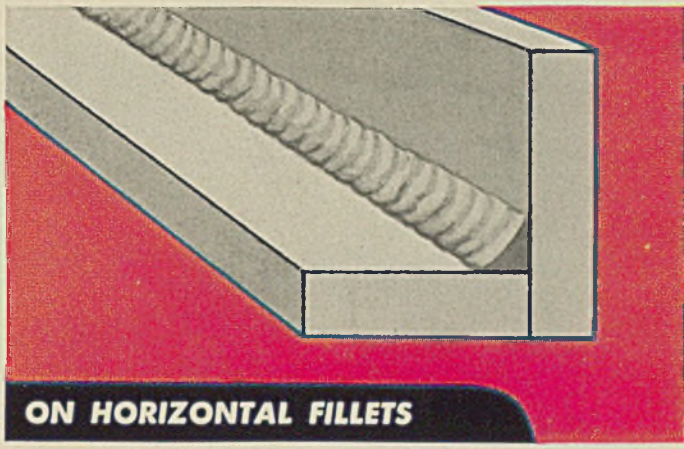
No matter what your welding problem may be, you'll find your G-E office and G-E arc-welding distributor of assistance in getting *more production from each welder* and *more weld-footage from each electrode* — THROUGH APPLICATION ENGINEERING SERVICE. *General Electric Company, Schenectady, New York.*



WHEN WELDING IN CORNERS

A-c avoids "arc blow," so often encountered with d-c welders. As a result, the joint is sound and uniform. Time is also saved because the operator doesn't have to fight "arc blow" or cut down the heat.

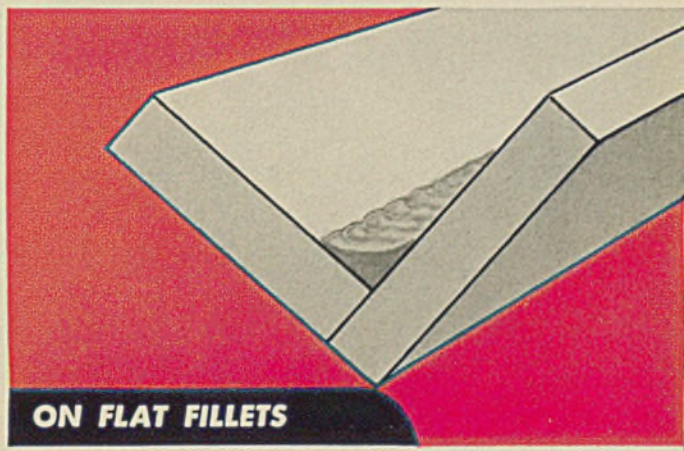


ON HORIZONTAL FILLETS

Increases in speed of 15 to 30 per cent are often achieved, especially on currents above 200 amp. One shop, using d-c welders and 3/16-inch rods, was producing 11 linear feet of 5/16-inch horizontal fillets per hour. After changing to a-c welding, current was increased to permit use of 1/4-inch electrodes, and then 15 feet of joint was welded per hour. A-c welders, in this case, increased speed 36 per cent.

ON DEEP-GROOVE BUTT JOINTS

Uniform, sound welds are obtained on this type of work. This is not only apparent by their appearance but is proved by tests and x-ray inspection. Where large electrodes, high deposition rates, and thorough penetration are important factors, a-c welding offers many advantages in speed and in quality of the finished weld.



ON FLAT FILLETS

No sacrifice of weld quality is necessary with a-c, despite the high speeds that are possible with this type of welding. When joints can be brought into this position, the heat can be boosted as high as the work or the electrode will stand, because neither position nor "arc blow" impose any limitations.

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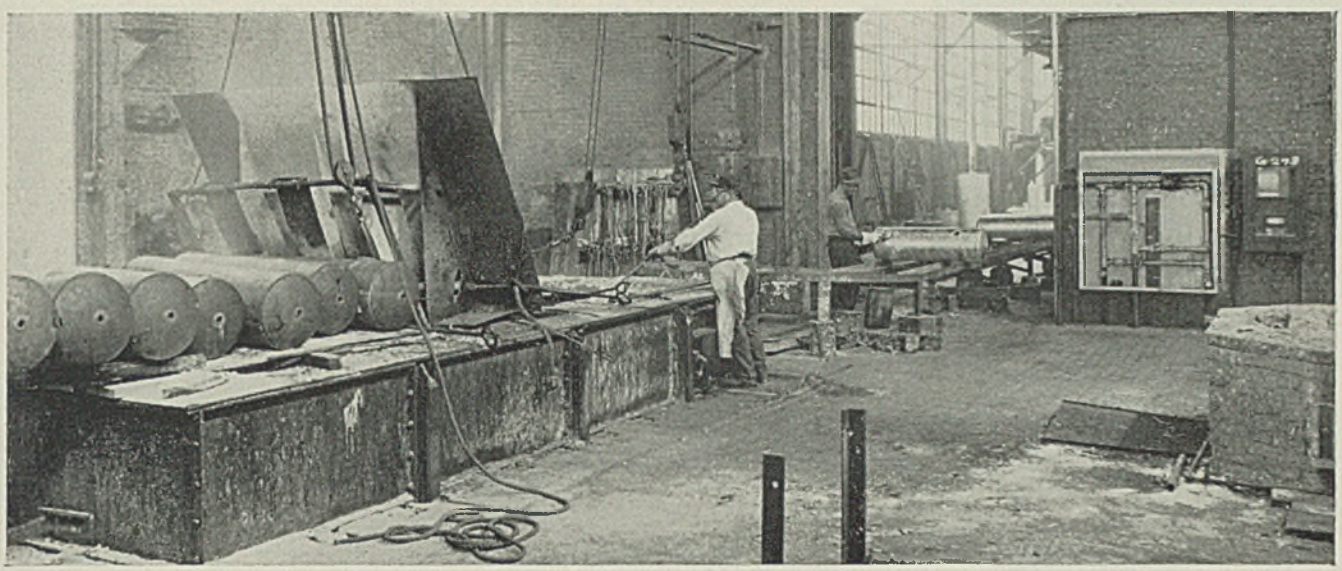


Gas-fired galvanizing pot for coating range boilers and tanks. (Courtesy Pennsylvania Industrial Engineers, Pittsburgh)

seems to have reduced the pot life by half. Still another pot with a life of 18 months to two years showed that there was a heat input of 12,000 B.t.u.'s per square foot of heating area. And still another which had a heat input of 10,000 B.t.u.'s per square foot of heating surface per hour, averaged three years.

In an electrically-heated galvanizing pot, the heating area of approximately 132 square feet consisted of two large submerged steel boxes with heating elements. It used 2612 B t.u.'s per square foot heating area per hour during a campaign of 115 days. Neither the pot sides, nor the heater boxes showed any sign of corrosion. The thickness of the pot side was 1¼ inches when installed and was unchanged when the pot was removed; the thickness of the heater boxes was ¾-inch and this also was the same. An almost indefinite pot life could be expected under such conditions.

Another pot lasted over four years when only 10,000 B.t.u.'s were put through each square foot of heating area. A large pipe pot with an average production of 4 tons per hour showed a heat delivery of about 20,000 B.t.u.'s per square foot of heating area. The life of these pots averaged 6 months, or less.

A tentative table based on actual installations and showing the relations of pot life to the heat transfer in B.t.u.'s per square foot of heating area, follows:

Pot life, time in months	B.t.u./ft.² heating area through pot side/hr.
0	30,000
1	25,000
4	20,000
6	18,000
9	16,500
12	15,000
15	14,200
18	13,300
21	12,500
24	12,000
27	11,500
30	11,000
33	10,500
36	10,000
39	9,800
42	9,500
45	9,200
48	9,000
51	8,800
54	8,600
57	8,400
60	8,200
63	8,100
66	8,000
69	7,900
72	7,800

This table can be used as a guide in making up galvanizing pot specifications, and in figuring pot sizes to safely meet production requirements. A satisfactory figure for all practical purposes should be 8000 to 10,000 B.t.u.'s per hour per square foot of heating area. Any figure under these two is almost certain to give satisfactory pot life.

Heat Required To Melt Zinc

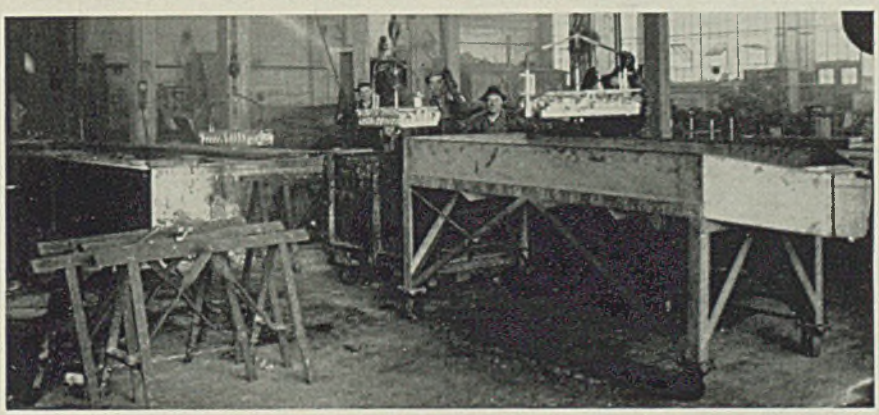
In starting a large full-sized galvanizing pot about 150 B.t.u.'s per pound of zinc melted were required or 300,000 B.t.u.'s per ton of zinc. Heat requirements for metal added to the pot in various amounts during galvanizing operations follow:

Zinc added to pot, lbs.	B.t.u.'s to heat zinc to 900° Fahr./hr.
1	150
100	15,000
500	75,000
1000	150,000
1500	225,000
2000	300,000

From data obtained on a large galvanizing pot under accurate control and observation it was found that a figure of approximately 160 B.t.u.'s per pound is required for heating the iron up to 900 degrees Fahr. For heating the work, therefore, the following is offered:

Production, lbs. per hour	B.t.u.'s/hour to 900° Fahr.
1	160
100	16,000
500	80,000
1000	160,000
1500	240,000
2000	320,000

The amount of zinc required for the hot-galvanized coating is a function of the bath temperature, the submersion time, the kind of article, the surface area and other factors which affect the quantity of zinc carried out of the bath as zinc coating. This carryover is about 10 per cent



Equipment employed by San Francisco Galvanizing Works, San Francisco, for galvanizing malleable iron fittings

Electrically-heated galvanizing pot. Covers at left are used when bath is idle. (Courtesy Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.)

of the weight of the production in pounds per hour. If the production is 6000 pounds per hour, then 600 pounds of zinc should be used. On the basis of 150 B.t.u.'s per pound to heat this zinc to 900 degrees Fahr., 90,000 B.t.u.'s are required for the new zinc per hour. At 160 B.t.u.'s per pound for the iron, the production of 6000 pounds per hour requires 960,000 B.t.u.'s to heat it to galvanizing temperature. The total heat required is the sum of the two or 1,050,000 B.t.u.'s. The furnace should be well insulated and have high fuel efficiency.

Under operating conditions the amount of heat required to galvanize a ton of steel shows wide variation. In one plant three galvanizing furnaces used 2,896,000, 2,006,620 and 8,835,640 B.t.u.'s respectively, per ton of steel galvanized. The fuel was natural gas. A coke furnace used 4,480,000 B.t.u.'s per ton and an oil furnace doing exactly the same kind of work 4,500,000 B.t.u.'s per ton. An oil furnace scheduled on wire used 660,000 B.t.u.'s. Using city gas as a fuel about 650,000 B.t.u.'s per ton of steel galvanized was required. This furnace, in operation for four years and five months, has a heat transfer per square foot heating area per hour of less than 8000 B.t.u.'s.

A pipe galvanizing furnace using oil fuel requires 1,210,000 B.t.u.'s per ton of product. In a plant doing electrical conduit and using natural gas as fuel 1,735,800 B.t.u.'s per ton of steel galvanized are required.

A pipe galvanizing plant may have a production from 4 to as high as 8 or 10 tons per hour. This compares with a 40-ton production per month for metalware. In 10 hours of pipe galvanizing as much production is done as in a whole month of galvanizing metalware articles.

Since cold material going through the bath has to be heated to the galvanizing temperature to obtain a proper coating and alloying action, it is important to know the production put through the galvanizing bath in pounds per hour. Range boilers which go through the bath slowly show a much smaller tonnage per hour than pipe, wire, sheets and similar products.

From these facts it is only logical to compare fuel values at one galvanizing plant doing range boilers with another plant coating the same product.

The larger the production put through the bath the greater the heat requirement. Consequently, this is the third factor that affects the B.t.u. requirements per ton of steel galvanized. Moreover, the higher the bath temperature the greater the amount of heat radiated from the bath. It is necessary to have a low B.t.u. heat transfer per square foot of heating area, as well as a uniform distribution of the applied heat over every square foot of heating area. These constitute the most vital factors of heating galvanizing pots. The kind of fuel used to heat the pot is also of great importance because it affects the furnace design.

About 1927 to 1929 electricity began to be used on a large scale for heating galvanizing pots. The peak showed over 19 pots heated with electricity, including an 80-ton pipe furnace. An installation with the pot packed in firebrick and Sil-O-Cel insulating brick, and with the heating elements enclosed in large steel boxes placed in the galvanizing bath, showed a consumption of 101 kilowatt hours per ton of steel galvanized at 875 degrees Fahr. or 344,915 B.t.u.'s. Allowing 10 per cent for a carryover of zinc, or 200 pounds, and 150 B.t.u.'s per pound for melting and raising to galvanizing temperature, gives a total of 30,000 B.t.u.'s for the zinc. This then gives a total heat requirement of 375,000 B.t.u.'s per ton of steel galvanized and may be taken as the absolute minimum figure that a ton of steel can be galvanized with any fuel or furnace under practical large scale operating conditions. Using this figure as a basis a tentative standard of efficiency of heating requirements for all fuels, furnaces and kinds of articles galvanized is presented as follows:

Production, lbs./hr.	B.t.u.'s per hour
1	187
10	1,875
100	18,750
500	93,750
1,000	187,500
2,000	375,000
4,000	750,000
6,000	1,125,000
8,000	1,500,000
10,000	1,875,000
12,000	2,250,000
14,000	2,625,000
16,000	3,000,000
18,000	3,375,000
20,000	3,750,000

This table merely serves to give a "heat requirement" mark to be attained as a standard of high fuel efficiency.

How extremely complicated heat requirements may become is seen in reviewing the figures for an early coal-fired galvanizing furnace of over 20 years ago. This plant had six soft-coal galvanizing furnaces for galvanizing buckets and tubs, and other kinds of metalware. Total heat requirements for the pail kettles was 2,660,000 B.t.u.'s per ton, and for tub kettles, 4,055,555 B.t.u.'s per ton. Pails were galvanized at 18 dozen per hour, the tubs at 10 dozen per hour. A pail day was 2998 pounds, a tub day was 5910 pounds. Pails were galvanized at a bath temperature of 855 to 865 degrees Fahr., tubs at 865 to 875 degrees Fahr.

From the foregoing discussion on total heat requirements for galvanizing a ton of steel, it is obvious that no definite B.t.u. figures can be given; that these figures are a function of:

1. Kind of article being galvanized.
2. Production in pounds per hour.
3. Bath temperature.
4. Furnace design.
5. Insulation.
6. Fuel used.
7. Inside or outside bath heating.

Other influences are the kind of base metal, the size of the articles, and whether the material is put through the bath continuously or individually.

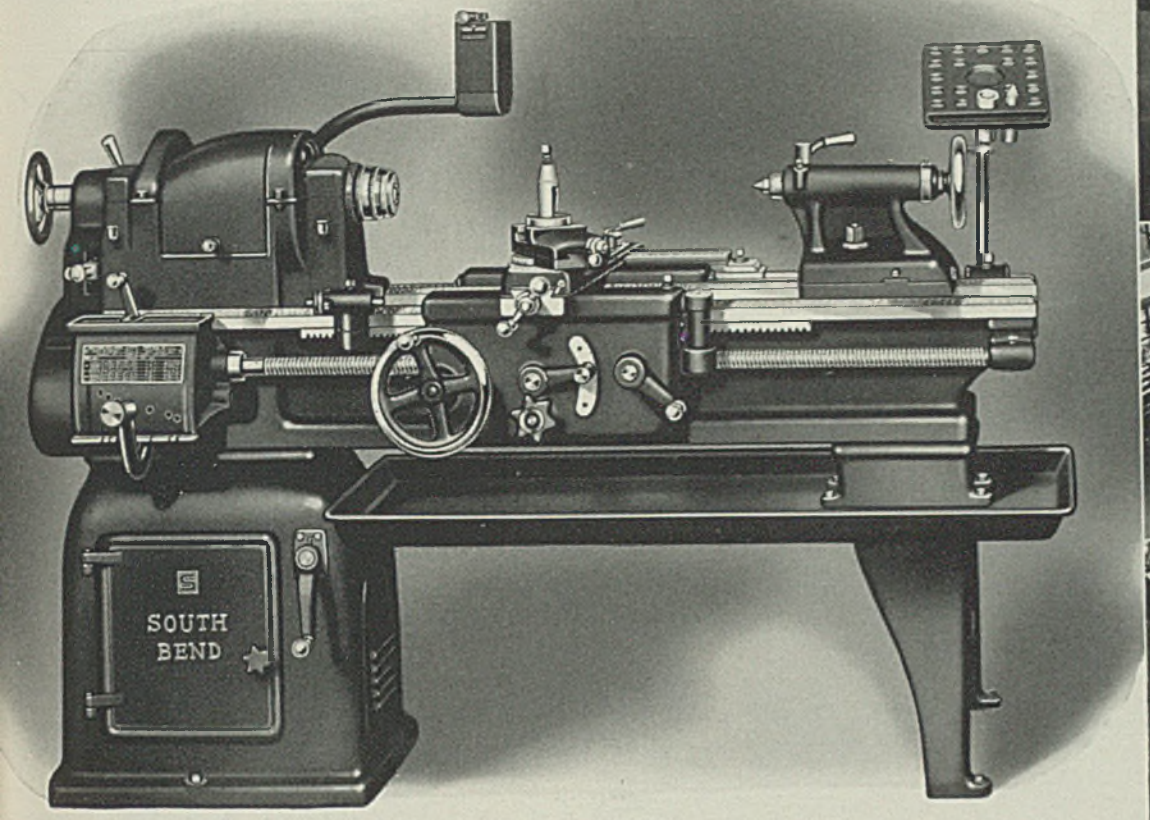
Radiation losses involve two sets of figures since the bath surface may be covered when not in use. Data on a full-sized galvanizing pot follow:

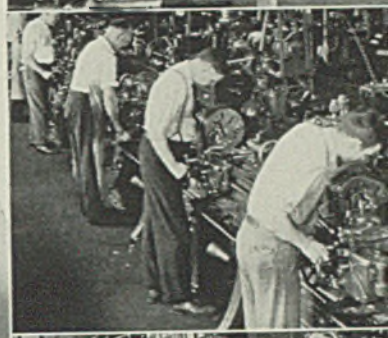
Bath temp., deg. Fahr.	Bath covered, B.t.u./ft.²/hr.	Bath uncovered, B.t.u./ft.²/hr.
800	1565	4553
810	1612	4570
820	1708	4587
830	1755	4600
840	1802	4625
850	1900	4648
860	1992	4743
870	2040	4932
880	2087	5122
890	2134	5573
900	2182	6071

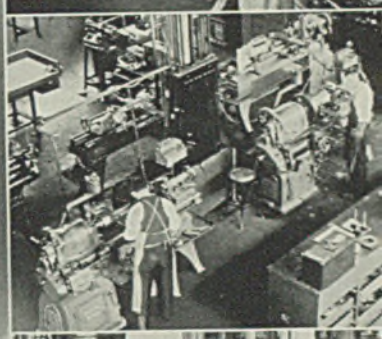
These figures show that 5000 B.t.u.'s per square foot of bath surface can be used as an average radiation loss when the galvanizing bath is in operation and uncovered. When the galvanizing bath is idle the temperature is allowed to drop to about 820 degrees Fahr. If left uncovered there is a radiation loss at this temperature of 4587 B.t.u.'s per square foot per hour; if the bath is covered when not in use the loss is only 1708 B.t.u.'s per square foot per hour.

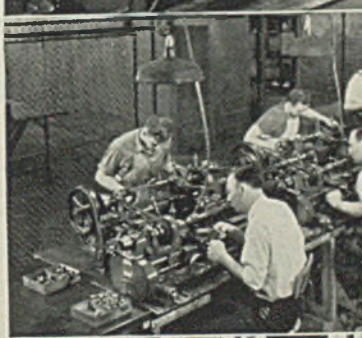
Roughly this is only one-third of the heat loss as compared to the bath radiation loss at 820 degrees Fahr. when uncovered. A cover, therefore, will roughly save about 60 per cent of the heat used when bath is idle. Heat losses start to increase rapidly above 850 degrees Fahr. With each 10 degrees of temperature rise from 860 to 900 degrees Fahr., the difference is about 1328 B.t.u.'s.

For
MODERN SHOPS









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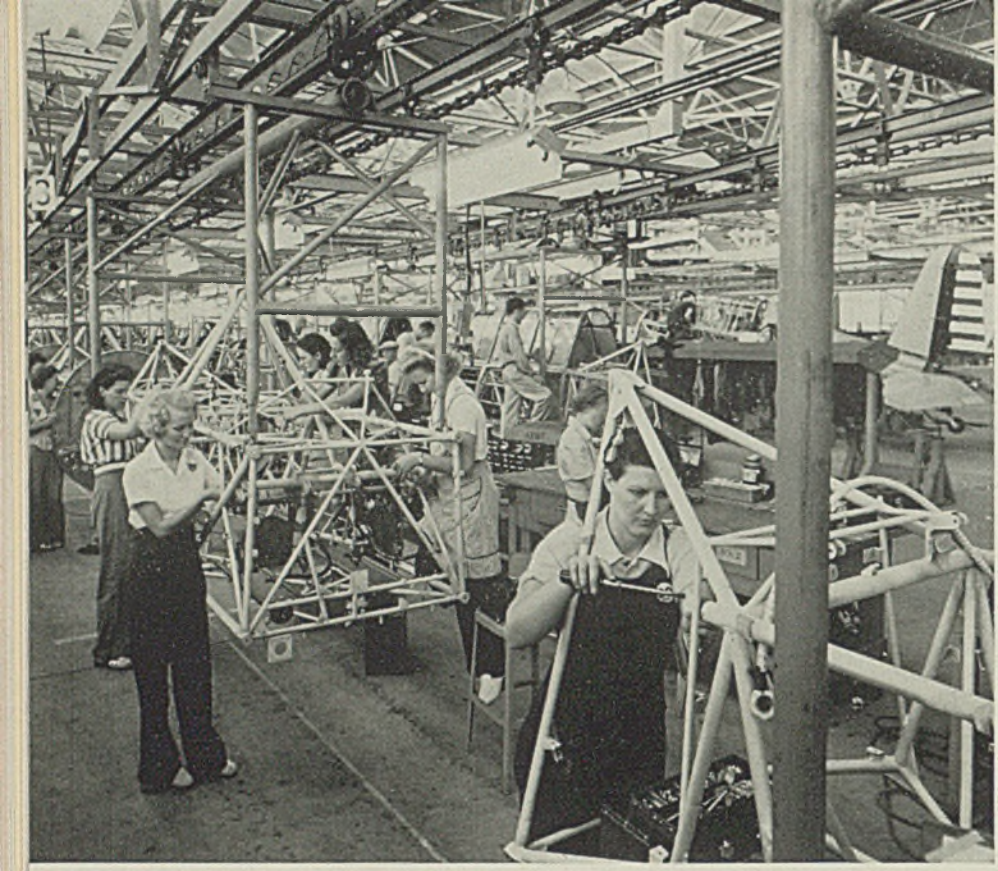


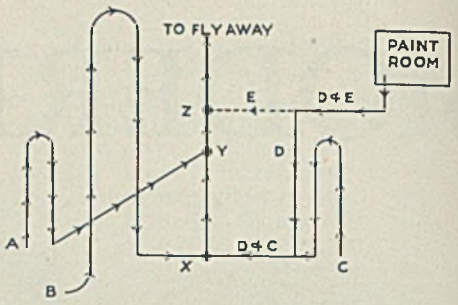


Fig. 1. (View at left)—Fuselage assembly on powered conveyor line. Note conveyor consists of three lines, the center being the main support, the right carrying the propelling chain and the left being a guide rail to keep fuselage hangar from swaying

Fig. 2. (Directly above)—Rough schematic of flow lines which form the powered conveyor setup described here. A is engine line; B, fuselage; C, tail; D, center wing; E, outer wing. Not complete, nor to scale

Installation of

MECHANIZED CONVEYOR LINE

. . . . raises possible plane production several hundred per cent, which in turn necessitates complete reorganization of all departments of the plant

INSTALLATION at an aircraft plant of a mechanized overhead conveyor which it was estimated would immediately jump production several times necessitated the reorganization of the entire plant setup. An exact scale replica of the plant was therefore constructed on which changes were planned —including installation of new machines, speed-up of present machines, and a new system of routing materials and semifinished parts through the plant. Resultant new layout is diagrammed in Fig. 2.

For manufacturing purposes, the company considers the plane as composed of five major units—fuselage, tail section, engine assembly, center wing section and outer wings. Each unit is completely put together in subassembly departments and brought by conveyor to the new moving assembly line for completion of the plane.

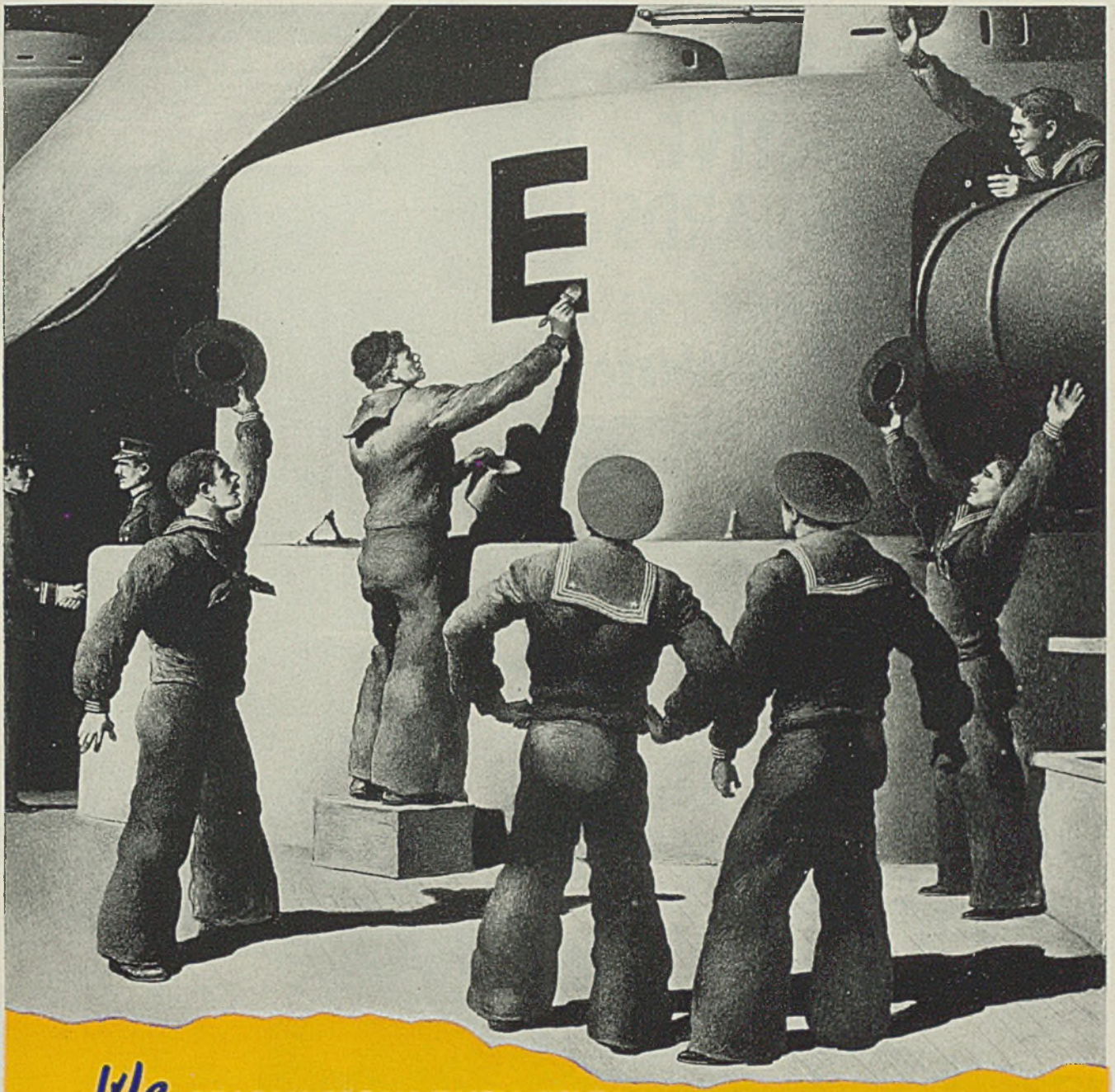
Starting at the left of the diagram, Fig. 2, can be seen path B, the long U-shaped loop traversed by the fuselages as they come from the welding department and undergo various assembly operations. Here instruments, controls, canopies, wiring, etc., are installed. Fig. 1 shows fuselage being assembled on this loop. Note that the cross-braced welded hangars which carry the fuselage are suspended from two sets of wheels which roll on the flanges of a monorail track. An endless moving chain is suspended on wheels from a second smaller monorail beside the first, and projections on this chain extend downward and contact the frames to move them along on their track. A third small rail on the opposite side of the main rail contacts rollers on the frame which keeps it steady as it moves, preventing sidesway.

At the last station on path B, frame and fuselage roll onto a short rail section which is carried across to the finishing line by a pair of hoists riding on overhead rails at right angles to the fuselage line at this point. Here fuselage is equipped with landing gear, joined to tail and center wing sections and removed from frame. Then rail carries hangar frame back to fuselage assembly line track where it is started moving back to beginning of line by endless chain. Another frame and fuselage move forward onto moveable rail section, and the process is repeated.

At the right of the diagram, Fig. 2, tail sections are assembled in frames moving on monorail tracks following path C. Complete with monocoque, stabilizers and control surfaces, tail sections meet the completed fuselage at point X—the start of the main or final assembly line. Here they are removed from the assembly frames and permanently attached to the fuselages.

Monorail following path D brings the center wing sections from the paint room, where parts travel through spray booths and under batteries of drying lamps, to path C just before it reaches X. These sections are also joined to the fuselage at X. Plane then moves down the assembly line as finishing operations are completed until it reaches point Y.

On balcony at left, engines are picked up by overhead monorail and carried along loop of path A through degreasing and assembly operations. Engine mounts, con-



We KNOW HOW THEY FELT!

Those men who earned the first Navy E, back in 1906, must have been the proudest crew of tars in the fleet. We know, for we feel the same bursting pride today. The blue Navy burgee now flying from our flagstaff sends a special thrill through every man in our plant. We're proud to be Americans.

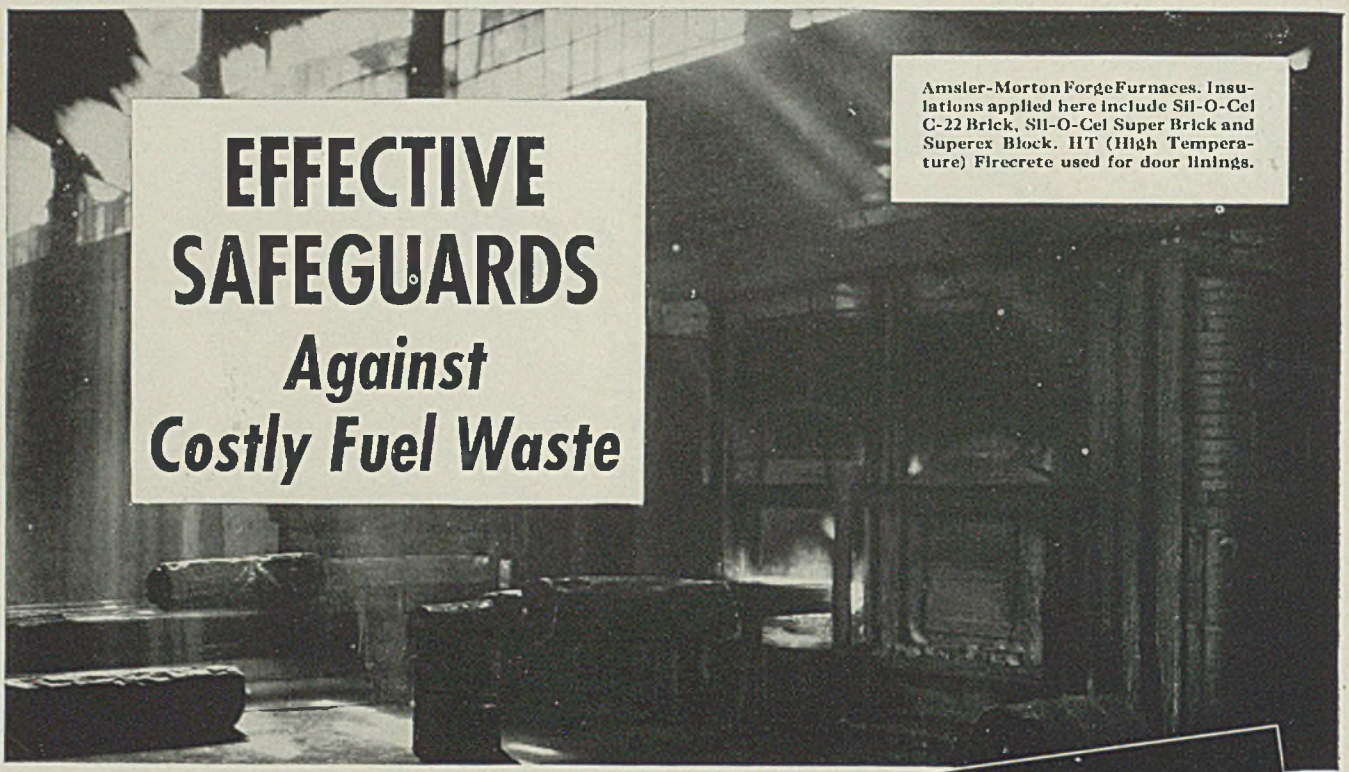
The Navy E is not lightly given, nor lightly received. It means more than Excellence. It stands for a good job well done, for teamwork better than the best . . . and its award to any civilian plant should double and redouble fighting spirit. From now until final Victory dawns, we pledge every effort to help *Keep America Rolling.*

Exide
IRONCLAD
BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia

The World's Largest Manufacturers of Storage Batteries for Every Purpose

Exide Batteries of Canada, Limited, Toronto



Amsler-Morton Forge Furnaces. Insulations applied here include Sil-O-Cel C-22 Brick, Sil-O-Cel Super Brick and Superex Block. HT (High Temperature) Firecrete used for door linings.

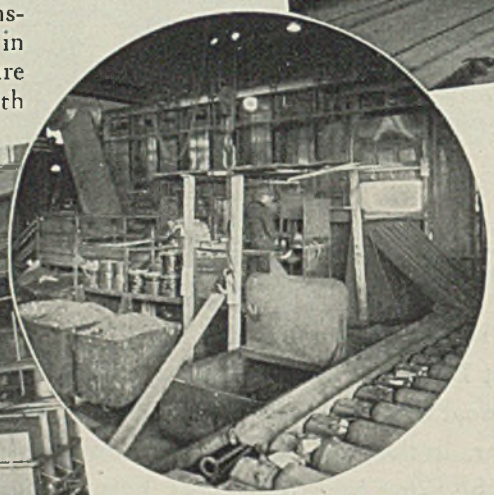
EFFECTIVE SAFEGUARDS *Against Costly Fuel Waste*

Johns-Manville Insulations minimize heat losses at Dominion Foundries and Steel, Ltd.

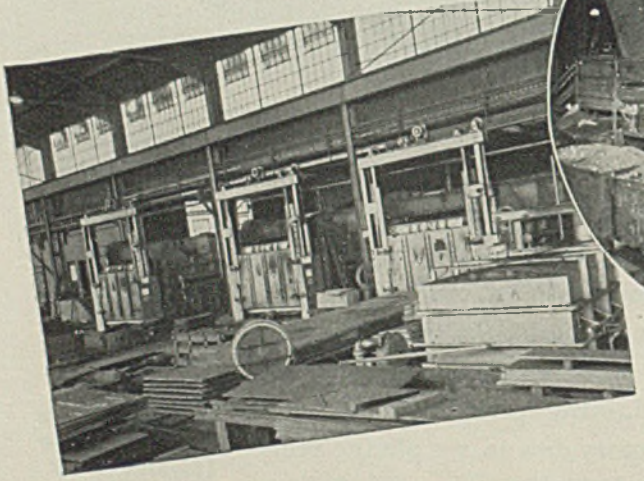
To meet a wide variety of service conditions in this Canadian mill, Johns-Manville Insulating Materials were specified. Many different J-M Insulations are used . . . in brick, block, pipe-covering and cement form. Each is designed for a particular operating requirement. In the services for which they are designed, all deliver the long life and high efficiency that mean maximum fuel savings.

For details on the complete line of Johns-Manville Insulations, see our listing in Sweet's Catalog, or write for brochure IN-55A. Johns-Manville, 22 East 40th Street, New York, N. Y.

↑ Amsler-Morton Car Type Annealing Furnaces. Sidewalls insulated with Sil-O-Cel C-22 Brick backed up with Superex Block. Roof of same materials plus 1" J-M No. 500 Cement.



← Amsler-Morton Billet Heating Furnace. Insulated with Sil-O-Cel C-22 Brick, JM-20 Brick and Superex Blocks. LW (Light Weight) Firecrete used for door linings.



← Swindell-Dressler Car Type Annealing Furnaces at Dominion Foundries and Steel, Ltd. Used here as insulation are JM-20 Brick and Superex Block. Doors are lined with LW (Light Weight) Firecrete.

JM Johns-Manville INDUSTRIAL INSULATIONS

For every temperature . . . for every service

trols, piping and other "plumbing" having been attached, completed power plants are carried by the overhead conveyor to point Y, where they are lowered by hoist and installed into the planes.

At point Z addition of outer wings coming from paint shop along path E completes assembly of planes. Beyond that point controls are adjusted, final inspection is made, and the planes roll out of the shop.

Among the means introduced for speeding up production of parts to feed the new conveyor line were a battery of huge mechanical presses which punch as well as draw sheet metal and which surpass greatly in speed the standard drop hammer methods; a moving conveyor line for prime coating of parts; a roller coater for priming large sheets of metal; and intensification of arc welding of fuselages to save 25 per cent of time in assembling the tubular steel framework of the plane.

A major factor in the speed-up effected was the elimination of the endless paperwork that formerly accompanied shop operations. Formerly the building of 100 center wing sections would have meant the issuance of 2700 individual shop orders, requisitions and the like. A single monthly schedule now does the trick. Time studies, job classifications and flow charts were prepared including all labor, parts and materials involved in assembling the component parts of the plane. By their use, planners can develop a breakdown of future production in relation to delivery schedules.

Copies of the master production chart detailing the number of manhours required, materials and parts to be received, and units to be assembled are issued to assembly departments. Copies of the same chart go to stock rooms to show accurately in advance the number of parts which must be issued and distributed to each department. By this advance scheduling, the whole shop is geared well ahead of time to the requirements of the delivery schedule at the airport outside the plant.

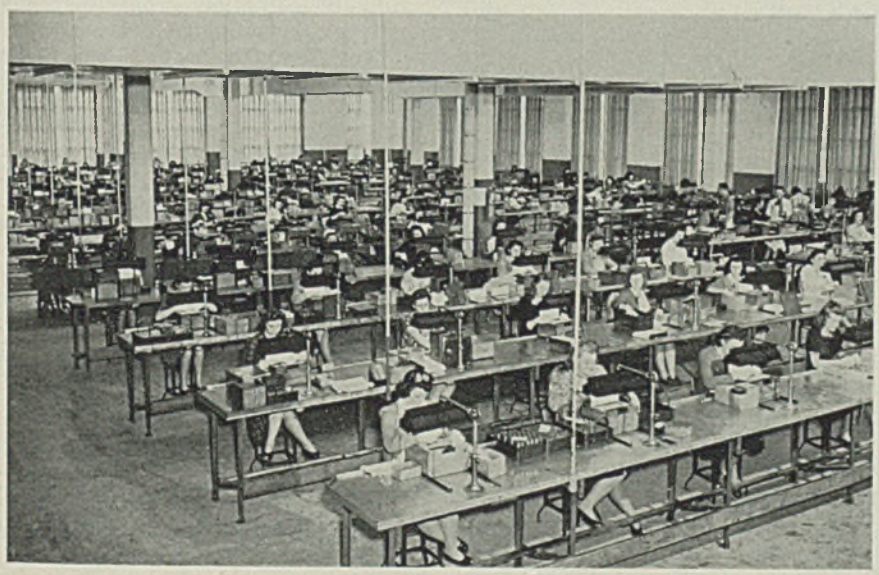
New Blackout Bulb Uses Orange Light

Important changes in blackout bulb specifications are announced by the Wabash Appliance Corp., Brooklyn, N. Y., whose bulb was put through exhaustive blackout tests recently.

The most important specification change is in color of light from blue and red to the deep orange recommended by the Office of Civilian Defense. Other changes are in size, which is smaller, in reduction of current consumption to 15 watts, in elimination of the former built-in reflector, and in the improved type of heavy black silicate coating to prevent light leakage.

The deep orange light is said to be ample to permit room occupants to see each other plainly.

Checking Bearings for Defects



BRIGHTLY polished balls and rollers parade before keen eyes in the scientifically lighted and air-conditioned inspection room in the Atlas Ball Division of SKF Industries Inc., Philadelphia. In this model room, girls wearing white gloves scan balls and rollers for surface defects with the same degree of visual concentration needed in detecting flaws and scratches on costly jewels. White gloves protect balls and rollers from moisture

Offers Germicide To Kill Oil Dermatitis

Natriphene Co., 3337 Book building, Detroit, announces an odorless, water soluble germicide in tablet form which when added in cutting, drawing and core oils and other similar compounds is said to prevent industrial dermatitis or skin disorders caused by bacteria or fungi present.

Tablets are dissolved at the rate of one per gallon of emulsified oil base or compound. This solution is added to the cutting oil base before dilution with water. Before adding to paraffin base oil, however, the tablets are dissolved in alcohol. Product also is claimed to prevent decomposition of oils by preventing or retarding bacterial or fungus growth.

Offers Substitute Primer Paint

As an alternative to aluminum paint priming, Midland Paint & Varnish Co., Cleveland, is offering manufacturers affected a metal lead primer which is claimed to be equal in its protective value to that of a good grade of aluminum paint. This, according to the company, is due to its metallic nonrusting components.

The Hyspar metal paint primer, as it is called, prevents rust from working from the inside of the material through the finishing coat. It may be brushed, sprayed or dipped, and dries hard in 4 to 5 hours. The paint is neutral gray in color and will not bleed through the finishing coat. Also it will not crack or flake off. It adheres tightly to metal under rapid climatic changes, and also is highly resistant to the salt air of the seaboards.

Stop-Off Lacquer Simplifies Hardening

Michigan Chrome & Chemical Co., 6340 East Jefferson avenue, Detroit, reports a specially developed Miccro Supreme stop-off lacquer is effective in localized hardening of steel parts. Its use is said to eliminate the usual handling and grinding operations required before heat treating.

Ordinarily, steel parts to be hardened only in certain areas are copper plated completely. From the plating cycle, parts are trucked to a grinder where plating is removed from portions to be hardened. The parts then are sent to the heat treating furnace.

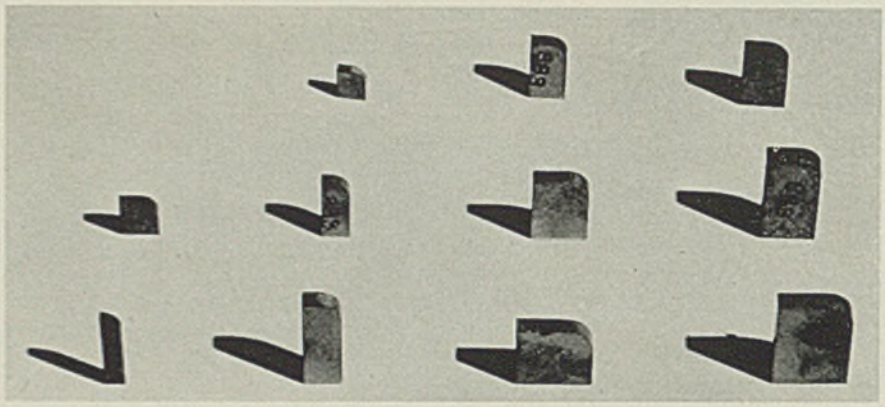
In using the stop-off lacquer, a coating is applied on the areas to be hardened before they are plated. After plating, all that is necessary is to remove the lacquer and the pieecs are ready for heat treatment without further preparation.

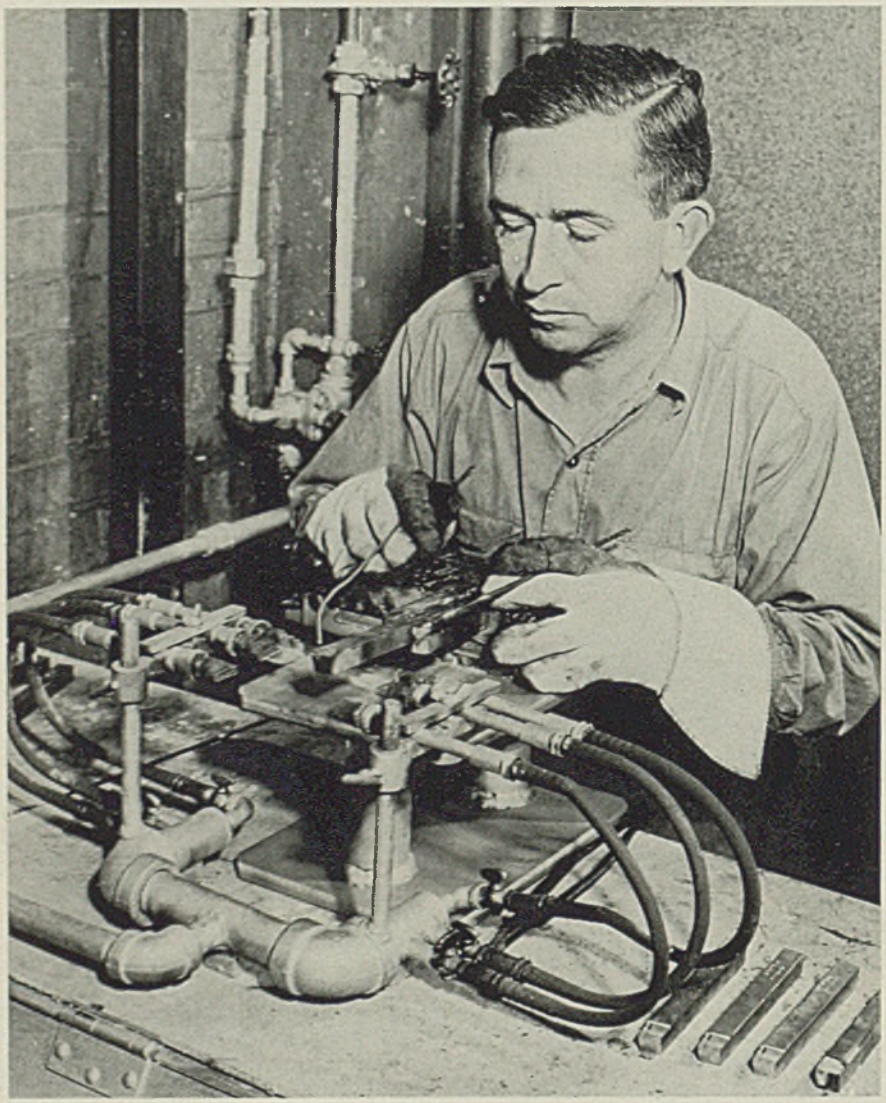
FAST TOOL-BRAZING SETUP

. . . . speeds production of war work and lowers costs at Buick

BUICK Motor Division of General Motors Corp. is now producing its own tungsten carbide cutting tools at a saving in cost in its plant in Flint, Mich., by brazing standardized sizes of carbide tips to shanks made of SAE 1340 steel. The possibility of delays in obtaining complete tools is thus avoided. The tips themselves are readily obtained from producers of tungsten carbide.

The General Motors standards committee found that all of the different carbide tools for all classes of work throughout the Buick organization could be produced from the eleven different sizes of carbide tips seen in Fig. 1, thus simplifying materially tip inventory.





Carbide tools are produced by Buick in the following manner:

Shanks are ground to size on all four sides from hot rolled stock on water-type surface grinders. From here they go to the milling department where the recess for the tip is milled out and the shank is stamped, ready for brazing the tip in place. The tip itself is polished on bottom and contact sides with a diamond wheel.

For brazing, an unusual setup has been developed which not only permits the use of city artificial gas (instead of requiring the usual oxy-acetylene torches or electric furnaces, etc.), but also is said to be one of the fastest tool-brazing setups ever developed. The brazing equipment, shown in Fig. 2, consists of a fixture having a flat top and six fishtail gas tips clamped in such a way that the tool, which is held in a vise resting on the flat surface of the fixture, can be slid into position between three flames on each side. The operator thus has both hands free with which to handle the tip and brazing material to aid in getting a good braze.

Each torch tip is connected individually to the gas supply manifold and can be adjusted independently to regulate the heat. The gas is mixed with air through a venturi tube at each one of the jets. The clamping arrangement supporting the gas tips permits them to be arranged laterally or vertically to direct their heat to the best advantage, according to the size and shape of tool being brazed.

Tool shank and tip are first cleaned by dipping in carbon tetrachloride. Heavy Flux and Easy-Flo No. 3 brazing alloy are then applied, the tool is clamped in the vise. Then the tip is placed in po-

(*Please turn to Page* 96)

Fig. 1. (Upper left)—From these eleven standard sizes, Buick makes all its carbide tips for tools

Fig. 2. (Lower left)—Tool is held in vise on fixture and is heated on both sides by flames from fishtail gas jets. Fuel is city gas. Tips are adjustable individually and can be moved laterally and vertically. Operator here is applying brazing alloy to tip

"Welding saved me $1 on that tankful"

What's the idea of giving me the welding nod every time I buy gasoline?

ALTER EGO: Just because you're searching through today's welding achievements for help in developing a crash-proof business for the future. So, look into the modern oil refineries for a cue.

That's right, they're all-welded so that they can work at higher pressures and thus turn out more gasoline per gallon of crude.

ALTER EGO: To be more specific, they've *doubled* the yield from crude, which cuts costs at the pump 5 cents per gallon. That's how you just saved $1.

Then why couldn't we put that same basic idea to work to boost the quality and cut the cost of our *product.*

ALTER EGO: We *could* if we *would*. All it takes is the *will* and the *way*. I'll furnish the will. You can get the *way* from The Lincoln Electric Company, Cleveland, Ohio. Just ask them for their Change-over Plan. Understand they GUARANTEE it to work, so there's nothing to lose — everything to gain.

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

TABLE I—Data Included in Spot Welder Control Chart

Style No.
Kind & Thickness of Material:
Name of Part:
Description of Machine:
Timer Settings:
  Squeeze Time
  Hold Time
  Off Time
  Weld Time
Face Diameter of Points:
Distance Between Points:
Pressure Between Points:
Number of Spots:
Size of Spot:

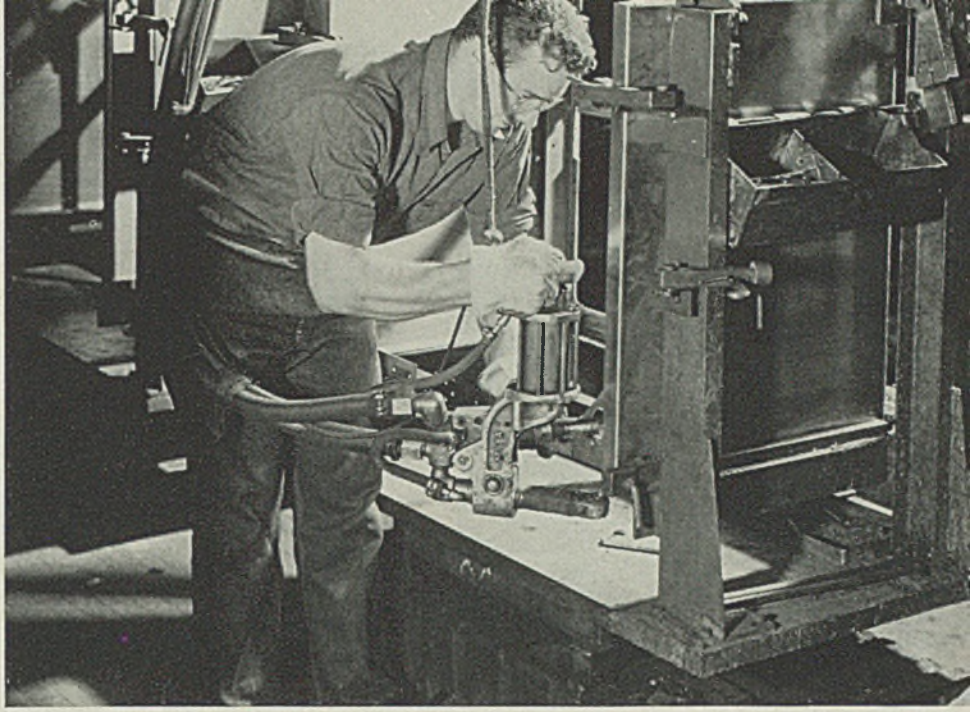


Fig. 1—Special jigs hold the wrapped steel sheet onto reinforcing sections while a special gun welder joins the parts quickly and accurately. The resistance welding gun is arranged to apply a current of about 400 amperes while exerting a force of 350 pounds between the two electrodes

QUALITY CONTROL

Assures Consistent

WELDING

Of Diversified Metals

By FRED C. GANDERT
Welding Engineer
Westinghouse Electric & Mfg. Co.
Mansfield, O.

THE PHENOMENAL expansion of resistance welding for fabricating products requires a rigorous system of quality control. This is particularly important due to the wide range of metals that are welded, including aluminum, brass, monel, silver buttons, nichrome, stainless steel, nickel plate, terne plate, cold roll and enamel iron. A typical resistance welding job is shown in Fig. 2. It is interesting that if all the spot welds produced in this plant during 1941 were placed side by side, they would extend from the Atlantic to the Pacific ocean; and similarly the seam welding would form a continuous strip from Cleveland to New York.

Resistance welding has had an unusual growth in the manufacturing of electric appliances during the past few years. The history of resistance welding at Westinghouse's Mansfield plant is typical. and dates back to 1918 when welding equipment consisted of two 15-kilovolt-ampere rocker-arm spot welders. Nothing was known at that time of electronic control, the methods used to join metals were rather crude; parts were joined by riveting, bolting, brazing, or gas welding. In the 10-year period between 1920 and 1930 resistance welding facilities of the plant were increased by four times. And beginning in 1930, resistance welding soon multiplied itself 15 times. About 1934 a definite and radical swing toward resistance welding was made. Prior to 1934, our ranges consisted of an inner riveted structure on which the exterior and interior parts were bolted or fastened by screws.

Resistance welding combined with the precision of electronic control has made it possible to manufacture low cost electric appliances of exceptionally high quality.

The system of quality control at Westinghouse's Mansfield, O., plant involves four factors.

Strength: When a new design is first started on production, two pieces of the same material are taken and a weld established. After the two pieces of material are welded together they are taken to a vise and ripped apart; a slug of sufficient diameter to insure proper strength to the product must be pulled from one of the sample parts. If the required strength is not attained, welding factors such as current, tip size, tip pressure, length of current application, etc., are varied until a combination is found that gives the required results.

Appearance: The second step is the finish on at least one side of the welded parts. Every effort is made to keep welds from painted or enameled surfaces. Where this is impossible, we endeavor to control marking and indentation on the exposed surface. This can be done by using a copper plate under the welding tip on that side as this spreads the heat and the compressive force, preventing indentation and making an invisible weld. Often a large diameter electrode will produce the same result.

Production: High speed welding is necessary to meet costs. However, the quality of the weld must not be sacrificed for speed or finish. Controls are utilized to repeat automatically the welding cycle as long as the operator holds down his foot switch. This scheme greatly increases output on many items as the operator merely moves the work along between welds while the controls automatically apply electrode pressure and current for the desired period and then release the work.

Machine Settings: To assist operators, inspectors and foremen in maintaining a good welded product after it has once been estab-

Fig. 2—Nickel plated heating racks for electric roasters are assembled in this special fixture and 29 welds are made on each unit in just one minute. About 150 completed racks are produced per hour on this setup

lished, a control card is employed to list proper settings for the machine, sequence panel and ignition control is used. This method is particularly effective where it is necessary to change the machine from one job to another. Information shown in Table I is included on the cards.

After a weld has been established and recorded on the control chart, Cupaloy welding tips and precision electronic control make it possible to retain this weld consistently. Cupaloy is an alloy, combining high mechanical strength and low electrical resistance used for spot welding points and seam welding disks.

This material enables the welding machines to produce millions of consistent welds daily. Modern electronic controls also help provide high speed production of quality welds so they permit exact repetition of precisely controlled welding cycles and so contribute much to producing uniformly good welds.

Electric ranges and the recently developed automatic cycle washer ("Laundromat") are typical examples of complicated metal structures fabricated by resistance welding at Mansfield. Today, the body of a modern range consists of one flat sheet blanked, pierced and notched in one die; braked into a U-shape. Then it is placed in welding bucks where component parts are gun welded while clamped rigidly in place as shown in Fig. 1. Range doors are spot welded, resulting in a solid one-piece door. This design of all-welded ranges not only reduced the number of parts, bolts, nuts, screws, etc., but enabled a material reduction in manufacturing cost.. Enamel chippage is also reduced because chippage usually occurs where two parts are fastened together by bolts or screws. As a result the streamlined all-welded one-piece range bodies have eliminated all except a few previous bolts and screws.

In the fabricated automatic washing machine, the spinner tub is drawn in two halves. The two halves are then placed in a rotating locating fixture, clamped solidly and spotwelded. The tub is then taken to seam welder and resistance welded. The front and back tub are deep drawn and numerous brackets are projected and spotwelded to them at rate of 75 welds per minute.

The cabinet is made from a flat sheet of steel, blanked, notched and then formed into a U-shape in a brake. The former wrapper sheet is then placed in a welding buck and clamped securely into place; the various subassembly parts and brackets are also placed into position and clamped. The cabinet is then welded by portable welders.

Fast Tool Brazing

(*Concluded from Page* 92)

sition in the milled recess and covered with flux to prevent oxidation. Next the assembly is slid forward, bringing the tool into the flames in such a manner that the flames contact only the lower part of the tool shank. This avoids direct contact of the flames with the tip and brings the brazing end of the shank up to an even temperature of about 1400 degrees Fahr. While one tool is heating, the operator prepares another tool for the vise.

As the tool heats up and approaches a cherry red, Easy-Flo No. 3-32/100 brazing wire is brought in contact with the rear of the carbide tip and allowed to flow under and around the tip. Excess brazing alloy, and air are removed by sliding the tip back and forth in the recess of the tool shank, using a 3/16-inch rod with a sharpened point. In Fig. 2 the operator can be seen applying the alloy with his right hand and holding the sharpened rod in his left. He then brings the fixture back away from the flames and, while holding the tip firmly into the recess, by means of the rod allows it to cool to a point where the brazing material solidifies. This is at around 1175 degrees Fahr. for the alloy used. At this point he removes the tool from the fixture, washes off the flux in hot water and turns his attention to the next tool.

When the brazed tool is cool, it is shot-blasted and goes into temporary stock as a "milled and brazed" tool. From this stock it is drawn out for finishing of the profile of the tip to the required final shape in one of the numerous grinding rooms or service departments throughout the plant.

Offers "Guide" for Exporting Machinery

To assist manufacturers in the proper preparation of machinery for export shipment, the Freight Container Bureau of the Association of American Railroads, 30 Vesey street, New York, is offering them a recently published manual entitled "Freight Container Bureau Manual on Preparing Machinery for Export Shipment." Copies of the publication may be secured for 25 cents each from the Freight Container Bureau.

Coating for Plating Is Immune to Acids

A protective coating called Chempruf, claimed to be immune to all acids and all alkalies in any concentration and at any working temperatures, is announced by Protective Coatings Inc., 10391 Northlawn, Detroit. It is said to be suitable for coating or lining plating and acid tanks, fume ducts, storage and processing tanks and for all surfaces, including ceramics, that must be protected against destructive reagents.

The coating is being offered in two types—A and B, the former being a brush-on heavy liquid that can be applied by any workman, and the latter, a plastic that hardens to withstand heavy-duty service, and must be applied by an expert. The product, according to the company, will not resist mineral solvents, oils or greases.

New Chart Gives Diameter Readings

To aid engineers, sheet metal workers and designers, Interstate Sales Co., 1123 Broadway, New York, announces a Divizor which gives instant readings of diameters and circumferences of any circle up to 72 inches in diameter, in steps of ⅛-inch or less. It also is said to give circumference divisions of 1/2, 1/3, 1/4, 1/5, 1/6, 1/7, 1/8, 1/9 and 1/16—the readings all being in fractions of an inch.

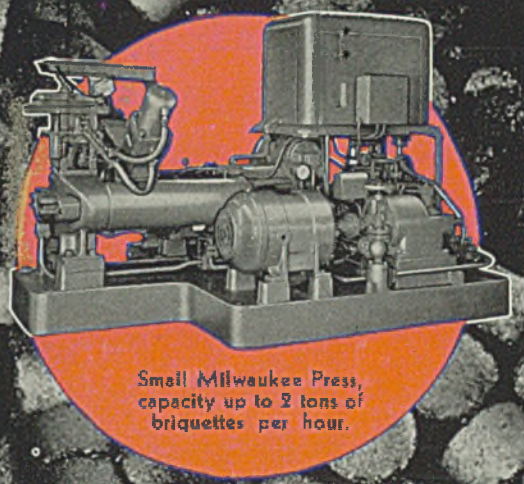
The device provides readings by means of a vinylite pointer revolving on a circular chart. The full circumference is shown on the line directly above the pointer, while the circumference divisions are read along the right-hand edge of the pointer below the diameter line.

Conserve National Resources!

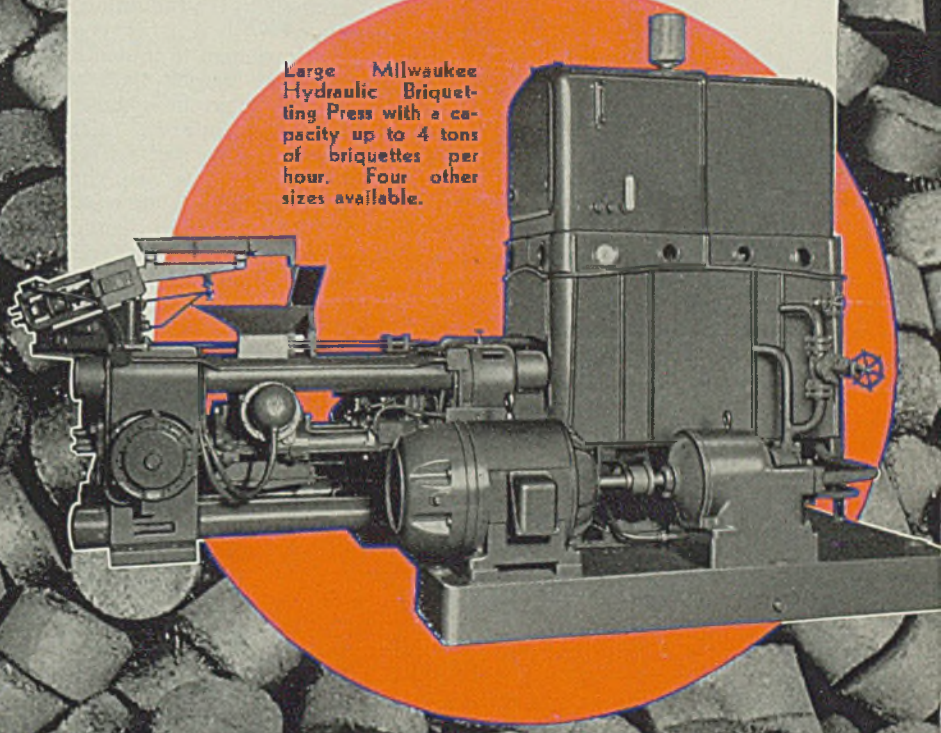
BRIQUETTE
Borings *and* Turnings
the Modern MILWAUKEE Way

● Make up for the scrap shipped abroad by melting your borings and turnings in a briquetted form. Today—more than ever before—it's necessary to reclaim good, usable material from metal scrap. Milwaukee Hydraulic Briquetting Presses give you that opportunity. They enable you to salvage the highest percentage of materials . . . permit better metal control . . . effect substantial savings in melting costs . . . make you independent of the scrap market.

Many of the nation's leading manufacturers are now using Milwaukee Presses. By furnishing their foundry sources with briquetted borings and turnings, these plants are assured of having an adequate supply of castings. Investigate your own conditions and let our engineers help you work out an economical borings and turnings reclamation department. Write for literature.



Small Milwaukee Press, capacity up to 2 tons of briquettes per hour.



Large Milwaukee Hydraulic Briquetting Press with a capacity up to 4 tons of briquettes per hour. Four other sizes available.

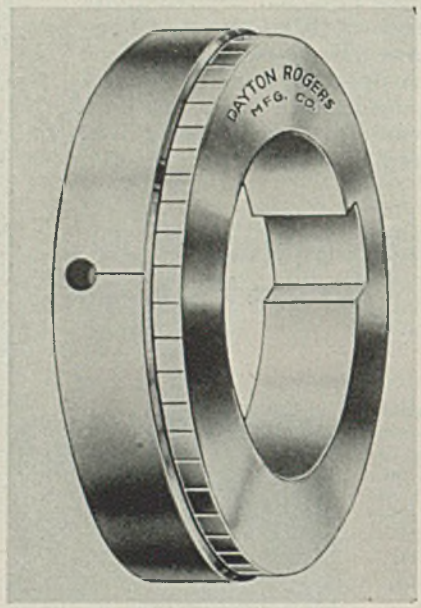
MILWAUKEE FOUNDRY EQUIPMENT CO.
3238 W. Pierce Street Milwaukee, Wis., U. S. A.

Help Win the War by BRIQUETTING Metal Scrap!

Industrial Equipment

Spacing Collars

Dayton Rogers Mfg. Co., 2830 Thirteenth avenue, South, Minneapolis, announces new precision adjustable spacing collars adapted for all gang milling setups. These are constructed to be used in accurately spacing all straddle milling, gang milling, and multiple slotting milling machine setups, and eliminate the use of shims. Offered in 11



sizes, for cutter arbors from ⅝ to 3 inches, they have a maximum adjustment of 1/16-inch and are graduated by thousandths.

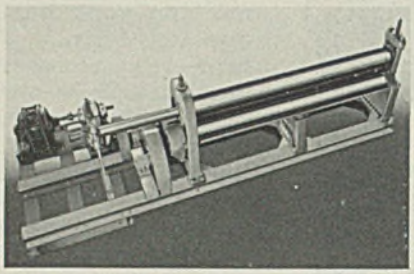
Lighting Control

General Electric Co., Schenectady, N. Y., announces a new series-multiple relay which provides a simple means whereby a series street-lighting circuit can control another series circuit or any nearby multiple circuit, for normal or blackout control. While intended for street-lighting control, it also can control display windows in stores and spectaculars.

Known as the type RIL Novalux relay, the unit consists of a small alternating current contactor mounted on and connected to the secondary of a type IL transformer. With the transformer supplied from a series circuit, the relay will be energized as long as current flows in the series circuit. The relay is protected from the weather by a removable cast-iron cover. Its closed-core transformer operates at high power-factor.

Plate Bending Roll

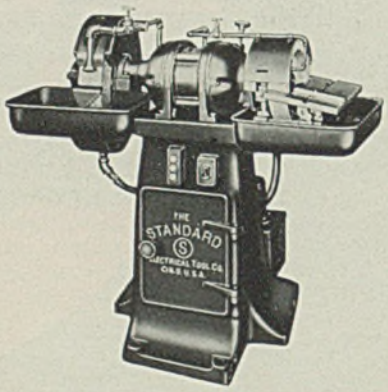
Webb City & Carterville Foundry & Machine Works, Webb City, Mo., announces a new plate bending roll for rolling large sheets of steel into



circular form. Manufactured in several sizes, it features greater strength in operation, and employs a standard gear reduction box, massive head and tailstocks, supported on a heavy steel fabricated base. Principal feature of this machine is its compact design.

Tool Grinder

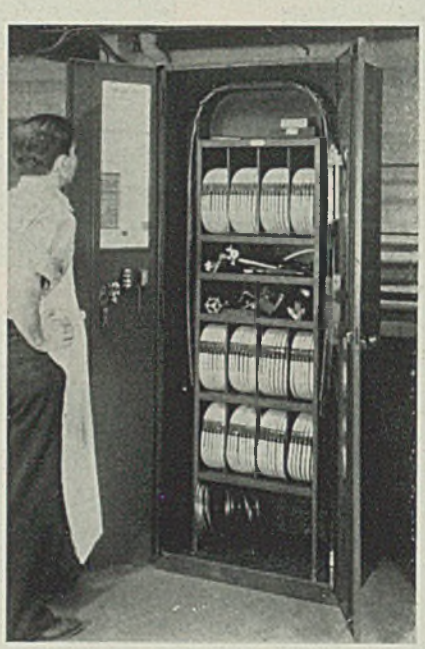
Standard Electrical Tool Co., Cincinnati, announces a new type CCGA carbide tool grinder designed for present day production. It is equipped with a 3-horsepower 1150 revolutions per minute motor for use with an 18-inch diameter by 2½-inch face straight grinding wheel. Suitable flanges are furnished to accommodate this size wheel with 10-inch diameter hole. On the opposite side, the spindle is furnished with a steel plate to accommodate 14-inch diameter cylindrical wheels for face or finish grinding. Also embodied here is a table which is not only ad-



justable to angle with suitable graduations, but also may be adjusted to compensate for wheel wear or to permit grinding various size tools. Machine is equipped with a reversible motor. As illustrated, it has a wet grinding attachment and separate toggle switch for controlling the motor driven pump. It is available in the 1-horsepower 10-inch, and 2-horsepower 12-inch sizes.

Supply Cabinet

Continental Machines, Inc., 1301 Washington avenue, South, Minneapolis, is offering a new Doall supply cabinet for storing saws, files and other materials. More than 800 feet of saw in 100-foot coils can be stored according to width, pitch, temper and set in 12 bins provided for this purpose in the unit. There also is ample space for saw bands that are in use. Directly over the saw-box bins a curved shelf forms a support to provide room for 12 file bands. Eight hooks at the left of this support are used for small file bands or file band extensions. The parts box furnished with each Doall machine fits into one of three shelves. The remaining shelves are for keep-



ing attachments which cannot be hung on the door brackets. Eleven brackets for keeping saw guides, file guides, wrenches and filler plates are located on the floors of the cabinet. All shelves and partitions are screw fastened, so that adjustments in sizes can be made to suit special requirements. The cabinets measure 16½ x 30¼ x 79⅞ inches and are furnished in machine tool gray.

Clamps for Wires

Tinnerman Products Inc., 2039 Fulton road, Cleveland, has introduced two new series of Harness Speed clamps for use in the aircraft industry in attaching wire "bundles" quickly. Both types have latching means which permit holding bundles or groups of wires together during sub-assembly operations, and while transporting the wiring to

WARTIME BILLET GRINDING
Demands STERLING *Planned Efficiency!*

THE return of peace depends upon speed of production now! Steel mills are important these days . . upon their effort today actually depends the length of the war! Speedier billet grinding, for example, is one means of increasing the production of steel so urgently needed.

Using the Sterling Grinding Wheel that has been especially built for your billet grinding job is important if jobs are to go through your plant faster. A wheel that will do a perfect job on one alloy, will not function efficiently or economically on another. Correct wheel selection becomes a necessity if your wartime production schedules are to be met.

The careful planning behind every billet, ingot, and slab you produce is matched by the skill that determines which Sterling Billet Grinding Wheel shall be used on your particular job.

Sterling engineers, with years of billet grinding experience, are ready to assist in your selection of wheels for your jobs. Sterling Billet Grinding Wheels, made to the measure of your own production problems, can be available in a reasonably short time. Write today for the cooperation Sterling engineers will gladly provide, there is no obligation.

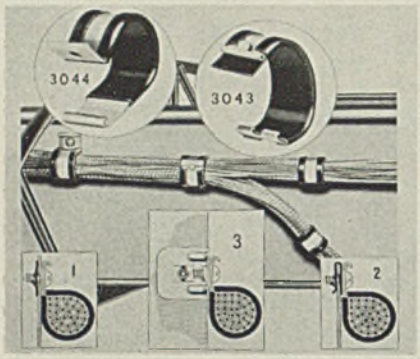
● Do you have a copy of the popular "The Art and Science of Grinding"? Thousands of them have been issued and put to good use. Your request on your letterhead will bring your copy at once.

• STERLING ABRASIVES •

THE
STERLING GRINDING WHEEL DIVISION
OF THE CLEVELAND QUARRIES COMPANY
TIFFIN, OHIO

THE WHEELS OF INDUSTRY

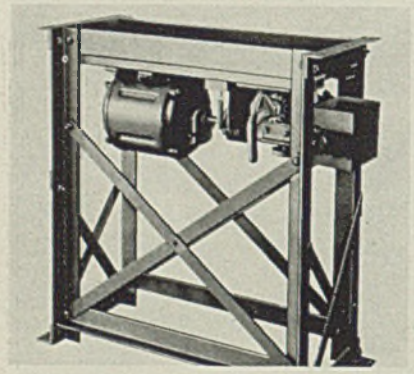
final assembly location. Clamps designated as No. 3043 are used at intermediate locations and where groups of wires branch off from the main bundle. Those designated No. 3044 are used as supporting clamps for attachment to main structure. The units are covered with extruded plastic channels which provide the cushion for the wire. Three methods of attachment are



shown by the accompanying illustrations: 1. With standard flat Speed nut; 2. With U Speed nut snapped over edge of flange; 3. With new bracket Speed nut for attachment at various degrees of angulation. Both types of clamps are available in ten different sizes to accommodate bundles of wire in group diameters ranging from ¼ to 1½ inches.

Gate Operators

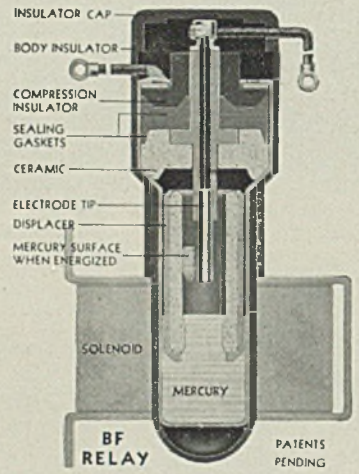
Barber-Colman Co., Rockford, Ill., has introduced a new electric gate operator for controlling sliding and sliding abutting gates. Offered in two models—the MR and MC—its motor unit consists, besides the motor, centrifugal clutch, magnetic brake, speed reducer, hand release and limit-relay or limit switch. The motor is of the 3-wire instanteously reversing type. It can be furnished



in 110, 220 or 440-volt, 60, 50, or 25-cycle, single or three-phase alternating current. The connecting mechanism which transmits power from the motor unit to the gate consists of a roller chain, an idler sprocket assembly, and a driving link for clamping the chain to the gate. The model MR requires only a momentary contact for control. It is usually controlled with a 3-contact station having "open" "close" and "stop" on the respective contact buttons. The gate can be stopped or reversed at any point of its stroke. The operator also can be arranged to require continuous contact of the control switch on either or both strokes of the gate. The model MC differs from model MR only in the control system which includes one or more 2-button switches. Short contact of the "open" button opens the gate, but the "close" button must be held during the entire closing stroke. Should someone try to drive through while the gate is closing, merely releasing the "close" button reverses the gate.

Mercury Relays

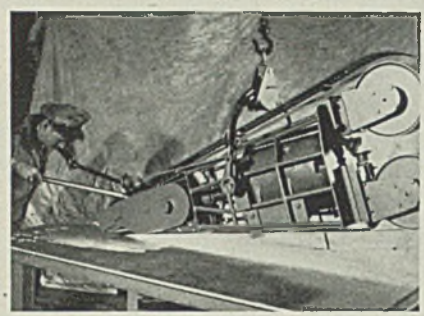
Durakool Inc., 1010 North Main street, Elkhart, Ind., announces two new quick-acting mercury relays for blackouts and defense applications.



The circuit in these units, designated as BF and CF, is made and broken in a hermetically sealed chamber under hydrogen pressure. The relays are unaffected by dust, dirt, moisture, corrosion and are not subject to arcing or pitting contacts. They have low contact resistance and are explosion proof. When the coil is energized the plunger is pulled down thus displacing the mercury, causing it to rise in the steel chamber until contact is made with the electrode. The BF relay has capacity up to 30 amperes and the CF relay has capacity up to 65 amperes.

Swing Grinder

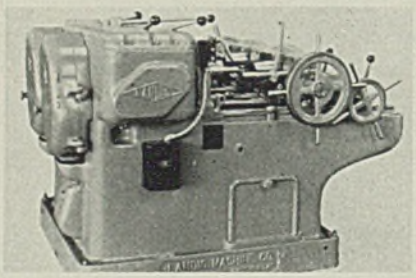
Jones Engineering Co., Ellwood City, Pa., announces a newly designed abrasive belt swing grinder to be used in war industries where much metal is to be removed and where smooth, even surfaces are required. It is used for deseaming and spot grinding tubing; spot grinding and finishing all types of strip, both in heavy gage and finished gage; and for conditioning breakdown plates, especially in the



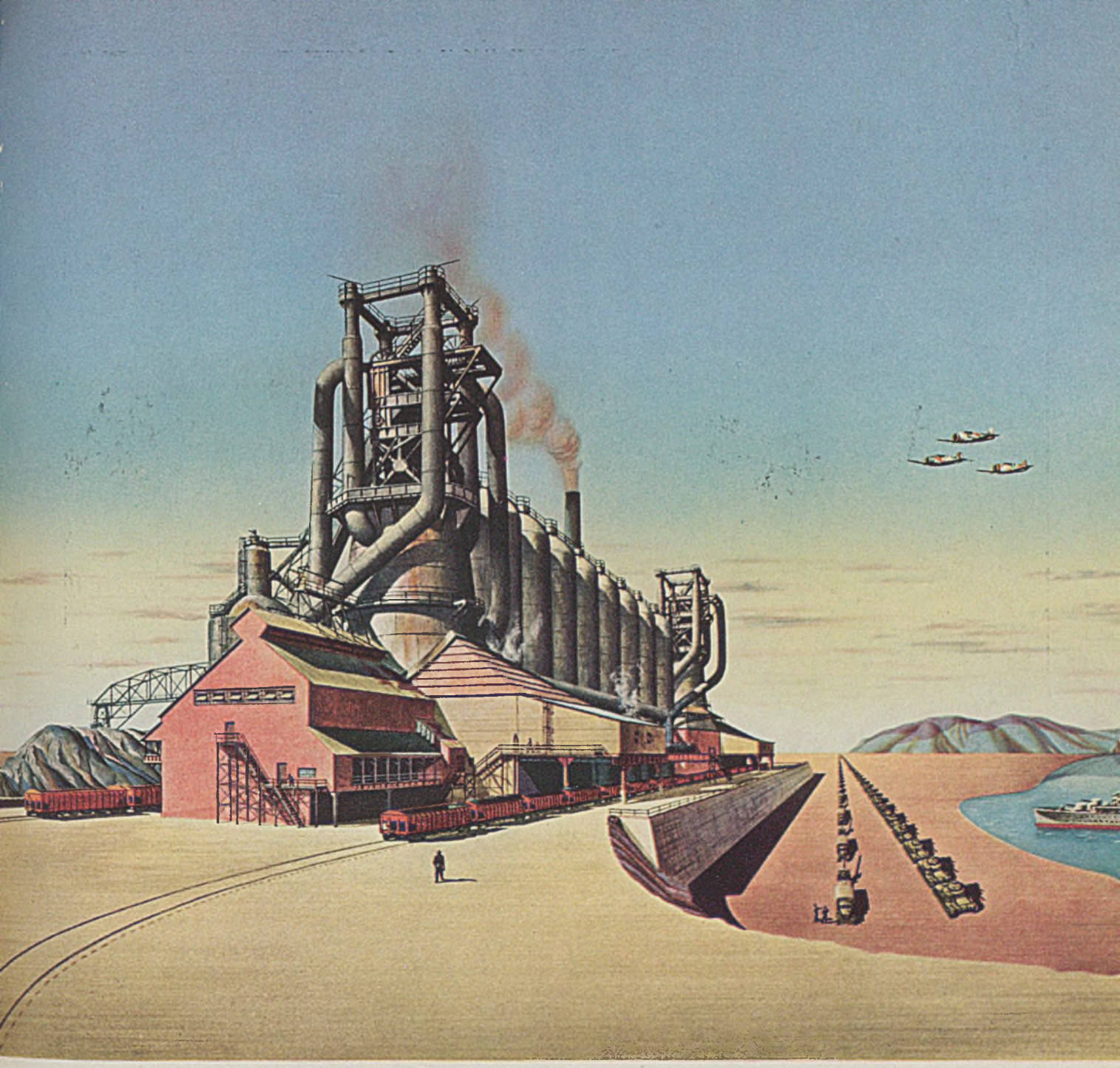
stainless steel industry, preparatory to cold rolling. The high rate of grinding speed of the machine is accomplished by an endless, electrostatically-coated abrasive paper belt 12 feet 4 inches long and 3 inches wide, driven over a special patented contact roll by a 5-horsepower totally-enclosed fan-cooled motor. The contact roll has a segment face and imparts a fingering action in grinding. The belt speed is 4500 feet per minute. Another feature of the grinder is its balance, making it possible to turn the machine to any desired angle for grinding. All controls are located at the front end of the machine. These include a stop and start button and hand wheels for tightening and adjusting the arrangements of the abrasive paper belt.

Shell Boring Machine

Landis Machine Co., Waynesboro, Pa., announces a new adaptation of its Landmaco machine for production of war material. It provides a means for removing excess metal within the bore of the nose end of shell on a high production basis. Heretofore this operation had to be handled after the forming operation, and before the threading or tapping of the nose end of the shell. In ar-



ranging the machine for handling this work, the die heads are replaced with a special adapter supporting a boring tool of the replacable bit type. Special round serrated grips are used for supporting work in alignment with the center of rotation of the machine spindle. In addition, a special work support or



Steel Is More Precious Than Gold

At the most critical moment in our history, we bury our gold in some mid-western field, and work frantically to produce more and more of the steel which is far more precious to us *now*, than gold.

This is a *steel* war. The greatest hope of mankind is the fact that America alone can produce 50% *more* steel than all the Axis-dominated countries.

The process of steel-making starts at the blast furnace, and a blast furnace needs enormous quantities of coke. Censorship forbids us to tell how greatly coke production has been increased with new Koppers coke ovens, but it is a heart-warming figure.

These ovens convert millions of tons of coal into coke, gas and other products, vast quantities of which are further processed by Koppers into chemicals used in the explosives, plastics, synthetics, rubber, dyes and drugs now so important to military success.

Among the many products Koppers has furnished for years to the steel industry are Fast's self-aligning couplings; special D-H-S Bronze for gears, slippers, segments, housing nuts, and bearings; iron gate valves; pressure-treated ties and timber; roofing, waterproofing and road materials; piston rings; deodorants and disinfectants.

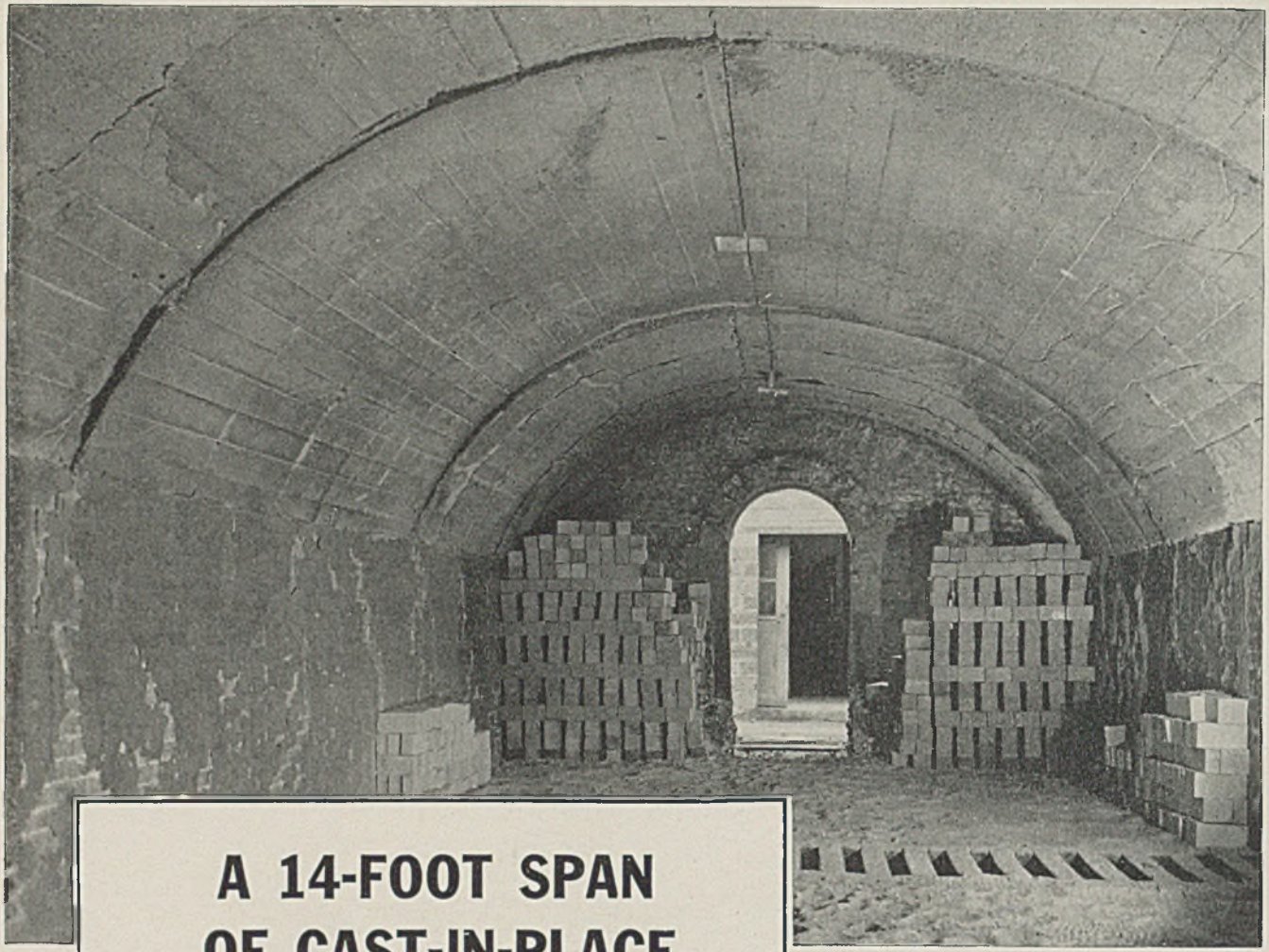
These products help make it possible to produce ever-increasing quantities of steel for tanks, guns, planes, ships and munitions. *It's up to American Industry.* Koppers Company, Pittsburgh, Pa.

KOPPERS

THE INDUSTRY THAT SERVES ALL INDUSTRY

BUY UNITED STATES DEFENSE BONDS AND STAMPS

WAR



A 14-FOOT SPAN OF CAST-IN-PLACE REFRACTORY CONCRETE

● *Refractory Concrete Roof Arch in end-fired, down-draft kiln. Span 14 ft., length 37 ft., rise 5 ft. thickness at crown 9". Dark lines across arch and along crown are construction joints. Other longitudinal and wavy lines are form marks. Arch had been in service one year when photographed.*

One of several roof arches of Refractory Concrete, made with LUMNITE, used by Eureka Fire Brick Works, Mount Braddock, Pennsylvania, in periodic kilns

EASILY and quickly built, these sprung arches are formed to the exact shape required for structural stability and proper distribution of heat. They keep their shape because there are no small units to work loose and drop into the kiln.

Elimination of joints reduces heat loss and air infiltration to a minimum. The only joints in this 14-ft. by 37-ft. roof arch are the two construction joints at the third points and one lengthwise at the crown.

Refractory Concrete to fit the design and conditions of your kiln or furnace can be made with LUMNITE and a suitable refractory aggregate. The aggregate for the Eureka arches was a hard clay grog. Lightweight aggregates are available for Refractory *Insulating* Concrete.

There's no need for special shapes or units of different sizes when you use cast-in-place Refractory Concrete. It is formed to fit the job. Size and shape of section is determined only by service requirements. That's what we mean when we say—*"Refractory Concrete is ADAPTABLE."*

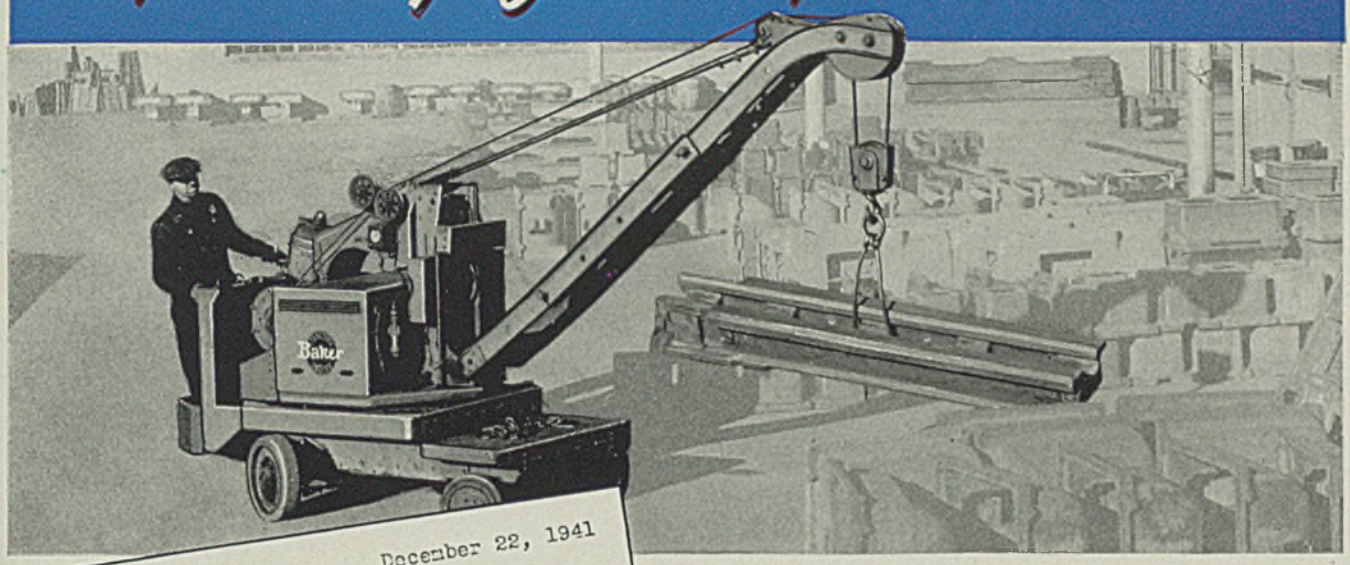
And most important today—*"Refractory Concrete is AVAILABLE."*

You can get LUMNITE from building supply dealers in all parts of the country. Aggregates can either be prepared in your own plant or purchased in all industrial centers.

For more information on Refractory Concrete, write Dept. S, The Atlas LUMNITE Cement Company (United States Steel Corporation Subsidiary), Chrysler Bldg., N.Y.C.

LUMNITE FOR REFRACTORY CONCRETE

BAKER CRANE TRUCKS
speed up yard operations



December 22, 1941

Gentlemen:

We thought that the attached photograph showing one of your cranes in operation in our casting storage yard might be of interest to you.

At this particular time the operator is handling a bed that is 8½' long. We also handle many of our longer and heavier beds, in fact considerably beyond the rating of the crane, by lifting one end and placing a dolly under the bed, and using the crane to lift the other end, and also to pull the long bed inside the building.

Yours very truly,

THE MONARCH MACHINE TOOL CO.

J. A. Raterman

J. A. Raterman

JAR:K

THE MONARCH MACHINE TOOL COMPANY
saves time and space

With every available square foot of inside floor space needed for increased production, yard storage and handling takes on added importance. Baker Crane Trucks have the sturdiness and maneuverability required for this work—their trackless flexibility makes them ideally suited for carrying heavy materials or parts in and out of buildings, and placing them just where needed. Time, space and man-power thus conserved has today a value far greater than the dollars and cents savings.

Let us demonstrate how a Baker Crane Truck may step up the efficiency of your yard storage operations. Call our nearest representative, or write us direct.

BAKER INDUSTRIAL TRUCK DIVISION of the Baker Raulang Co.

2167 WEST 25TH STREET • CLEVELAND, OHIO

In Canada: Railway and Power Engineering Corporation, Ltd.

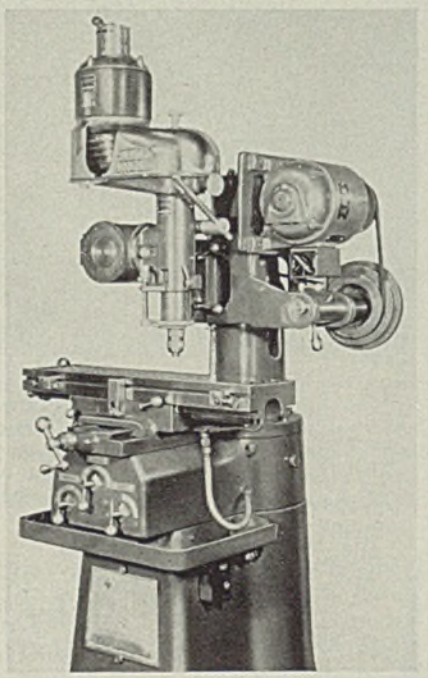
cradle is employed immediately back of the carriage front, or vise of the machine to align the work with the work grips and to facilitate handling of the work piece. A hand-operated work stop locates the work in relation to the boring tools. A leadscrew feeds in the work to the boring tool.

Distribution Unit

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has introduced a new air-cooled network distribution unit for industrial plants using secondary network systems. Consisting of a high-voltage double-throw primary transfer switch, an air-cooled 3-piece transformer and network protector housed as a single unit, it transforms power from the primary voltage to secondary grid voltage. Ratings are from 300 to 1000 kilovolt-amperes on all standard voltages between 2300 and 13,800 with secondary voltages of 125/216 four-wire, 226/460 four-wire and 460 three-wire. Primary air-break switch opens the exciting current of the associated transformer and will withstand a short-circuit current of 10,000 amperes for two seconds without damage to or appreciable movement of its parts. The 3-phase transformer is of the dry type, air-cooled and insulated. It is designed to carry rated kilovolt-amperes at normal voltage and frequency without exceeding a 75-degree Cent. rise above an ambient temperature of 40 degrees Cent. Network protector is the 3-pole open type mounted in the low-voltage end of the unit housing and adequately spaced and barriered from all high-voltage circuits to permit inspection.

Milling Machine

Aircraft Machinery Corp., Burbank, Calif., has introduced a new Armor turret milling machine claimed to have a wide operating range and great flexibility. With hydraulic feed it utilizes a combination of a horizontal spindle and a vertical spindle capable of any angle, mounted on a single rigid turret, rotating a full 360 degrees. For production milling, the hydraulic feed on the longitudinal table is said



to provide smooth power for deep cuts while hydraulic valves provide metered feed and rapid transverse in either direction. Micrometer stops guard against overrun, and hydraulic relief protects cutters against breaking. For tool room and experimental purposes, two simple levers rapidly convert longitudinal travel from hydraulic feed to hand feed without disturbing work. The vertical, angle and horizontal spindles have three low and three high spindle speeds.

Photoelectric Control

United Cinephone Corp., Torrington, Conn., announces a model 77 positive and automatic photoelectric blackout control which offers a practical answer to the problem of maintaining industrial plant lights without the risk of infringing on

100 Years of Experience

have trained us for today!

INTO America's growing war machine go a thousand vitally essential parts in which wire ensures efficient operation.

A century of progressive experience in learning how to make the finest wire and wire products for peace-time manufacture now proves its inestimable value. And even today our efforts for improvement have not been discontinued. Our scientists and research workers still labor tirelessly to discover new ways to make wire better — not only for today's needs but for the years to come.

With wire products so indispensable—with so many of the things we take for granted dependent upon wire in its various forms—isn't it important to make sure that the steel wire you use is the most reliable you can buy.

And isn't it reasonable to assume that the *safest* source of wire supply is the company that has the world's largest facilities for steel wire making, and has been at it for more than one hundred years.

American industry is accepting the fact that war needs have first call on all production. We are confident that our customers appreciate and understand the sacrifices that must be made during these times. In this all-out effort, our energies and resources are dedicated to the common task that lies before all of us.

So far as possible, we will endeavor to serve industry's needs, but—this above all—we must not forget that our very freedom is in grave danger. With courage and determination, let us all concentrate on its defense so that we may march, hand in hand, to a victorious peace.

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Export Company, New York

Cold Finished Steel Bars · Cold Rolled Strip Steel · Stainless Steel
Manufacturers' Wires · Spring Wire · Welding Wire · Wire Springs

Wire maker to the nation ... today and tomorrow

UNITED STATES STEEL

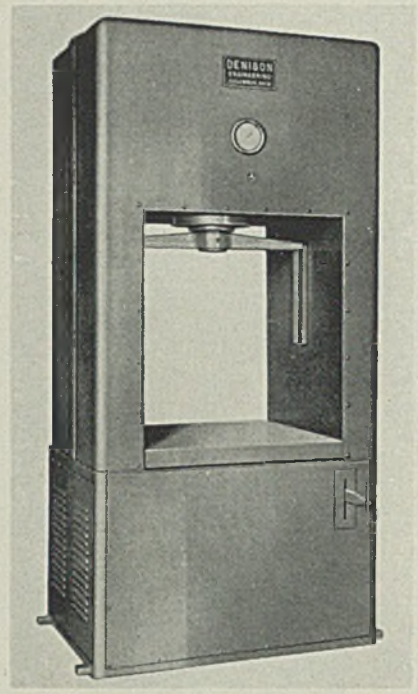
local blackout rulings. It blacks out the plant just as soon as the street lights go out. The control is mounted so it focuses on a street light near the plant and when the street light is extinguished at the power station, due to an alarm, the control will become operative and extinguish the lighting circuit it controls. The unit operates on 1/200 part of a foot candle, which makes it highly sensitive to light. The collector lens on the cover receives the light from a fixed point

as far as 100 feet away. The lens converges the light on a small aperture thus allowing it to fall on the photocell behind the aperture. The opening itself shields the photocell from ambient light and increases the sensitivity of the control. A relay in the control is held energized when light is on the photocell, and when the light is interrupted or extinguished the relay de-energizes and breaks the circuit.

Hydraulic Press

Denison Engineering Co., Columbus, O., announces a new model DLOS2 HydrOllic oil hydraulic press in capacities of 50 tons and up for wide range straightening, assembling and pressing operations in either small-lot or production work. It is funished with hand-lever or electrical controls. The control is arranged so that tonnage applied to the work is controlled, within reasonable limits, by the operator in accordance with the requirements of the operation. The ram and cylinder head assembly is located in the top part of the box frame of the press. The directional control valve and its operating mechanism, the motor,

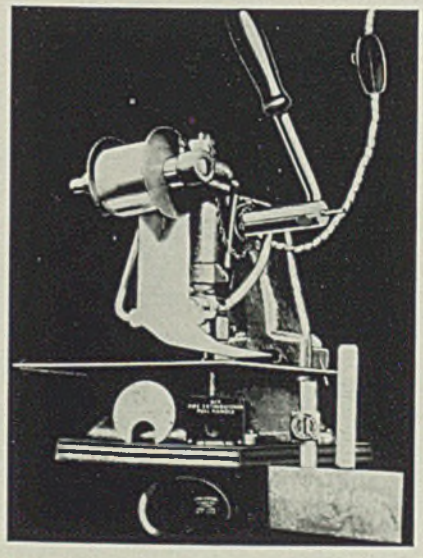
pumps, tonnage controls, and oil reservoir are located in the base of the press. For electrical control, the press is equipped with two operating push-buttons, requiring



hand tie-up, as the press will not operate if only one button is pushed. The press will continue to exert pressure until the push-buttons are released.

Marking Machine

Acromark Corp., 9 Morrell street, Elizabeth, N. J., is offering a new bench marking machine for marking parts and materials which formerly had to be engraved. This



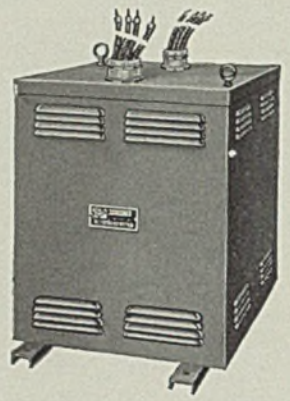
machine uses solid dies or interchangeable type, and transfers color to faces of the letters only when used on enameled metals, bakelite and plastics. By using an interchangeable type holder in the ram of the unit, any number can be set

up quickly. Combinations of solid lettering dies can be set up with the type to accomplish both lettering and numbering. In operation, the heated die or type with the color transfer held over its face by an automatic feed mechanism impresses the mark into the material and leaves the desired color.

Machine illustrated will mark parts up to 1 inch thick within an area of 1 x 3 inches or less, depending upon the material.

Transformers

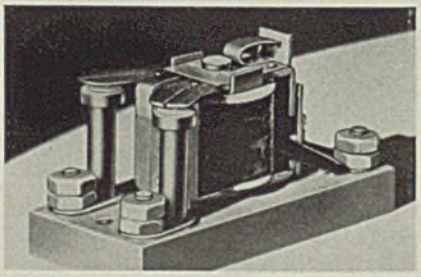
Acme Electric & Mfg. Co., Cuba, N. Y., has introduced a new line of air-cooled industrial transformers for use in simplifying wiring of industrial plants—especially those being converted to war work. Units in the line are available in sizes from



1.5 kilovolt-amperes in single phase design and from 3 to 50 kilovolt-amperes three phase design. They also can be furnished in 3-phase designs with primaries of 240/480 and 600-volt in sizes from 3 to 50 kilovolt-amperes. The 2400-volt primary transformers are designed with 5 per cent taps in sizes from 5 to 50 kilovolt-amperes. This will allow for voltage correction to compensate for voltage-drop where lines are carried over an extended area.

Aircraft Relay

Industrial Control Division, General Electric Co., Schenectady, N. Y., announces a lightweight CR2791-A100A relay for aircraft applica-

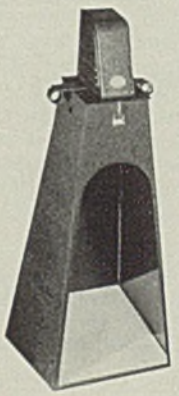


tions calling for operation at high altitudes under severe vibration conditions. The relay weighs only 4½

ounces, is 3⅛ inches long, 1⅝ inches high, 1¾ inches wide and can be mounted in any position. It is designed for mechanical frequencies of 5 to 55 cycles per second at 1/32-inch maximum amplitude (1/16-inch total travel) in any direction. Altitudes from sea level to 40,000 feet and ambient temperature ranging from minus 40 to 93½ degrees Cent. fall within the performance scope of the relay. It has a current rating of 25 amperes at 12 or 24 volts and the coil operates at 1.2 watts. The single-pole normally-open contacts are designed to stay open when the coil is not energized, and closed when the coil is energized at rated voltage even when subjected to linear acceleration of 10 times gravity in any direction, or to the vibration conditions outlined above. The entire relay, built to meet United States Army Air Corps specifications, is corrosion-proof, having passed the Navy's 200-hour salt-spray test. It also is applicable to tank installations.

Microfilm Reader

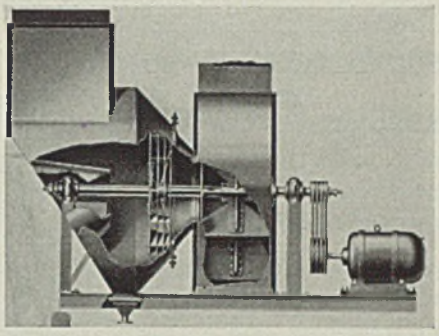
Spencer Lens Co., Buffalo, announces a new inexpensive microfilm reader for reproducing microscopic characters of microfilm. It consists of a projection head, a glass film book, and a shadow box and screen. The projection head is an optional projection system incorporating a spotlight type of longlife bulb, the proper condensing system and a specially designed projection lens. This head is held by spring clips to the shadow box, which also serves as a



support, and may be rotated to project the film in either a vertical or horizontal meridian as may be desired. Operation of the instrument is simple. The microfilm is placed in the convenient glass film book and moved to show the desired page or illustration by easy manipulation. The glass film book consists of two pieces of glass, hinged and bound at the edges with transparent Cellophane tape. The tape serves to space the film properly, to protect it from scratching and to orient the film in relation to the focal plane of the objective. The image is projected upon the special screen and is so protected by the shadow box that a darkened room is unnecessary. An iris diaphragm in the obpective permits adjustment of the light to the comfort of the user. The instrument as designed will accommodate rolls of film from a few inches to several feet in length very easily.

Dust Collector

Claude B. Schneible Co., 3951 Lawrence avenue, Chicago, has placed on the market a FiltreFan collector unit for removing dust and



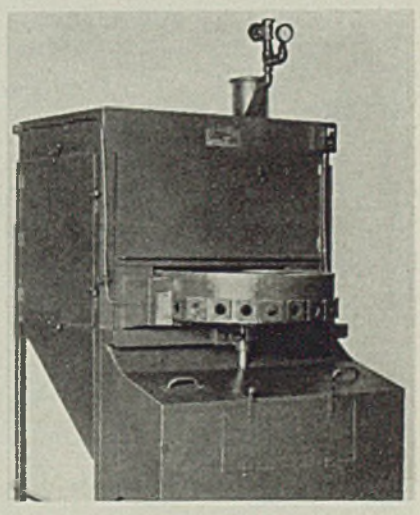
fly ash from flues, kilns and furnaces, smelter stacks and cupolas. It consists of a combination housing on which is mounted a rejector and a fan wheel. These being mounted on a motor-driven shaft. Solids are removed from the gas stream by the rejector wheel which throws the particles into a dead zone and hopper by centrifugal force. The dust particles do not come into contact with the wheel. Dust-laden air or gas enters the scroll of the rejector wheel through a tangential inlet. It is rotated by vanes, throwing the dust particles outward against the scroll from which they travel to the discharging hopper. The clean air enters the periphery of the rejector wheel and is drawn toward the center between the side sheets and the vanes. Through an outlet port in the center, the air is drawn by a fan wheel to be exhausted through an outlet duct. Wheels, housings and hopper are of heavy steel plate. The combination housing is mounted on a single base which includes the motor mounting. The housing is split horizontally in line with the shaft to make the rotating assembly removable.

Remote Control Head

Arens Controls Inc., 2253 South Halsted street, Chicago, has developed a remote control head for installations where the vernier adjustment and the lock are primary considerations and push-pull movement is of secondary importance, although it provides all three. It features a lock and vernier which are engaged at all times. When coarse adjustment is required, for example, a slight pressure of the hand releases the thread engagement which serves the dual purpose of providing the positive lock and the worm thread for fine adjustment. A small pin set in at the top of the face plate rides in the groove of the worm thread when the pressure exerted by a spring in the bottom of the face forces the plunger, or movable threaded rod, into engagement. This engagement is released when the pressure of the hand on top of the knob depresses the spring and allows the plunger to move freely. Immediately upon release of the hand pressure, the spring forces re-engagement and the positively locked condition. The head can be mounted on any type control, with a sliding flexible member of piano wire or wound spring designed to take a tension load.

Sandblast Machine

Leiman Bros. Inc., 139-4 Christie street, Newark, N. J., has introduced a compact, automatic sandblast machine for cleaning shell or shell parts. It is equipped with a rotary table on which the work is held. The table extends into the interior of the machine and while its outer edge is being reloaded, the inside edge is under the blasting nozzles. The table is operated by a motor which drives it at a prearranged and quickly changed rate of speed so that the work being sandblasted receives the full cleaning effect of the sand. A number of nozzles throw the sand in any direction desired, or concentrate it on one point. A slotted, multiple rubber curtain prevents the abrasive or dust from blowing out a power suction blower which draws the dust from the interior of the machine, aiding in this respect. The machine may be equipped with two or more nozzles which are set at the



proper angle according to the work to be done. These are of the suction type drawing sand from a hopper at the bottom of the machine.

Prizes for New Ideas On Compressed Air Use

Educational committee of the Compressed Air Institute, 45 Warrington Place, East Orange, N. J., has amplified its contest for new ideas on industrial uses of compressed air. Opened as a compressed air contest before Pearl Harbor, it was intended to speed defense. To gain wide dissemination of ideas for greater war production the institute has doubled the cash prizes for ideas, making a total of $1000, and has extended the time for one month, to terminate July 1.

The competition is open to anyone in industry and awards will be on the basis of the ideas submitted, rather than on the form of presentation. Bulletin board posters, describing the contest, are available without charge. Inquiries should be addressed to the educational committee, East Orange, N. J.

12 Years' Work Embodied In New "Standard" Book

A new American standard known as "Definitions of Electrical Terms, C42", is now ready for general distribution, according to the American Institute of Electrical Engineers, 33 West Thirty-ninth street, New York.

The volume represents the first time the definitions of the important terms common to all branches of the art as well as those specifically related to each of the various branches have been assembled and printed under one cover.

This glossary is the result of more than twelve years' work of a sectional committee of 46 members having 18 subcommittees drawn from available specialists. More than 300 individuals have given material assistance and many others have assisted in specific instances. The 34 organizations represented on this sectional committee include the national engineering, scientific and professional societies, trade associations, government departments and miscellaneous groups.

Embodying some 300 pages, the "Definitions" book measures 8 x 11 inches and is being offered for $1 in the United States.

Develops Material To Shatter-Proof Glass

Wilbur & Williams Co., Boston, announces a new liquid-type transparent material for application on glass to prevent shattering during air raids. Applied by spraying or brushing, it dries very quickly, forming a strong, tough film having a tensile strength of from 3000 to 5000 pounds per square inch, it is said. The coating also is claimed to pass sunlight with little absorption, and to weather well without discoloration.

According to the company, the material has an elongation of over 20 per cent, permitting considerable movement of the glass without rupture of the film. Its actual melting-point is over 200 degrees Cent. It also can be washed whenever necessary.

Invites Comments on Revised Boiler Code

The boiler code committee of the American Society of Mechanical Engineers, 29 West Thirty-ninth street, New York, recently released a completed preliminary draft of the proposed revision of section VIII of the boiler construction code for general distribution and critical review, in order to expedite the work as much as possible.

Comments are invited from all interested parties, with the request that they be received by the secretary of the boiler code committee not later than July 1, 1942.

Copies of the draft may be obtained from the society's headquarters at $1 per copy.

Helpful Literature

1. Metal Roofing

Levison Steel Sales Co.—8-page "Engineers' Handbook" gives instructive data on specifying and estimating "APS" asphalt protected steel roofing and siding. Construction details are shown with numerous sketches.

2. Graphite Lubricants

Acheson Colloids Corp.—4-page technical bulletin No. 191.4 discusses colloidal graphite as focusing anode material for cathode ray tubes. Methods of application, apparatus employed, drying and baking, and coating other glass forms are covered.

3. Metal Cutting

Continental Machine Co.—78-page illustrated booklet, "Doalls On Production," is divided into nine sections showing over 100 different ways in which these contour cutting machines are used on production work. Jigs, fixtures and attachments which facilitate machining processes are clearly shown in each picture.

4. Material Handling

Mercury Manufacturing Co. — Folder contains series of bulletins describing modern materials handling equipment. Industrial trucks, tractors and trailers of all kinds are described and illustrated. Numerous illustrations show equipment at use in diversified industries. Complete specifications are listed for all equipment.

5. Casting Sealing

Bakelite Corp.—4-page technical bulletin, "Bakelite Sealing Solutions for Porous Castings," explains use of these solutions for reclaiming metal and alloy pressure castings, and contains instructions for impregnation of castings and baking operations.

6. Lighting Equipment

General Electric Co.—12-page booklet, "How Light Can Help," is reprint of address given by H. Freeman Barnes before Electrical Institute of the Tri-Cities. It comprises discussion as to value of proper light in increasing our war production.

7. Safety Tools

Ampco Metal, Inc.—8-page illustrated folder is entitled, "Protection Against Fire and Explosion." Non-sparking safety tools made from "Ampco Metal" and "Ampco" beryllium-copper which are designed for use in presence of explosive gases, fumes and dusts are described.

8. Truck Crane

Link-Belt Speeder Corp.—6-page illustrated booklet No. 1928 sets forth features of model HC-70 truck mounted crane which is used with hook block, clamshell bucket, or dragline bucket. Brief specifications, clearance dimensions and lifting capacities are given, together with lists of recommended applications.

9. Stainless Castings

Allegheny Ludlum Steel Corp.—4-page illustrated bulletin, "Stainless Steel Castings," shows typical products cast from stainless steel, ranging in size from a few ounces to 3000 pounds. Available analyses are listed and specifications given.

10. Magnetic Equipment

Dings Magnetic Separator Co.—Illustrated bulletin, "The Magnet," is regularly issued publication of company. It deals with interesting and unusual applications of magnetic equipment in diversified industries. Installation photographs are included.

11. Potentiometers

Foxboro Co.—Illustrated bulletin No. A-305 presents complete line of potentiometer temperature indicators and indicating resistance thermometers. Instruments illustrated and described include single-point and multiple-point models; models equipped with selective key-switches for as many as 82 contact points, and numerous portable models.

12. Turnings Crusher

Jeffrey Manufacturing Co.—8-page illustrated bulletin No. 747 sets forth advantages of line of crushers for reducing metal turnings to compact crushings. Cross-sectional views show construction and design details, as well as operating features. Tables list complete specifications and dimensions.

13. Decimal Equivalents

John Hassall, Inc. — chart indicates decimal equivalents for common fractions. It is intended as convenience for technical men.

14. Washers

Thompson Bremer & Co.—14-page illustrated bulletin gives data on selection, application and available types of "Everlock" vibration resistant washers. They consist of ring-shaped bodies having numerous pairs of tongues, edges of which are bent alternately up and down. Under pressure tongues are flexed, setting up spring tension to hold screw or nut.

15. Paper Products

Dennison Manufacturing Co.—4-page illustrated bulletin contains descriptions and suggested applications for paper products in war work. Covered are exploders, gummed labels and seals, bomb and mine tags, detonator assembly trays, eyeletted envelopes, manifold tags, paper caps and masks, anti-aircraft shell boxes and colored tags.

16. Carburizer

Hevi Duty Electric Co.—24-page illustrated bulletin No. HD 142 describes electric carburizing furnace which utilizes hydro-carbon oil as carburizing medium. Unit consists of furnace operated by automatic temperature controls, and cover on which is mounted motor-driven fan for forcibly circulating carburizing gas throughout charge in baskets within a retort sealed by cover.

17. Switching Locomotives

Atlas Car & Manufacturing Co. — 4-page illustrated bulletin No. 1265 gives complete specifications on 65-ton, double geared, diesel-electric "Atlas" switching locomotives. Chart gives relationship between speed in miles per hour and tractive effort in pounds, based upon 350 horsepower net for traction.

18. Dust Collectors

American Foundry Equipment Co.—58-page illustrated catalog No. 72 describes "Dustube" dust collectors in both knockdown and assembled types. It gives full information and photographs of available models, with operating data, construction features and basic specifications of these cloth bag type collectors. Engineering section includes technical layouts, engineering tables and charts for applications.

19. Foundry Refractories

Ramtite Co.—8-page illustrated bulletin No. FA-1 describes refractories for foundry applications. Plastic firebrick, castable refractories, bonding materials, and other refractory products are covered. Typical applications in aluminum, brass, gray iron, malleable and steel foundries are discussed.

20. Metal Cutting

Simonds Saw & Steel Co.—72-page illustrated booklet, "Metal Cutting Methods," contains practical data regarding design, care, application and ordering of metal cutting saws, cutters, shears and other tools. Specifications are given for tools for various metal cutting operations, and methods presented for obtaining maximum service and production.

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21. Lead Roofing

Revere Copper & Brass, Inc.—20-page bulletin No. 12-C on "Roofloy" lead roofing describes this material and gives typical applications. Advantages, technical data, methods of application, and specifications are given.

22. Toolroom Grinding

Norton Co. — 178-page illustrated, "Handbook on Toolroom Grinding," gives complete information regarding abrasives and wheels for toolroom grinding, instructions on sharpening milling cutters and reamers, sharpening miscellaneous tools, sharpening lathe and planer tools and other forms of grinding. Miscellaneous abrasive products are described and practical data presented on technical phases of grinding.

23. Materials Handling

American Monorail Co.—48-page illustrated bulletin, "How Handling Problems Have Been Solved With American MonoRail," describes and presents complete specifications on track, truss rails, switches, trolleys, cranes and accessories. Typical installations in all types of industrial, processing and commercial plants are shown and briefly described.

24. Machine Tools

Ex-Cell-O Corp. — Illustrated booklet contains statement of company president regarding company's war policy. Balance of booklet is composed principally of action photographs showing company activities on war work. Aircraft parts, machine tools, cutting tools and precision parts are shown, and their manufacture pictured.

25. Switchboards

Allis-Chalmers Manufacturing Co.—12-page illustrated bulletin No. B-6149 discusses modern switchboards and panels for controlling generators, feeders, incoming lines, transformers, rotary converters and motors. Typical installations are shown and details of switchgear are included.

26. Aircraft Metal Hose

American Metal Hose branch, American Brass Co.—25-page illustrated bulletin No. A-48 contains complete engineering data on "American" flexible aluminum shielding conduit, shielding conduit fittings and ferrule attaching machines, as well as other products applicable to aircraft industry.

27. Sanitation Equipment

Chain Belt Co.—6-page illustrated folder No. 389 is descriptive of sanitation equipment. Technical information is given concerning "Slo-Mixers" which offer operators of sewage and water treatment plants advantages of "Langlier" process of multi-stage flocculation.

28. Paint Selection

American-Marietta Co.—"Valdura Paint Selector" tells how to choose and use maintenance paints. One chart is surface selector which recommends specific paints for application to various surfaces. Paint specifier lists basic paints, outlines their qualities, and gives thinner and primer recommendations. Included are handy measuring tables, light reflection table, and paint consumption tables.

29. Electrical Products

P. R. Mallory & Co.—32-page illustrated 1941 catalog lists prices, descriptions, and complete specifications on potentiometers and rheostats, circuit selectors and all wave switches, special switches, dial plates, phone plugs, extension jacks, microphone jacks, cable, cable connectors, markers, indicator lights, resistors, capacitors, and condensers.

30. Machine Equipment

Challenge Machinery Co.—12-page illustrated catalog No. F-835-C describes and lists specifications on line of lapping plates, layout surface plates, bench plates, work benches, surface plates, straight edges, angle plates, V-blocks and cut-off machines.

31. Instruments

Production Instrument Co. — 50-page illustrated catalog No. 42 describes counting, timing and recording devices for industrial and process applications. Mechanical and electrical counters, actuating switches, photoelectric counters, timing and recording instruments and time totalizers are described.

32. Flame Cutting Tip

Air Reduction—8-page illustrated bulletin No. ADC-631 is descriptive of the new "Airco 45" high speed machine cutting tip which is claimed to increase flame cutting speeds from 20 to 30 per cent. Specifications for various sizes of tips are given.

33. Iron & Steel Products

A. M. Byers Co.—62-page illustrated 1942 general catalog contains technical data and describes wrought iron tubular and hot rolled products, steel tubular products and alloy steels. Specifications are given for various materials, with full details on sizes, applications and other data on products.

34. Blast Cleaning Rooms

Pangborn Corp.—24-page illustrated catalog No. 400 discusses blast cleaning equipment, with particular emphasis on various types of blast cleaning rooms with mechanical and semi mechanical systems of abrasive recovery. Handling of work, typical installations, accessories and supplies are covered.

35. Piston Rings

Koppers Co.—Two 2-page bulletins Nos. A-7 and A-8 picture types of "American Hammered" piston rings for single and double acting 2- and 4-cycle diesel engines. Rings are shown for normal operation, scuffing conditions, overload conditions, ring sticking conditions, port clipping and for extreme conditions.

36. Dryers and Kilns

C. O. Bartlett & Snow Co.—56-page illustrated bulletin No. 89 describes rotary dryers, coolers, calciners, kilns and associated equipment. Technical data section includes pertinent engineering information. Copies are available to engineers or industrial executives concerned with this equipment.

37. Grinding

Sterling Grinding Wheel Co.—48-page illustrated pocket-sized booklet is entitled "The Art and Science of Grinding." It contains description of "Sterling" wheels together with tables of data helpful to users of grinding wheels. Answered are 40 questions commonly asked concerning abrasive wheels, their use and manufacture.

38. Metal Tags

Jas. H. Matthews & Co.—12-page illustrated bulletin is supplement F to catalog No. 146. It tells how to improve present methods of addressing shipments by using metal shipping tags. Information is given on complete line of metal tags and embossing machines for addressing tags. Numerous illustrations show types of tags used and products addressed.

39. Materials Handling

Barrett-Cravens Co. — 160-page illustrated catalog No. 501 describes and gives full specifications on lift trucks and skids, portable elevators and cranes, barrel and drum storage racks, and two and four wheel trucks for all types of materials handling operations.

40. Floodlighting

Westinghouse Electric & Manufacturing Co.—22-page booklet B-2280 describes recommended floodlighting practice for nighttime production and protection in outdoor areas near manufacturing buildings, and for construction projects. Application data gives floodlight types, locations, spacing, aiming and mounting type.

41. Adhesive Labels

Avery Adhesives—Illustrated booklet describes adhesive stickers and labels and discusses such uses as identification, inspection markers, parts numbers and similar applications to products in war industries. Uses of these labels which adhere to any smooth surface as substitutes for metal tags are discussed.

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War Board Tightens Control Over Steel

Production Requirements Plan to supersede priorities. Allocations may be broadened. Top preferences exceed productive capacity

MARKET IN TABLOID ★

Demand

Lend-lease allocations heavy.

Prices

Ceilings unchanged.

Production

Unchanged at 98½ per cent.

WAR Production Board is tightening control of steel and iron products to divert all possible material from nonessential uses.

An amendment to Order M-21, which covers distribution of steel and iron, provides that after May 15 no deliveries may be made on priorities below A-10. Director of Industry Operations has announced that War Production Board shortly will move to place industry completely under the Production Requirements Plan and will discontinue granting preference ratings on individual applications for material to be used in general manufacturing operations.

Practically all consumers requiring priority assistance are expected to apply under the Production Requirements Plan for the quarter beginning July 1. Under this plan a single application is filed covering all requirements for a calendar quarter. Preference ratings on PD-1-a applications will be greatly restricted.

Orders carrying A-1-a rating are becoming so numerous that on some products, notably bars and shapes, broad allocations seem the only solution. This method has improved the situation in plates but leaves much to be desired. Many steelmakers have been working exclusively on A-1-a orders or directives for many weeks but are unable to keep pace and are carrying some of the highest priority tonnage over from month to month, in some instances the equivalent of two weeks production. Definite delivery promise is almost impossible on anything not carrying AA priority or a directive. So many of the latter are being issued that rolling schedules can not be frozen more than two weeks in advance and even then dislocations are caused by later orders.

With steady increase of orders for heavy steel products, plates, shapes and bars, the question of semifinished steel supply for lighter products, sheets, strip and wire, becomes more troublesome. A possibility is envisioned by some producers of closing down their sheet and strip mills later this year, production of that class of products even now being greatly curtailed from normal proportions.

Substitution of steel for brass in shell cases and other ordnance items, because of extreme shortage, places an additional demand on steelmakers. Steel for these purposes carries highest priority, further congesting order books in the higher classifications.

Low phosphorus grades of pig iron and scrap are increasingly scarce, due to heavy consumption in steel castings for war use. Inasmuch as England and Russia also need this grade the situation is expected to become more acute in the near future.

Steelmaking last week held steady at 98½ per cent for the third consecutive week. Buffalo advanced 2½ points to 93 per cent and St. Louis 2½ points to 93, while Youngstown gained 2 points to 94. Chicago receded ½-point to 104½ per cent, Detroit 3 points to 87, Cincinnati 4 points to 87½, Cleveland 2 points to 87½ and New England 15 points to 85. Rates were unchanged at Pittsburgh, 95½; Wheeling, 82½; Birmingham, 95; eastern Pennsylvania 94.

Lend-lease steel allocations tend toward finished material rather than semifinished, as a measure to retain as much as possible of scrap resulting from further processing. Much has been lost by heavy exports of raw and semifinished steel, 25 to 30 per cent normally being cropped at various stages of manufacture and recycled immediately.

Blast furnaces consumed 6,899,667 gross tons of Lake Superior iron ore in March, compared with 6,222,583 tons in February and 6,288,792 tons in March, 1940. In first quarter ore consumption was 20,082,553 tons, compared with 18,061,473 tons in the same period last year. Total ore stocks April 1 at furnaces and Lake Erie docks were 19,550,606 tons, compared with 17,760,742 tons a year previous. Active blast furnaces in the United States April 1 numbered 174, three more than on March 1. Plans are being discussed by ODT for movement of 88,000,000 tons in 1942, an increase of 4 to 6 million tons over previous estimates.

Although frequent minor changes in prices are being made by Office of Price Administration items included in STEEL'S composite prices have not been affected and the composites are unchanged. Finished steel remains at $56.73, semifinished steel $36, steelmaking pig iron $23.05 and steelmaking scrap $19.17.

COMPOSITE MARKET AVERAGES

	Apr. 25	Apr. 18	Apr. 11	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

	Apr. 25, 1942	Mar. 1942	Jan. 1942	Apr. 1941
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.48	2.47	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.217	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.215	2.15	2.21
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to ⅜-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron

	Apr. 25, 1942	Mar. 1942	Jan. 1942	Apr. 1941
Bessemer, del. Pittsburgh	$25.34	$25.34	$25.34	$25.34
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern, del. Philadelphia	25.34	25.365	25.34	25.34
No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	24.69
No. 2 foundry, Chicago	24.00	24.22	24.22	24.22
Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	24.06	24.06	24.06	24.06
No. 2X, del. Phila. (differ. av.)	26.215	26.24	26.215	26.215
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	31.54	31.44	31.34	30.34
Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.19
Ferromanganese, del. Pittsburgh	125.63	125.39	125.33	125.33

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 invidividual 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 lease-lend 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. Worcester 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 80-1.10 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, squares	0.40
3400	3.20	T 1300, Mn, mean 1.51-2.00	0.10
4100 .15-25 Mo. 46.00 .20-.30 Mo. 1.50-2.00; Ni.	0.55 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 Base	Pacific Ports	Granite City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c
Transformer			
72	6.15c	6.90c	.....
65	7.15c	7.90c	.....
58	7.65c	8.40c	.....
52	8.45c	9.20c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.20c; 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; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.
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, 12½ gage and lighter, per base column	67
Do., 11 gage and heavier	70
Barbed wire, 80-rod spool, col.	70
Twisted barbless wire, col.	70
Single loop bale ties, col.	59
Fence posts, carloads, col.	69
Cut nails, Pittsburgh, carloads	$3.85

Pipe, Tubes

Welded Pipe: Base price in carloads to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

Steel In.	Blk.	Galv.	Iron In.	Blk.	Galv.
⅛	56	33	½	24	31½
¼ & ⅜	59	40½	¾	30	10
½	63½	51	1-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

Steel In.	Blk.	Galv.	Iron In.	Blk.	Galv.
2	61	49½	1¼	23	3½
2½-3	64	52½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-10	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O. D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2¼"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $40.00.
Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $40.00.
*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $28-$30.
Supplies: Angle bars, 2.70c; tie plates, 2.15c; track spikes, 3.00c; track bolts, 4.75c; do. heat treated, 5.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.
High Speed Tool Steels:

Tung.	Chr.	Van.	Moly.	Pitts. base, per lb.
18.00	4	1	..	67.00c
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

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEEL					
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
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	.....	.....

*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

½ x 6 and smaller	65½ off
Do., ⅝ and ⅝ x 6-in. and shorter	63½ off
Do., ¾ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	56 off
Plow bolts	65 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
½-inch and less	62	64
⅝-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	..

Hexagon Cap Screws

Upset 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	68 off
Headless, ¼-in., larger	55 off
No. 10, smaller	60 off

Piling

Pittsburgh, Chicago, Buffalo	2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
⅞-inch and under	65-5 off
Wrought washers, Pittsburgh, Chicago Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	$6.00
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

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$25.00	$24.50	$26.00	$25.50
Newark, N. J., del.	26.62	26.12	27.62	27.12
Brooklyn, N. Y., del.	27.65	.....	.....	28.15
Birdsboro, Pa., del.	25.00	24.50	26.00	25.50
Birmingham, base	†20.38	†19.00	.....	.....
Baltimore, del.	25.67	.....	.....	.....
Boston, del.	25.12	.....	.....	.....
Chicago, del.	‡24.47	.....	.....	.....
Cincinnati, del.	24.30	22.92	.....	.....
Cleveland, del.	24.12	23.24	.....	.....
Newark, N. J., del	26.24	.....	.....	.....
Philadelphia, del.	25.51	25.01	.....	.....
St. Louis, del.	‡24.12	23.24	.....	.....
Buffalo, base	24.00	23.00	25.00	24.50
Boston, del.	25.50	25.00	26.50	26.00
Rochester, del.	25.53	.....	26.53	26.03
Syracuse, del.	26.08	.....	27.08	26.58
Chicago, base	24.00	23.50	24.50	24.00
Milwaukee, del.	25.17	24.67	25.67	25.17
Muskegon, Mich., del.	27.38	.....	.....	27.38
Cleveland, base	24.00	23.50	24.50	24.00
Akron, Canton, O., del.	25.47	24.97	25.97	25.47
Detroit, base	24.00	23.50	24.50	24.00
Saginaw, Mich., del.	26.45	25.95	26.95	26.45
Duluth, base	24.50	.....	25.00	24.50
St. Paul, del.	26.76	.....	27.26	26.76
Erie, Pa., base	24.00	23.50	25.00	24.50
Everett, Mass., base	25.00	24.50	26.00	25.50
Boston	25.50	25.00	26.50	26.00
Granite City, Ill., base	24.00	23.50	24.50	24.00
St. Louis, del.	24.50	24.00	.....	24.50
Hamilton, O., base	24.00	23.50	.....	24.00
Cincinnati, del.	24.68	24.68	.....	25.35
Neville Island, Pa., base	24.00	23.50	24.50	24.00
‖Pittsburgh, del., No. & So. sides	24.69	24.19	25.19	24.69
Provo, Utah, base	22.00	.....	.....	.....
Sharpsville, Pa., base	24.00	23.50	24.50	24.00
Sparrows Point, Md., base	25.00	24.50	.....	.....
Baltimore, del.	26.05	.....	.....	.....
Steelton, Pa., base	.....	24.50	.....	25.50
Swedeland, Pa., base	25.00	24.50	26.00	25.50
Philadelphia, del.	25.89	25.39	.....	26.39
Toledo, O., base	24.00	23.50	24.50	24.00
Mansfield, O., del.	26.06	25.56	26.56	26.06
Youngstown, O., base	24.00	23.50	24.50	24.00

*Basic silicon grade (1.75-2.25%), add 50c for each 0.25%. †For phosphorous 0.70 and over deduct 38c. ‡Over 0.70 phos. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

High Silicon, Silvery

6.00-6.50 per cent (base)	$29.50		
6.51-7.00	$30.50	9.01- 9.50	$35.50
7.01-7.50	31.50	9.51-10.00	36.50
7.51-8.00	32.50	10.01-10.50	37.50
8.01-8.50	33.50	10.51-11.00	38.50
8.51-9.00	34.50	11.01-11.50	39.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling irons, Nos. 5 and 6.)

Charcoal Pig Iron

Northern

Lake Superior Furn.	$28.00
Chicago, del.	31.54

Southern

Semi-cold blast, high phos, f.o.b. furnace, Lyles, Tenn.	$28.50
Semi-cold blast, low phos., f.o.b furnace, Lyles, Tenn.	33.00

Gray Forge

Neville Island, Pa.	$23.50
Valley, base	23.50

Low Phosphorus

Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.81, delivered, Philadelphia.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorous Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorous content of 0.70% and over.

Manganese Differentials: Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

Ceiling prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton, effective April 20, 1942.

Export Prices: In case of exports only, the governing basing point nearest point of production may be used, plus differentials and export transportation charges.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick	
Super Quality	
Pa., Mo., Ky.	$64.60
First Quality	
Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00
Ohio	43.00
Second Quality	
Pa., Ill., Ky., Md., Mo.	46.55
Georgia, Alabama	38.00
New Jersey	49.00
Ohio	36.00
Malleable Bung Brick	
All bases	$59.85
Silica Brick	
Pennsylvania	$51.30
Joliet, E. Chicago	58.90
Birmingham, Ala.	51.30
Ladle Brick (Pa., O., W. Va., Mo.)	
Dry press	$31.00
Wire cut	29.00
Magnesite	
Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Basic Brick	
Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.	
Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Washed gravel, duty pd., tide, net ton	nominal
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$25.00
Do., barge	25.00
No. 2 lump	25.00

Ferroalloy Prices

Ferromanganese: 78-82%, carlots, gross ton, duty paid, New Orleans, Mobile, Baltimore, Philadelphia, New York $120; Del. Pittsburgh $125.65; f.o.b. Southern furnaces $140; Add $10 for ton, $13.50 for less-ton and $18 for less than 200-lb. lots.

Spiegeleisen: 19-21%, carlots per gross ton, Palmerton, Pa. $36.

Manganese Briquets: Contract basis in carloads per pound, bulk freight allowed 5.50c; packed 5.75c; ton lots 6.00c; less-ton lots 6.25c; less 200-lb. lots 6.50c. Spot prices ¼-cent higher.

Electrolytic manganese: 99.9% plus, less carlots, per lb. 42.00c.

Chromium Metal: Per lb. contained chromium in gross ton lots, contract basis, freight allowed, 98% 80.00c, 88% 79.00c. Spot prices 5 cents per lb. higher.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, f.o.b. Niagara Falls, N. Y. $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: 66-70%, per lb. contained chromium in carloads, freight allowed, 4-6% carbon 13.00c; ton lots 13.75c; less-ton lots 14.00c; less than 200-lb. lots 14.25c. 66-72%, low carbon grades:

	Car loads	Ton lots	Less ton	Less 200 lbs.
2% C.	19.50c	20.25c	20.75c	21.00c
1% C.	20.50c	21.25c	21.75c	22.00c
0.20% C.	21.50c	22.25c	22.75c	23.00c
0.10% C.	22.50c	23.25c	23.75c	24.00c

Spot is ¼c higher.

Chromium briquets: Contract basis in carloads per lb., freight allowed 8.25c; packed 8.50c; gross ton lots 8.75c; less-ton lots 9.00c; less 200-lb. lots 9.25c. Spot prices ¼-cent higher.

Ferromolybdenum: 55-75%, per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Calcium Molybdate (Molyte): 40-45%, per lb. contained molybdenum, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, 80.00c.

Molybdic Oxide Briquets: 48-52%, per lb. contained molybdenum, f.o.b. Langeloth, Pa., any quantity 80.00c.

Molybdenum Oxide: 53-63%, per lb. contained molybdenum in 5 and 20 lb. molybdenum contained cans, f.o.b. Langeloth and Washington, Pa., any quantity 80.00c.

Molybdenum Powder: 99% per lb. in 200-lb. kegs, f.o.b. York, Pa. $2.60; 100-200 lb. lots $2.75; under 100-lb. lots $3.00.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrophosphorus: 23-26%, based on 24% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Mt. Pleasant, Tenn.; contract price $75, spot $80.

Ferrosilicon: Contract basis in gross tons per carload, bulk, freight allowed; unitage applies to each 1% silicon above or below base.

	Carloads	Ton lots
50%	$ 74.50	$ 87.00
Unitage	1.50	1.75
75%	135.00	151.00
Unitage	1.80	2.00
85%	170.00	188.00
Unitage	2.00	2.20
90-95%	10.25c	11.25c

Spot prices ¼-cent higher.

Silicon Metal: Contract basis per lb., f.o.b. producers' plants, freight allowed; 1% iron; carlots 14.50c, ton lots 15.00c, less-ton lots 15.25c, less 200 lbs. 15.50c.

Silicon Metal: Contract basis per lb.; 2% iron; carlots 13.00c, ton lots 13.50c, less-ton lots 13.75c, less 200 lbs. 14.00c. Spot prices ¼-cent higher.

Silicon Briquets: Contract basis; in carloads, bulk freight allowed, per ton $74.50; packed $80.50; ton lots $84.50; less-ton lots per lb. 4.00c; less 200-lb. lots per lb. 4.25c. Spot ¼-cent per lb. higher on less-ton lots; $5 per ton higher on ton lots and over.

Silicomanganese: Contract basis freight allowed, 1½% carbon; in carloads per gross ton $128; ton lots $140.50. Spot $5 per ton higher.

Ferrotungsten: Carlots, per lb. contained tungsten, $1.90.

Tungsten Metal Powder: 98-99%, per lb. any quantity $2.55-2.65.

Ferrotitanium: 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained titanium; ton lots $1.23; less-ton lots $1.25. Spot 5 cents per lb. higher.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20%. Contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Ferrovanadium: 35-40%, contract basis, per lb. contained vanadium, f.o.b. producer's plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Vanadium Pentoxide: Contract basis, per lb. contained vanadium, any quantity $1.10. Spot 5 cents per lb. higher.

Zirconium Alloys: 12-15%, contract basis, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot $5 per ton higher.

Zirconium alloy: 35-40%, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼-cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) Contract basis, f.o.b. Niagara Falls, N. Y., per lb. 7.50c; ton lots 8.00c. Spot ½-cent higher.

Simanal: (Approx. 20% each silicon, manganese, aluminum) Contract basis, freight allowed, per lb. of alloy; carlots 10.50c; ton lots

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 Bands	Hot-rolled Strip Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets Hot Rolled	Sheets Cold Rolled	Sheets Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars Carbon	Cold Drawn Bars S.A.E. 2300	Cold Drawn Bars S.A.E. 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.68	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	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.30	4.84	3.40	3.80	8.70	7.05
Omaha	4.10	4.20	4.20	4.15	4.15	5.75	3.85	5.32	5.50	....	4.42	....	....
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.37	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	5.75	3.85	....	5.25	5.00	4.60	....	....
Houston, Tex.	3.75	4.30	4.30	4.05	4.05	5.50	4.00	....	5.25	....	6.90	....	....
Seattle	4.20	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.

	S.A.E. Hot-rolled Bars (Unannealed) 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	....
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	6.02	5.77	7.87
Seattle	6.25	....	8.00	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

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.

EUROPEAN IRON, STEEL PRICES

Dollars at $4.02½ per Pound Sterling

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	BRITISH Gross Tons f.o.b. U.K. Ports	£	s	d
Merchant bars, 3-inch and over	$66.50	16	10	0
Merchant bars, small, under 3-inch, re-rolled	3.60c	20	0	0
Structural shapes	2.95c	15	10	0
Ship plates	2.90c	16	2	6
Boiler plates	3.17c	17	12	6
Sheets, black, 24 gage	4.00c	22	5	0
Sheets, galvanized, corrugated, 24 gage	4.61c	25	12	6
Tin plate, base box, 20 x 14, 108 pounds	$ 6.20	1	10	9

British ferromanganese $120.00 delivered Atlantic seaboard duty-paid.

Domestic Prices Delivered at Works or Furnace—

		£	s	d
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	$25.79	6	8	0(a)
Basic pig iron	24.28	6	0	6(a)
Furnace coke, f.o.t. ovens	7.36	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	23	15	0
Bands and strips, hot-rolled	3.30c	18	7	0

(a) del. Middlesbrough 5s rebate to approved customers. ††Rebate 15s on certain conditions.

Ores

Lake Superior Iron Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents. unit, del. E. Pa.

Foundry and basic 56-63%, contract	12.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
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%	32.50
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 and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

PRICES FOR OTHER THAN RAILROAD SCRAP

				ELECTRIC FURNACE AND FOUNDRY GRADES										
				Low Phos. Grades										
	OPEN HEARTH GRADES*	Machine Shop Turnings	BLAST FURNACE GRADES*	Billet, Bloom Forge Crops	Bar Crops and smaller; Punchings, Plate	Heavy Structural, Plate 3 ft. and less	Heavy Structural, Plate 2 ft. and less	Heavy Structural, Plate 1 ft. and less	Cut Auto Scrap 3 ft. and less	Cut Auto Scrap 2 ft. and less	Cut Auto Scrap 1 ft. and less	Alloy-Free Low Phos. & Sulphur Turnings	First Cut Heavy Axle & Forge Turnings	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren	$20.00	$16.00	$16.00	$25.00	$22.50	$21.00	$21.50	$22.00	$20.00	$20.50	$21.00	$18.00	$19.50	$21.00
Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville	18.75	14.75	14.75	23.75	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Bethlehem	18.25	14.25	14.25	23.25	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Buffalo	19.25	15.25	15.25	24.25	21.75	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	19.50	15.50	15.50	24.50	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Detroit	17.85	13.85	13.85	22.85	20.35	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85
Toledo	.....	13.85	13.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chicago	18.75	14.75	14.75	23.75	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Kokomo	18.25	14.25	14.25	23.25	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Duluth	18.00	14.00	14.00	23.00	20.50	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00
St. Louis	17.50	13.50	13.50	22.50	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif.	17.00	13.00	13.00	22.00	19.50	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	12.50	12.50	21.50	19.00	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50
Seattle	14.50	10.50	10.50	19.50	17.00	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50
Portland, Oreg.	.....	.....	.....	.....	15.50	14.00	14.50	15.00	13.00	13.50	14.00	11.00	12.50	14.00

RAILROAD SCRAP

	Heavy Melting Steel	Scrap Rails	Rails for Rolling	Scrap Rails 3 ft. and under	Scrap Rails 2 ft. and under	Scrap Rails 18 in. and under
Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton	21.00	22.00	23.50	24.00	24.25	24.50
Philadelphia, Wilmington, Sparrows Point	19.75	20.75	22.25	22.75	23.00	23.25
Cleveland, Cincinnati, Middletown, Ashland, Portsmouth	20.50	21.50	23.00	23.50	23.75	24.00
Chicago	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Kokomo	19.25	20.25	21.75	22.25	22.50	22.75
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00
Birmingham	18.00	19.00	20.50	21.00	21.25	21.50
Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Seattle	15.50	16.50	18.00	18.50	18.75	19.00

CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

	Group A	Group B	Group C
No. 1 Cupola Cast	$18.00	$19.00	$20.00
No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under	18.00	19.00	20.00
Clean Auto Cast	18.00	19.00	20.00
Stove Plate	17.00	18.00	19.00
Unstripped Motor Blocks	17.50	18.50	19.50
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Miscellaneous Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes states not named in groups A and B, plus Kansas City, Kans.-Mo.

*Open Hearth Grades refer to No. 1 heavy melting steel, No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 busheling. Blast Furnace Grades refer to mixed borings and turnings, shoveling turnings, No. 2 busheling 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, Homestead, Duquesne, Munhall and McKeesport, Pa. Cincinnati basing point includes the switching district of Newport, Ky. St. Louis basing point includes the switching districts of Granite City, East St. Louis and Madison, Ill. San Francisco basing point includes the switching districts of South San Francisco, Niles and Oakland, Calif.

Inferior Grades: Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

Commissions: No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. Commissions must be shown as separate item on invoice.

Maximum Shipping Point Price: Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.65 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.00 per ton.

Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than $1, 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 "corresponding 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 not more than $5 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $5 the nearest basing point price. Colorado scrap is remote scrap for Colorado consumers only.

Sheets, Strip

Sheet & Strip Prices, Page 114

Sheet producers generally are in position to accept tonnage in the A-1 classifications but A-1-a tonnage is becoming constantly heavier. With direct allocations and special directives coming out frequently schedules are difficult to maintain.

Sheet mill backlogs are lighter since manufacturers of durable consumer goods have cancelled contracts on which hope of delivery was remote and for which they have no use under restrictions on their output. With great increase in proportion of heavy products an increasing portion of semifinished steel is being diverted to these purposes, with consequent curtailment for lighter products, including sheets. This presages a reduction in sheet output as this condition intensifies.

Galvanized sheet production is steady at close to 48 per cent of capacity, compared with 61 per cent a year ago and 46 per cent two years ago. Average rate to date this year was about 50.7 per cent, compared with 73.1 per cent in the like period last year and 56.5 in 1940.

Orders for narrow cold-rolled strip are being checked closely to determine end use of the steel. This often requires information from the prime contractor and entails much paper work. Bookings of strip are about equal to heavy shipments but with lend-lease tonnages given right of way deliveries are being pushed back on even A-1 orders. High carbon material continues at a high ratio.

Deliveries of hot-rolled strip are indefinite below A-1 and while some orders are taken with A-2 and even A-3 ratings shipment is extended.

Alloy strip is closely restricted and controls include primary schedules as far back as the ingot, which are submitted two months in advance. Alloy strip orders now being taken will not be out of the furnace until June and delivery will be much later. About four months is consumed from production of the raw steel until delivery of the strip.

Plates

Plate Prices, Page 115

Deliveres on strip-plate are confined almost entirely to the A-1 group and directives are required on any tonnage outside that priority. Universal plates are more available than sheared or strip-plate, due largely to narrower widths in which they are produced. Steel plate consumers with excessive inventories will be denied allocations in May. With demand 50 per cent above capacity WPB is keeping close watch on inventories.

Some sheared plate mills have been working for weeks on A-1 orders exclusively, with tonnages carrying directives taking precedence. As a result some A-1-a tonnage is carried over each month, in some

cases equal to two weeks production.

Allocation of plates for May delivery, geared to inventories, will reduce tonnage to some shipyards below expectations or about equal to April. Shipments to industrial fabricating shops with A-1-a ratings will be maintained, consumers in that group having worked off monthly allocations of material without building inventories as a rule. Jobbers, who received a minimum of plate in April, with top priorities are expected to get more Warehouse stocks of plates are depleted in numerous instances, the same applying to floor plates. Demand on mills for armor plate is growing.

Bars

Bar Prices, Page 114

Bar orders carrying A-1-a ratings are being received in such volume that broad allocations seem the only way to handle the situation. Measured by results obtained in plate allocation this leaves much to be desired.

Barmakers in most cases can offer deliveries on nothing below A-1-c and some cannot reach that low. Others have been able recently to handle some business as far down as A-1-g, though that is the exception.

Priorities of AA or a directive are necessary to obtain a definite delivery promise under present circumstances as schedules under ordinary priorities are constantly upset by directives. An instance of this was the recent distribution of a heavy tonnage for lease-lend, which worked havoc with plans for deliveries on top priority orders.

Deliveries on small sizes of hot-rolled bars are slightly better. Bolt and nut shops are highly engaged on war contracts, also small tool producers, and as a rule are operating on month to month inventories. Two purchases of hot-rolled bars, 1150 tons, have been closed by two navy yard shops.

Pipe

Pipe Prices, Page 115

Supplies of butt weld steel pipe to distributors are freer than most products, but demand is off, with some price shading. Lap weld continues tighter with demand active, notably larger sizes on direct mill shipments. After May 15, light pipe, butt weld, may be sold without priority, but the decline in private construction is curtailing demand. War plant installations account for most cast iron pipe inquiry.

Cleveland city council has adopted a revised plumbing code approved by plumbing contractors and organized labor, the Cleveland Chamber of Commerce, Institute of Architects and Federal Housing Authority. Materials will be saved by use of smaller, but adequate, sizes of pipe and fittings.

Wire

Wire Prices, Page 115

Orders for wire are in larger volume than shrinkage of demand from consumers whose output of nonessential goods has been restricted. The situation is spotty, heavy buying being done in some products while demand for another lags. This results in some departments being operated seven days a week while others are partly idle. The former condition exists more in the processing departments, orders for high finishes being heavy.

Backlogs are out of balance as to products and priority and WPB is asked frequently to designate deliveries on orders with the same preference rating. Wire rods are scarce and integrated producers have little to offer others after filling their own requirements. Sales outside are being made only on top priorities.

Demand for wire by screwmakers is heavy, especially for aircraft. Movement of wire rope to mills continues heavy and nails are going to jobbers in better volume. Producers in some cases are unable to take additional alloy orders even on A-1-a ratings, lacking semi-finished, and such volume is being allocated frequently.

Rails, Cars

Track Material Prices, Page 115

Railroad equipment builders now have more than a billion dollars worth of war contracts for Army,

Navy and Maritime Commission. Repair and car building shops of railroads will also be given contracts for such work. Division of Statistics of WPB reports that 16 of the 20 principal railroad equipment manufacturers have contracts for work totaling $1,436,200,000, including some for the British Purchasing Commission. All this will be done in converted plants. Recent cut in car and locomotive building by WPB renders additional car shop facilities available for war work.

It is understood a large tonnage of steel rails for shipment to a European ally under lend-lease is to be allocated within a short time.

Structural Shapes

Structural Shape Prices, Page 115

Important saving in weight of structurals for government construction, up to 10 per cent, is planned by redesigning to get higher allowable tension stresses in tension members, without change in columns. This change in design is being aided by the American Institute of Steel Construction.

Direct allocations of plain structural material and fabricated structural steel are increasing with the choke point centered largely in open-hearth operations or limitations on semifinished. Some fabricating shops, heavily booked ahead, are reluctant to quote on tonnage appearing in the open market.

Reinforcing Bars

Reinforcing Bar Prices, Page 115

Demand for reinforcing bars is active, mainly in small lots, although buyers stand little chance of placing tonnage unless they have top priority. On a filtration plant for Philadelphia, requiring 4000 tons, bids exceeded appropriation and were rejected. Some changes in design and effort to obtain higher than the present A-4 priority will precede readvertising.

Heavily booked on war contracts, sellers are being pressed to meet deliveries and are reluctant to take on additional tonnage without top ratings or direct allocation. Small lots from stock generally also take higher ratings. Large volume for housing continues pending.

Pig Iron

Pig Iron Prices, Page 116

Pig iron allocations for May promise to be much the same as in April, which were generally satisfactory. A large proportion of shipments were at A-3 or better, with practically nothing as low as A-10. Most foundries operated at a high rate, indicating the extent of conversion to war production.

A current development is growing scarcity of low phosphorus pig iron, due to increasing production of steel castings for war use. This is expected to become more pronounced in the near future as both England and Russia need this grade.

Due to shortage of brass a large plumbing supply manufacturer has experimented with cast iron for faucets, to be coated with black japan. While appearance is not equal to brass they are serviceable.

Foundries are expediting orders with priorities below A-10 and are not accepting further business that low, as a result of revision in Order M-21, which extends that order to foundries. Some orders probably will be cancelled as it will not be possible to complete all before May 15. Many foundries are small and without adequate bookkeeping facilities and difficulty is expected in gathering data required by the order.

Steelworks in New England are being currently supplied by outside allocations of basic, reflecting the tight situation in that grade during the period of relining the Mystic furnace. Foundries for the most part are being supplied through May by district reserves, although a trifle more outside iron is also to come from new suppliers.

Scrap

Scrap Prices, Page 118

Larger supply of scrap continues and the situation is easier. In most consuming areas present flow is sufficient to maintain the current high rate of steelmaking but affords no opportunity to accumulate reserves.

Steelmaking grades show per-

haps the best improvement but cast scrap also is in better supply. In areas adjacent to manufacturers of soil pipe and sanitary fixtures, whose output has been curtailed, other foundries are able to get larger tonnage of cast material. Automobile wrecking operations have produced a better supply of motor blocks.

Low phosphorus scrap is progressively scarcer and acid and electric furnace oerators have difficulty, despite appeals to Washington for relief. Skeleton steel for chemical work is in light supply as producers, especially of light skeleton and bundled material, have been forced to curtail because of inability to obtain high preference work. Due to its large use in incendiary bombs, mill scale is in increasing demand.

An unusual situation developed last week when a steelmaker in eastern Pennsylvania temporarily held up shipments of heavy melting steel because they were in too large volume to be unloaded immediately. This indicates an easier situation in steelmaking scrap in the East. Foundries along the Delaware river are receiving some shipments of cast scrap by barge from the South.

Producers in the St. Louis district have been aided by increased arrivals, which are of better quality than formerly. Several mills have been aided by allocations, one interest formerly operating five open hearths on a two-day supply now has nine furnaces active and has reserve for two weeks.

Improvement following intensive drives at Buffalo is such that capacity operations for the summer is indicated and an effort is being made to build up stocks for next winter. About 70,000 tons have been gathered from dormant sources.

Considerable tonnage of abandoned street car track is being reclaimed in the Cincinnati and adjoining Kentucky districts and automobile wrecking is bringing out a large tonnage.

An indication of the part played by automobile wreckers in the improved scrap situation is shown in reports to WPB offices. In Cook county, Illinois, which includes Chicago, for the four weeks ending April 4 wreckers in 127 yards dismantled 3724 cars to produce 4008 tons of scrap. Adjacent to that area 48 yards scrapped 1305 cars and produced 1208 tons of scrap in two weeks ended April 4. Iowa reports that in the final week of March 58 wreckers sold 374 tons of scrap from 286 cars and in the last two weeks of March 49 Wisconsin yards broke up 897 autos and reclaimed 1393 tons of material.

WPB has issued Order M-24-b forbidding mixture of any tin component in a bundle or car of scrap or delivery of a mixed car or bundle. Scrap containing tin plate or tin alloy must be segregated and sold as such, to prevent contamination of steel by being mixed with other scrap.

Movement of scrap by lake is getting under way, three cargoes reaching Buffalo last week. With two cargoes previously received a total of about 25,000 tons has been unloaded.

Warehouse

Warehouse Prices, Page 117

Warehouses are given some exceptions in a WPB amendment of

Tool Steel Scrap

Cents per pound, to consumers f.o.b. shipping point

Tungsten Types
(For each 1% tungsten contained)

Solid scrap containing over 12%	1.80c
Solid scrap containing 5 to 12%	1.60
Turnings, millings containing over 12%	1.60
Do., 5 to 12%	1.40
Turnings, millings, solids under 5%	1.25

Molybdenum Types

Solid scrap, not less than 7% molybdenum, 0.50 vanadium	12.50
Turnings, millings, same basis	10.50
Solid scrap, not less than 3% molybdenum, 4% tungsten, 1% vanadium	13.50
Turnings, millings, same basis	11.50

Mixed Scrap
(Molybdenum and Tungsten Types)

Solid scrap, each 1% contained tungsten	1.60
Solid scrap, each 1% molybdenum	.80
Millings, turnings, each 1% tungsten	1.40
Millings, turnings, each 1% molybdenum	.70

order M-21, limiting deliveries of steel and iron to A-10 priority and upward after May 15. Distributors are allowed to deliver carbon steel on unrated orders when certified for maintenance repair, limited to 3 per cent of such warehouse deliveries. Persons other than producers may deliver nails, bale ties, small black or galvanized welded pipe on unrated orders.

Small allocations of plates have been made in the Detroit area to ease the situation for tool and die shops engaged in production of tools and fixtures for plants converting to airplane and tank work, but the situation continues tight.

Pacific Coast

Seattle—Rolling mills, fabricating and plate shops are taking no new business except A-1-a priorities required in the national program. Backlogs are large, some plants having orders to the end of the year. Operations are at capacity.

Army and navy plans in this area include many major projects developing rapidly and under considerable secrecy. War department is reported to be considering erection of two cantonment-type hospitals in eastern Washington, each to cost nearly $5,000,000. Land adjacent to a navy yard is being condemned for expansions while in another area a $600,000 project is planned. Large housing projects are under consideration. Inland Construction Co., Omaha, is reported low, $468,880, at Fort Peck for an airport at Glasgow, Mont.

Tacoma has awarded contracts in connection with the Nisqually power project, including 600 tons of copper wire to Love Electric Co., Tacoma, $80,960; six transformers to Pennsylvania Transformer Co., $88,182; four transformers to Allis-Chalmers Mfg. Co., Milwaukee, $80,880. For the same project 2500 tons of shapes and unstated tonnages of plates and reinforcing will be required, general contract to L. E. Dixon Co., Los Angeles.

Oregon Highway Commission has called bids April 30 for six projects, including a 613-foot concrete viaduct at Eugene and a steel bridge over the Umpqua river, tonnage unstated. Washington state, due to conditions, has canceled bids for seven projects, called for April 28, the year's program to be restricted to repair.

Expansion of a dry dock plant, to be undertaken immediately, will include two 500-foot slips, shop buildings, one 400 feet in length, offices and other structures for ship repair facilities. Eleven adjoining acres have been acquired, the total expenditure approximating $6,000,000. The new $17,000,000 plant of the Kaiser Co. is half completed, the first keel of 117 Liberty ships, under contract, being laid. At full operation six ships a week will be delivered, plans calling for 25 launchings and 18 deliveries by Dec. 31. A new system of assembling superstructures, which will be lowered into the hulls, as the latter are launched, is expected to greatly speed operations.

Seattle has opened bids for the Airport Way water system improvement. This job was awarded welded steel plate, 600 tons, last December, but failure to obtain priorities, caused cancellation and new bids called for cast iron pipe, 24 to 30 inches, totaling in excess of 1000 tons. Major cantonment and housing projects in Washington and Oregon are stimulating demand for cast iron pipe and several large tonnages are in the market. Bremerton, Wash., plans a $500,000 water system improvement, including two deep wells, two reservoirs and a 24-inch supply line. Bids for the first unit are called for April 29.

Jobbing houses are working under unfavorable conditions, demand urgent and supplies inadequate. An acute shortage of nails, due to large army construction and public housing projects, has developed. Sales are well diversified but wholesalers are unable to fill many orders. Replacements are slow and insufficient.

Scrap continues to arrive in good volume from the interior but mill stocks show no increase, due to maximum consumption. Dealers are resigned to present price ceilings and regulations, which appear to have stabilized the market.

San Francisco — More defense work projects in various parts of the Pacific Coast are coming out

for figures, though information regarding the actual tonnages involved and the location of the project is withheld.

Pacific Gas & Electric Co., San Francisco, will start construction of a 60-mile 24 and 26-inch pipe line along the right of way of a Standard Oil Co. pipeline. The latter line, formerly used for transporting gas, will be used for crude oil, thus eliminating water-borne shipments. The line to be built by the Pacific Gas & Electric Co. will carry gas. Approximately 12,000 tons of plates will be required.

Structural shops have exceptionally large backlogs, practically all of the work to be done for various branches of the government. W. A. Bechtel Co., shipbuilders at Sausalito, Calif., have awarded 1200 tons for a subassembly shop to Bethlehem Steel Co. and a like tonnage for a plate shop to Herrick Iron Works. Awards totaled 21,237 tons and brought the aggregate for the year to 479,917 tons, compared with 159,816 tons for the same period a year ago.

The largest private cast iron pipe letting went to United States Pipe & Foundry Co. and involved 320 tons for the east bay municipal utility district, Oakland, Calif.

Over 34,000 tons of reinforcing bars for Defense Public Works projects has been placed recently. Awards totaled 34,909 tons and brought the aggregate for the year to 49,435 tons, compared with 39,590 tons for the period last year.

Canada

Toronto, Ont.—While the Canadian steel controller has been placing restrictions on civilian uses of steel and metals for several months past, it is only now that the real teeth are beginning to show in orders regulating consumption. Canada's war industry is urgently in need of steel and other metals and these demands only can be met by almost total suspension of nonwar goods. The latest restriction order deals with metal clad refrigerators. Under the new order issued by Alan H. Williamson, no more domestic metal-clad refrigerators of any kind will be made in Canada after April 30, except by permit from the controller of supplies. The order, however, does not affect commercial refrigerators, manufacture of which is already on a 75 per cent quota, or refrigerators made of wood.

The first order placed for new rolling stock in more than a year made its appearance last week. The order was for 900 cars and was placed by the Canadian Pacific Railway Co., distributed as follows: Canadian Car & Foundry Co. Ltd., Montreal, 500 forty-ton steel box cars; National Steel Car Corp. Ltd., Hamilton, 200 fifty-ton steel box cars and 150 seventy-ton ore cars; 50 fifty-ton steel box cars to Eastern Car Co., Amherst, N. S., subsidiary of Nova Scotia Steel & Coal Co. Ltd.

Demand for plate is increasing rapidly and despite the fact that Canadian plate mills now are producing 25 to 40 per cent above rated capacity, output is not sufficient to meet requirements. In order to maintain the present high rate of plate output mills have been forced to curtail production in other departments to enable a continuous flow of steel to plate mills.

Merchant bar demand is increasing steadily as new war plants come into production with the result that practically all output has been contracted to the end of the year. Bar mills and wire mills have been on reduced operating schedules, owing to shortage of steel.

Notwithstanding restrictions on use of structural steel, new lettings are in good volume and orders pending, directly associated with war activities, are estimated at approximately 20,000 tons. Lettings for the week rose to about 10,000 tons. Structural steel fabricators report capacity operations with backlogs extending to the year-end.

Merchant pig iron sales are steady but lack new developments. Orders are holding at about 8000 tons weekly divided between foundary and malleable grades with an additional 1500 tons of basic being shipped.

Further improvements in scrap offerings was reported for the week and dealers look for substantial speeding in deliveries for the next few weeks. Deliveries of steel scrap to the Hamilton mills are in better volume and now are almost sufficient to meet day to day needs. Cast scrap, while more plentiful, is still far behind actual needs.

Metallurgical Coke

Coke Prices, Page 115

By-product foundry coke supply is adequate and delivery is prompt in spite of the high rate of consumption and the threat of shortage encountered recently.

Beehive coke producers meet difficulty in obtaining sufficient coal for capacity operation, one factor being the large number of miners taken by the draft. Efforts are being made to obtain deferment for experienced miners as essential to operation of the coke industry. In the Connellsville region a large number of miners is being taken each week for military service.

Refractories

Refractories Prices, Page 116

War Production Board has ordered users of refractory brick to move material from brickyards within two to three weeks from completion of the order. Mills are erecting sheds for reception of this material as fast as shipped. Former practice was to delay shipments for a month to six weeks, with resulting congestion of producers' yards.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 115

Price schedule on bolts, nuts, rivets and screws is expected to be issued about May 1 by OPA. Work has been under way for several months past. Due to the number of items and sizes it has proved a difficult task. A simplification program is included.

Bolt and nut makers find difficulty in placing orders for bars and rods with ratings under A-1 and some mills refuse to make promises of delivery on priorities below A-1-e and on one case under A-1-c. Most bolt and nut producers are operating under PRP instead of a blanket rating and are able to supply ratings in the A-1 classification on sufficient tonnage to give a fairly good rate of operation, though not full capacity in most instances.

Several producers participated in a recent allocation of 15,000 tons of various items for second quarter production for the Army. The allocation was not industry-wide.

Steel in Europe

Foreign Steel Prices, Page 117

London—(*By Cable*)—Iron and steel output and demand are expanding in Great Britain. Supplies of raw materials are satisfactory, including hematite pig iron. Demand continues intense for alloy steels, shipbuilding and colliery materials, plates, tubes and wire products.

Equipment

Boston—Suppliers of small cutting tools and fixtures for the machine tool industry are pressed to meet demand and have record backlogs. Some of these shops apparently underestimated early in the emergency the extent of machine shop and war requirements; now larger orders are supplementing those which piled up earlier. A western Massachusetts firm, for the Navy, booked taps and dies at $235,925.83, this being but one of several contracts. Orders for metalworking tools have eased since the first of the month, but not before several weeks of all-time high bookings, adding to tremendous backlogs. So heavy are shop backlogs, notably for aircraft and allied industries, builders are uncertain as to quoting on open inquiries. Brown & Sharpe Mfg. Co., Providence, R. I., the only bidder on 29 tool and cutter grinders for Wright Field, was awarded the contract, one of several given the same shop, while Heald Machine Co., Worcester, shared in another. Crane builders quote completion in around 240 days on bridge cranes.

New York—Machine tool orders have slackened, following the rush to get under the priority deadline of April 1. This has left a wake of confusion in order departments, much detail as to specifications, scheduling and prospective deliveries remaining to be clarified; likelihood of some overbuying by scattered shops who may have overestimated equipment requirements for war contracts is apparent. Actually needing two machines for specified work, some placed three or four and several of these estimates are being pared down. Diversion of some tools is also being made to Russia. Allocations as to

deliveries are being tightened and builders, steadily extending production schedules, are completing each month four to six times as many machines as normally. Orders for the aircraft industry are tremendous, this demand filtering down to suppliers of parts, continued heavy orders to manufacturers of bearings being a case in point.

Seattle—Demand continues in excess of supply, inventories are at low ebb and dealers unable to furnish many items. Replacements are slow and uncertain. Purchasing agent, Seattle, for Alaska road commission has placed contracts for 21 tractors, 11 graders, four scrapers and three power shovels. Tacoma has awarded 15,000 insulators and pole line hardware to R. Thomas & Sons Co., low at $31,086. Bonneville Power Administration announces award to Ohio Brass Co., Mansfield, O., of a $18,713 contract for conductor and ground wire hardware at Spokane; Okonite-Callender Cable Co., Seattle low for cable and terminals for Ampere station; Lapp Insulator Co. Inc., Le-Roy, N. Y., low at $33,586, for conductor for Covington-Coulee line; Olympic Foundry Co., Seattle, low at $4200, for weights and rods, and Powercraft Corp., St. Louis, low at $8481, for disconnecting switches. Bids are also in for 18 instrument and distributing transformers. Bids are called May 1 for furnishing switchgear for Longview station, No. 2753.

Reveal Process To Treat Low-Grade Chromite Ores

(*Concluded from Page* 31)

tent, and we have attacked this problem in two ways: To develop a process for producing pure chromium metal by electrolytic methods; and to produce by metallurgical operation a product which might be used for making standard ferrochromium. This work has been quite successful along both lines, but of greatest immediate importance at present is the process for producing a concentrate usuable for making standard ferrochromium."

Removal of an excessive amount of iron from chromite ores is the chief metallurgical problem, according to Dr. Dean, whose experiments have shown that this can best be accomplished by the reducing roast and leaching process. In this method chromite ore concentrates, mixed with coke, are treated in a rotary kiln especially designed by bureau metallurgists. The material thus treated is cooled, and part of the iron is removed by gravity concentration or by magnetic methods. Additional reduced iron may be removed by leaching with sulfuric acid, or sulphur dioxide leaving residue enriched in chromium.

Rubber-Tired Farm Machinery Manufacture Prohibited

WPB has ordered production of farm machinery and equipment requiring rubber tires discontinued after April 30, except for combine harvester-threshers.

Production of combines requiring rubber tires must be stopped after July 31.

Bureau of Labor Statistics' index of market prices of standard (nonspecialty) machine tools remained unchanged in March from the February level of 118.1 per cent of the August 1939 average.

Nonferrous Metals

New York—Increases in domestic mine production of copper and lead and in recovery of scrap metals of all grades are beginning to be reflected in statistical reports. Further increases may be expected, due partly to operations of the premium price program, although there is no immediate prospect that supply will balance demand fully.

Copper—March output from domestic mines came to 85,556 tons, the largest recorded in years. Capacity to consume copper continues to rise faster than production. Last August fabricators consumed 144,500 tons but shortage of metal caused a drop to only 124,200 tons last month. One of the five new

Nonferrous Metal Prices

April	Copper Electro. del. Conn.	Copper Lake, del. Midwest	Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. smelter	Nickel Cathodes
1-24	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

brass mills went into production early this month, another is due to start in six weeks, and the other three will follow later in the year.

Lead—Output rose to 50,919 tons last month, a new high since January, 1941. Lack of boats has restricted production from imported ores.

Zinc—Smelters have been able to keep output just over 79,000 tons of virgin metal per month. First block of the Fairmont City, Ill., plant which is being erected for the Defense Plant Corp., has gone into production of 6000 to 7000 tons of metal per year. The new electrolytic refinery being built there for the government will go into production late this year. Output is expected to reach a rate soon in excess of 1,000,000 tons per year.

Says Patent Agreements Benefited America

(*Concluded from Page* 37)

Krupp had done. It was the absence of instruction on the use of the tungsten carbide that had made it difficult for Krupp to sell it in this country.

The product developed by General Electric was much tougher than that imported from Germany, which permitted the use of smaller pieces in a cutting tool.

That the prices charged for the tool service weren't excessive was indicated by the fact Carboloy Co. was in the red for its first 11 years. Despite deficits, the price of the hard metal was reduced six times since 1930 to the present price of 7½ cents a gram.

Pointing out that Mr. Lewin had admitted in effect that General Electric and Carboloy now are operating the industry at reasonable prices, free of all restrictions, and are doing all they can to further the war effort, Dr. Jeffries noted that the current investigation is merely academic and could not relate to any present activity.

Plant Expansion, Construction and Enterprise, Government Inquiries, Sub-Contract Opportunities, Contracts Placed and Pending

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.

Philadelphia office, Contract Distribution Branch, Production Division, WPB, Broad Street Station Building, reports the following subcontract opportunities:

11-15-1: An Elmhurst, N. Y., firm requires subcontracting facilities on small shafts and assembly for instruments, .372 long by .0257 to .0165-inch. Concerns with watchmaking facilities of production type best qualified to make this article. Material, H. H. brass; tolerances required plus or minus .0005-inch. Quantity, 20,000 pieces at rate of 2000 to 3000 per week, production to start as soon as possible. Prints and specifications on file at Philadelphia office and sample at exhibit room.

11-15-2: An Eau Claire, Wis., manufacturer requires subcontracting facilities on body for M48 detonating fuze. Materials are forgings or bar stock. Tolerances plus or minus .005. Quantity, large production. Tools required are multi-spindle screw machines 2⅝-inch capacity, finished forgings and threading facilities. Prints and specifications at Philadelphia office.

11-15-3: A Grand Rapids, Mich., firm requires subcontracting facilities on component parts for AN-M101A1 bomb tail fuze, six different component parts. Quotations will be considered on any one or more. Material, stainless steel, cold-drawn steel seamless steel tubing and steel bar stock. Tolerances, plus or minus .001. Quantity, 500,000 at rate of 50,000 to 100,000 per month. Tools necessary, automatic screw machines ¾ to 1⅝-inch for threading operations. Prints and specifications on file at this office.

15-14-1: A Chicago manufacturer requires urgent subcontracting facilities for platinum welding; 35 different types, with requirements of 2000 pieces per week, each type. Will supply all necessary material. Samples on display, all small pieces. Jewelry manufacturing work.

16-14-1: A Philadelphia manufacturer requires facilities for machining heavy steel castings and races. Equipment required, heavy chucking machines, heavy-type turret lathes such as Warner & Swasey 2A or 3A and other machines of like type; single and multi-spindle automatic screw machines. Castings furnished by prime contractor. Large quantities. Prime contractor employs special type of jaws and chucks for this particular work. Drawings for jaws and chucks will be furnished to subcontractors if necessary.

16-14-2: An Akron, O., firm requires subcontracting facilities for manufacturing male and female frames for tank tracks. These are steel forgings and machining. Material and work to be provided by subcontractor. Quantities, approximately 500,000 pieces in lots of 35,000 per month, production to start as soon as possible. Drawing and specifications on file at this office and sample on display in Philadelphia exhibit.

16-14-3: An Akron, O., firm requires subcontracting facilities for promotion of steel castings and machining on component parts for medium tanks. Large quantities. Drawings and specifications on file at this office.

4-B7-1: A government arsenal requires subcontracting facilities for chill molds for 75 and 90-mm. guns. Tools required: Engine boring lathes, 48 x 24 inches; taper attachments, master boring bar available for tooling up; crane facilities; heat-treating equipment. Material: Gray iron castings, specification 14 x S 15 (2). Tolerances ⅛-inch. Quantities 12 of 22,900 pounds each for 75-mm. and 10 of 44,500 pounds each for 90-mm. A-1-a priority. Rush.

17-15-1: A Philadelphia manufacturer is in urgent need of subcontractors to make fuze body part 143-B. Tools required are 2⅝-inch multi-spindle automatic screw machines.

4-B10-1: A New York City firm requires subcontracting assistance on machining turrets for medium tank M4A2. Materials, to be furnished by prime contractor, are rough castings 85 x 80 x 31 inches, weight 6600 pounds and cast armor-grade steel. Tolerances .001. Quantity 960. Production to start at once with deliveries, 60 in June, 130 in July, 130 in August, then 160 per month. Tools required: Milling, 12 hours per turret, horizontal milling machine capable of holding pieces 9 feet wide, including fixture, should have 6-inch spindle; vertical boring, 16 hours per turret, with Carboloy tools capable of 9-foot swing. Plans and specifications not available. Jigs, fixtures, gages and tools to be furnished by subcontractor. Material 230 to 260 brinell hardness.

Minneapolis office, Contract Distribution Branch of WPB, 326 Midland Bank building, is seeking contractors for the following:

S. O. No. 179: Urgently needed for airplane program; 100,000 pairs per month of washer-like parts machined from annealed forgings which are furnished. Operations following rough machining are heat treating, magnaflux, Rockwell testing, grinding, polishing, handlapping.

S. O. No. 178: Automatic screw machine work: Prints are available in this office on various automatic screw machine parts from ⅛" to 1⅛", material brass or steel, quantities 150,000 to 300,000, tolerances reasonable.

S. O. No. 190: Local contractor has subcontracting work on 2 small parts for which we have samples. 5000 pieces of each to be done by automatic screw machines, size No. 0, ½" diameter stock. Material—steel No. S.A.E. 1020.

S. O. No. 191: Subcontracting work available on rough machining bases for machine tool company. Require 42" x 42" planers with long bed. Castings are 30" to 40" wide x 13' long and 17' long. Weight 3¾ tons and 5 tons. Must have cranes to handle. Castings furnished.

Chicago office, Contract Distribution Branch of WPB, 20 North Wacker Drive, is seeking contractors for the following:

10-F-A-123: A special request has been made to secure additional prime contractors for the manufacture of 37 mm shot. This work will carry high priorities. The machine requirements are as follows: 4, 6 or 8 spindle Greenlee, Gridley, Cone, or Acme Automatic screw machines with bar capacity of 1½" to 1⅝". Hand screw machines with a capacity of 1½" for second operation. Centerless grinders, swaging equipment. Hardening and heat treating equipment. The hardening, heat treating and centerless grinding may be subcontracted. Drawings available at this office.

9-F-N-205: (1) The Navy requires 10 small parts. Samples and drawings are available for inspection at this office. Total number required is approximately 52,000 pieces. Requires multiple spindle-automatic, cylindrical grinders and milling machines. (2) Also, 15 items are needed. Require spur and bevel gear cutting, Potter & Johnson or Fay automatic broaching and milling machines and auxiliary tooling equipment. Blueprints are available for inspection in our permanent exhibit on the 28th floor.

18-A-315: Large prime contractor has six (6) automatic screw machine items to sublet. Quantities varying from 5000 to 50,000 pieces each. Machine required—2⅝" six spindle Gridley or four spindle Acme. Machining time in minutes given for each item, also price agreeable to prime contractor. Subcontractor to furnish material. Blueprints available at this office.

Cleveland office, Division of Contract Distribution, WPB, Union Commerce building, is seeking contractors for the following:

S-140: Subcontractor wanted by Pennsylvania firm to turn, thread and bore adapter. Equipment required, multiple-spindle automatics, 2¾ to 3-inch capacity; turret lathes for second operation. Material, WD x 1314 steel. Tolerances, .010-inch. Quantities, large, 3200 to 4000 units per month. Delivery to start immediately. Blueprints on file at this office.

S-141: Subcontractor wanted by Pittsburgh firm to machine three sets lathe head stock and cover. Equipment required, 8 x 10-foot stroke planer and boring mill with 4-inch bar or larger;

planing only acceptable. Material, nickel cast iron. Delivery, complete by July 15. Blueprints on file.

S-142: Subcontractor wanted by Pittsburgh firm to machine three lathe beds, two sections in each. Equipment 8 x 30-foot stroke planer. Material, nickel cast iron. Delivery, complete by August 30. Blueprints on file.

D-45: Subcontractor to furnish small aluminum castings, also subcontractor with machine tools consisting of automatics, hand screw machines to ¾-inch, Blanchard grinders, broaching machines, lapping, No. 3 Warner & Swasey machine, Heald boremattics and hand mills. Materials, steel bar stock, bronze and aluminum. Tolerances close. Blueprints on file.

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

D-9: New Jersey manufacturer is seeking automatic screw machine facilities for production of a variety of nut blanks, both hexagonal and circular, ranging in size from ⅛ to 1-inch, hexagonal and 1 to 1⅝-inch, circular. Material: SAE 3140, SAE X1315, SAE 1112, SAE X1335 and 18-8 St. Steel will not be furnished by prime contractor. Quantity, 500 to 2000 per month. Samples on display at New York city office.

D-12: An upstate manufacturer is seeking facilities for production of finely machined traveler shafts. Material, cold-finished 18-8 stainless steel, No. 303. Tolerances, plus .0 to minus .0005. Quantity 500 to 1000, 50 per week now, 100 per week later. Machines needed, thread miller and lathe with multiple cutter. Drawings, specifications and sample at New York state exhibit.

D-13: Ohio manufacturer is seeking large quantity of aluminum alloy rivnuts. Material, aluminum alloy No. 538W, heat treated. 28,000 p.s.i. minimum tensile strength. Tolerances, elongation and 2-inch length 18 min. Quantity, 500,000 in lots of 100,000. Machines needed, rivet-making machines, automatic screw machines. Sample available at New York state exhibit.

D-14: Connecticut arms manufacturer is seeking six-spindle automatic screw machine facilities for production of 60-mm cartridge containers. Material, steel WD x 1335. Dimensions, 2⅜-inch long by ⅞-inch O.D. Tolerances .0025. Quantity, in lots up to 1,000,000. Drawings, specifications and samples at New York state exhibit.

S-92: A New Jersey prime contractor needs subcontractors with facilities for forging aluminum parts in large quantities. Same contractor also needs subcontractors with facilities for producing small aluminum rivets, ¼-inch and smaller. Machine tools, heat-treating and anodizing facilities must be available.

STRUCTURAL SHAPES .

SHAPE CONTRACTS PLACED

28,000 tons, airplane engine plant, Chrysler Corp.; 20,000 tons to Bethlehem Steel Co., Bethlehem, Pa.; 8000 tons to Gage Structural Steel Co., Chicago (to be fabricated by Four V Structural Steel Companies).

12,725 tons, aircraft plant, to Muskogee Iron Works, Muskogee, Okla.

9000 tons, addition, Curtiss-Wright Corp., airplane division, to Fort Pitt Bridge Works, Pittsburgh.

7500 tons, addition, Curtiss-Wright Corp., to Four V Structural Co., Chicago.

6000 tons, two ore bridges, Bethlehem Steel Co., Lackawanna, N. Y., to Lackawanna Steel Construction Corp., Lackawanna.

SHAPE AWARDS COMPARED

	Tons
Week ended April 25	80,040
Week ended April 18	57,966
Week ended April 11	24,194
This week, 1941	15,490
Weekly average, 1942	29,383
Weekly average, 1941	27,373
Weekly average, March, 1942	18,011
Total, 1941	506,054
Total, 1942	470,141

Includes awards of 100 tons or more.

3200 tons, new blast furnace, Bethlehem Steel Co., Lackawanna, N. Y. to Bethlehem Fabricators Inc., Bethlehem, Pa.

2200 tons, prefabricated building, for navy, to International-Stacey Corp., Columbus, O.

2000 tons, addition, Curtiss-Wright Corp., to Bethlehem Steel Co., Buffalo.

2000 tons, aeronautical engineering plant, to Whitehead & Kales Co., Detroit.

1400 tons, magnesium plant, International Chemical & Mineral Co., to Pittsburgh-Des Moines Steel Co., Des Moines, Iowa.

1200 tons, sub-assembly building, W. A. Bechtel Co., Sausalito, Calif., to Bethlehem Steel Co., San Francisco.

1200 tons, plate shop, W. A. Bechtel Co.,

Sausalito, Calif., to Herrick Iron Works, Oakland, Calif.

1100 tons, addition, Otis Elevator Co., Harrison, N. J., to Harris Structural Steel Co., New York.

500 tons, magnesium plant, Connecticut, to unstated fabricator.

500 tons or more, various structures for Bonneville power administration, to Bethlehem Steel Co., at $65,808.

335 tons, Alaska road commission bridge, to Pittsburgh-Des Moines Steel Co., Pittsburgh, at $39,834.

300 tons, airplane repair building, naval reserve aviation base, to New City Iron Works, Chicago; Sherry-Richards Co., Chicago, contractor.

270 tons, state bridge, Waterford, Conn., to Harris Structural Steel Co., New York, through A. I. Savin Construction Co., East Hartford, Conn., contractor.

200 tons, miscellaneous buildings for Atlantic bases, to Harris Structural Steel Co., New York, through Arundel Corp., Baltimore.

180 tons, building extension, Worthington Pump & Machinery Corp., Harrison, N. J., to Savary & Glaeser Co., Dunellen, N. J., through Wigton-Abbott Co., Paterson, N. J.

130 tons, building for American Engineering Corp., Philadelphia, to Lehigh Structural Steel Co., Allentown, Pa., through Austin Co., Cleveland.

100 tons or more, power substation structure, Tacoma, Wash., to Western Ornamental Iron Works, Tacoma, Wash.

SHAPES CONTRACTS PENDING

2500 tons or more, second Nisqually power project, Tacoma, Wash.; L. E. Dixon Co., Los Angeles, contractor.

260 tons, tidal basin bridge, Washington.

120 tons, bridge, Alaska Road Commission, invitation 09797, Alaska; bids April 27.

Unstated, state bridge over Umpqua river; bids to Oregon highway commission, Portland, April 30.

REINFORCING BARS . .

REINFORCING STEEL AWARDS

10,000 tons, ammunition dump; 5000 tons to Sheffield Steel Corp., Kansas City, Mo.; 4000 tons to Columbia Steel Co., San Francisco; 1000 tons to Bethlehem Steel Co., Bethlehem, Pa.

2300 tons, fuze plant, to Laclede Steel Co., St. Louis; 100 tons previously awarded to Joseph T. Ryerson & Son Co. Inc., Chicago (STEEL, March 30); James Stewart Corp., Chicago, contractor.

1500 tons, ordnance works, to Olney J. Dean Steel Co., Cicero, Ill.; J. L. Simmons, Springfield, Ill., contractor.

1273 tons, Missouri Valley Ship Build-

CONCRETE BARS COMPARED

	Tons
Week ended April 25	16,562
Week ended April 18	4,741
Week ended April 11	18,840
This week, 1941	20,775
Weekly average, 1942	8,970
Weekly average, 1941	13,609
Weekly average, March, 1942	9,201
Total, 1941	205,650
Total, 1942	143,528

Includes awards of 100 tons or more.

ing Co., to Laclede Steel Co., St. Louis.

403 tons, Bureau of Reclamation, Kremmling, Colo., to Colorado Fuel & Iron Corp., Denver.

375 tons, Bureau of Reclamation, Shasta dam, Calif., to Carnegie-Illinois Steel Corp., Pittsburgh.

213 tons, Bureau of Reclamation, invitation B-44,045-A, Earp, Calif., to Republic Steel Corp., Cleveland.

200 tons, addition, Missouri ordnance works, to Laclede Steel Co., St. Louis.

150 tons, United States Health building, St. Louis, to Laclede Steel Co., St. Louis.

148 tons, addition, airplane engine parts plant, Studebaker Corp., to Joseph T. Ryerson & Son Inc., Chicago.

REINFORCING STEEL PENDING

Unstated, Anderson Ranch dam power plant, Idaho; bids to Denver April 20.

Unstated, state, 613-foot concrete bridge, Eugene, Oreg., bids to Oregon highway commission, Portland, April 30.

Unstated, Nisqually power project, dams, powerhouses, etc., Tacoma, Wash.; L. E. Dixon Co., Los Angeles, contractor.

PIPE . . .

CAST PIPE PLACED

320 tons, 12-inch, Class 150, east bay municipal utility district, Oakland, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

CAST PIPE PENDING

1000 tons, 24 to 30-inch, water supply line, Airport Way project, Seattle; bids April 23.

PLATES . . .

PLATE CONTRACTS PLACED

1400 tons, storage tanks, Standard Oil Co., Richmond, Calif., to Western Pipe & Steel Co., San Francisco.

1300 tons, storage tanks, Union Oil Co., Oleum, Calif., to Western Pipe & Steel Co., San Francisco.

450 tons, pressure vessels, Union Oil Co., Oleum, Calif., to Western Pipe & Steel Co., San Francisco.

450 tons, sulphuric acid tanks, Davison Chemical Corp., Curtis Bay, Md., to Graver Tank & Mfg. Co., Chicago; Leonard Construction Co., Chicago, contractor.

RAILS, CARS . . .

CAR ORDERS PLACED

Baltimore & Ohio, 25 fifty-ton hopper cars, to Bethlehem Steel Co.

CAR ORDERS PENDING

Illinois Central, 1000 hopper cars, upon approval of WPB, to Pullman Standard Car Mfg. Co.

LOCOMOTIVES PLACED

Bessemer & Lake Erie, seven steam locomotives, reported placed as follows: Five 2-10-4 type steam engines to Baldwin Locomotive Works, Eddystone, Pa.; and two 0-8-0 type, to American

Locomotive Co., New York.

Laurinburg & Southern, one 44-ton diesel-electric switch engine, reported placed with General Electric Co., Schenectady, N. Y.

BUSES BOOKED

Twin Coach Co., Kent, O.: Twenty-one 41-passenger for Southern Coach Lines Inc., Chattanooga, Tenn.; eleven 31-passenger for Motor Transit Co., Jacksonville, Fla.; nine 44-passenger for Surface Transportation Corp., New York; nine 31-passenger for Chicago Surface Lines, Chicago; seven 26-passenger for Suburban Bus Co., Yonkers, N. Y.; five 31-passenger for Tidewater Power Co., Wilmington, N. C.; five 25-passenger for Kansas Power & Light Co., Topeka, Kans.; five 31-passenger for Fort Worth Transit Co., Fort Worth, Tex.; three 29-passenger for Milwaukee Electric Railway & Transportation Co., Milwaukee; three 26-passenger for Club Transportation Co., New York; three 42-passenger and three 37-passenger for Co-Operative Transit Co., Wheeling, W. Va.; two 33-passenger for Dayton-Suburban Bus Lines, Dayton, O.; two 23-passenger for New Haven & Shore Line Railway Co., New London, Conn.

CONSTRUCTION and ENTERPRISE

Michigan

DETROIT—Colonial Broach Co., 147 Jos. Campau Ave., will erect an addition to its plant in Warren township, Macomb county. Henry M. Freier, Detroit, architect.

DETROIT—Figures are being taken by Edward Schilling, 900 Marquette building, Detroit, architect, for construction of factory and office building in Detroit for Vinco Corp., 9099 Schaefer highway.

DETROIT—Aeronautical Products Co. will erect a $90,000 factory on Ryan road. Derrick & Gamber Inc., 3500 Union Guaranty building, architect.

DETROIT—Draper Motors Co., 9680 Grinell avenue, has let contract for one-story plant addition to Darin & Armstrong Inc., 2041 Fenkell avenue. Cost $55,000.

DETROIT—Barton-Malow Co., 1900 East Jefferson, has general contract for substructure for an addition to office and a new manufacturing building at Detroit Diesel Division of General Motors Corp. Argonaut Realty Co., architect.

DETROIT — Herron-Zimmers Moulding Co., 3900 East Outer drive, has awarded contract to Industrial Construction Co. for addition to tool shop.

DETROIT—Smith, Hinchman & Grylls Inc., 800 Marquette building, is preparing plans for plant for Timken-Detroit Axle Co., 100 Clark street.

DETROIT—Qualified Gage Corp., 21522 Fenkell avenue, has been incorporated with $25,000 capital to manufacture tools and gages. Alf Seines, 2533 Kenall avenue, correspondent.

FERNDALE, MICH.—J. A. Utley Co., Royal Oak, Mich., has general contract for addition to factory of N. A. Woodworth Co. here.

GRAND HAVEN, MICH.—William H. Keller Inc., Grand Haven, will erect additions to its factory and office buildings. Robinson, Campau & Crowe, Grand Rapids, Mich., architects.

GRAND RAPIDS, MICH.—W. B. Jarvis Co., Grand Rapids, has awarded contract to Osterink Construction Co., Grand Rapids, for $100,000 addition to its plant. (Noted April 20.)

GRANDVILLE, MICH. — Contract has been awarded to Osterink Construction Co., Grand Rapids, for additions to factory here for Winters & Crampton Corp.

LANSING, MICH.—Christman Co., Lansing, has contract for addition to factory of Monroe Auto Equipment Co., Monroe, Mich. Reed M. Dunbar, Monroe, architect.

PONTIAC, MICH.—Ray W. Ward, Pon-

tiac, architect, is preparing plans for an addition to a factory.

PORT HURON, MICH. — Walter H. Wyeth, Port Huron, architect, has completed plans for addition to office building of United Brass & Aluminum Co. here.

ROYAL OAK, MICH.—G. B. Dupont Inc., 1031 East Ten Mile road, Royal Oak, has been organized to manufacture tools, by George B. Dupont, 816 Lockwood road.

SAGINAW, MICH.—Chevrolet Division of General Motors Corp. will erect an aluminum forge plant. Albert Kahn Inc., New Center building, Detroit, architect.

SAGINAW, MICH.—Frantz & Spencer, Saginaw, architects, are preparing plans for heat treating plant here for Wickes Bros.

Connecticut

BRIDGEPORT, CONN.—Bridgeport Brass Co., H. W. Steinkraus, general manager, plans two-story factory addition costing $250,000. George S. Armstrong & Co. Inc., 52 Wall street, New York, engineer.

HARTFORD, CONN.—Pilbrick-Booth & Spencer, 367 Homestead avenue, will build two-story factory addition. Estimated cost $40,000.

STAMFORD, CONN. — Norma-Hoffman Bearings Corp. is considering one-story, 125 x 135-foot factory. Estimated cost $55,000.

STAMFORD, CONN.—Contract has been awarded to F. Mercede, High Ridge road, for two-story 80 x 200-foot addition to plant of Union Wire Die Corp., 375 Fairfield avenue, estimated to cost $95,000. V. Mayper, 110 West Fortieth street, New York, engineer.

WATERBURY, CONN.—Waterbury Tool Division, Vickers Inc., 188 East Aurora street, has asked bids for one-story, 150 x 350-foot factory costing $165,000. L. Caproni, 1221 Chapel street, New Haven, Conn., engineer.

Massachusetts

EAST BOSTON, MASS.—Bethlehem Steel Co., East Howard street, Quincy, Mass., has given general contract to McCutcheon Co., 250 Stuart street, Boston, for one-story 88 x 201-foot machine shop addition.

Rhode Island

PROVIDENCE, R. I.—Owner, care of Robert L. Stevenson, architect, 101 Tremont street, Boston, has let contract to Bowerman Bros., 70 Bath street, for one-story 60 x 100-foot machine shop. Cost over $40,000 including equipment.

New York

BROOKLYN, N. Y.—Brooklyn Edison Co. Inc., 380 Pearl street, will spend approximately $300,000 for alterations and additions to electric switch house.

JAMESTOWN, N. Y.—Rano Tool Co., 17 Ross street, H. J. Randall, president and manager, has awarded contract for one-story tool manufacturing plant addition to Warren Construction Co., 335 Steele street. Estimated cost $40,000. (Noted April 20.)

LONG ISLAND CITY, N. Y.—Patch Wagners Corp., 35-53 Eleventh street, has plans by T. D'Alvy, care of owner, for one-story machine shop. Cost $50,000.

NEW YORK—International Aluminum & Bronze Foundry Inc. has been incorporated with $20,000 capital to engage in general foundry business. Correspondent, Emanuel Loebel, 11 West Forty-second street, New York.

NIAGARA FALLS, N. Y.—Building permits have been granted to E. I. du Pont de Nemours & Co. Inc. for two buildings, costing $125,000 and $75,000, to be erected on Chemical road, adjacent to its R. & H. Chemical Department.

New Jersey

PERTH AMBOY, N. J.—Wallace J. Wilck, 280 Hobart street, has contract for one-story 70 x 70-foot machine shop extension. John Noble Pierson & Son, 333 State street, architects.

Ohio

CINCINNATI — Construction work on second addition to plant of Avery-Ferguson Co., 75 Disney street, Oakley, has been started.

CLEVELAND—Valve Engineering Corp., is being organized through office of J. W. DeCumbe, attorney, Hanna building, to manufacture and sell valves.

WARREN, O.—Mullins Mfg. Co., Youngstown Pressed Steel Division, is erecting two coal storage silos, elevating equipment and a brick stack.

CLEVELAND—Pump Engineering Service Corp., Bradford Eyman, 12910 Taft avenue, is preparing plans for airplane parts plant on West 212th street between Grayton road and Rocky River drive.

MIDDLETOWN, O.—Aeronca Aircraft Corp. has been granted permit to erect plant addition.

TALLMADGE, O.—Herman Machine & Tool Co., F. Karg, manager, has given contract for one-story 40 x 175-foot machine shop addition to J. Almauer, 287 Brown avenue, Akron, O. Estimated cost $45,000. (Noted April 6.)

Pennsylvania

LATROBE, PA.—Stupakoff Ceramic & Mfg. Co., Latrobe, is having plans prepared for a manufacturing building in Pennsylvania, 105 x 260 feet. Robert J. Brocker, Coulter building, Greensburg, Pa., architect.

MEADVILLE, PA.—Talon Inc. will spend approximately $40,000 for altering and improving its plant. Wilbur Watson Associates, 4614 Prospect avenue, Cleveland, architects.

NEW CASTLE, PA.—A 51-acre site here is being cleared for erection of a large new industry. Greater New Castle Association has raised $35,000 to clear title for the land in preparation for start of construction.

PITTSBURGH—Rust Engineering Co., Clark building, Pittsburgh, has been awarded contract for architect-engineer and management services in connection with manufacturing plant in Kentucky, to cost over $5,000,000. Office of Corps of Engineers, Nashville, Tenn., will supervise.

SHARON, PA.—National Malleable & Steel Casting Co. plans $1,500,000 expansion program at its Sharon works, including a new building providing 70,000 square feet of floor space, and new equipment.

Illinois

AURORA, ILL.—Barber-Green Co., 631 West Park avenue, has plans by F. B. Gray, 73 South LaSalle street, Chicago, for factory addition to cost over $40,000.

JACKSONVILLE, ILL.—National Enameling & Stamping Co., which is about to begin production of war material at its plant here, will build a new and larger unit at estimated cost of $1,250,000. Contract has been awarded.

PLANO, ILL.—Weir Machine & Foundry Co. Inc., 12 West Main street, has been incorporated by F. Weir, A. Sampson, and J. B. Arterburn Sr., to manufacture metal products. Correspondent: Sheldon J. Sauer, 12 West Main street, Plano, Ill.

SOUTH BELOIT, ILL.—Warner Electric Brake Mfg. Co. has given general contract for addition to its plant to Cunningham Bros., 359 East Grand avenue, Beloit. Estimated cost $40,000, with equipment.

Indiana

SOUTH BEND, IND.—South Bend Lathe

Works, M. Howard, secretary, has plans completed by Maurer & Maurer, 107 Lincolnway East, for five-story 60 x 200-foot factory. Estimated cost $200,000.

MUNCIE, IND.—Warner Gear Co. will spend approximately $150,000 for plant addition and equipment.

Alabama

BIRMINGHAM, ALA.—Thomas Foundries Inc., 3800 Tenth avenue North, plans erection of foundry building, 70 x 188 feet.

Maryland

CUMBERLAND, MD.—War Department has awarded contract to Kelly-Springfield Engineering Co., Cumberland, for installation and operation of manufacturing plant.

District of Columbia

WASHINGTON—United States engineer offices, First and Douglas streets Northwest, will take bids April 30 for furnishing six operating tables and appurtenant equipment for Dalecarlia filter plant; also six rate controllers, gages, actuators, and 36 hydraulically-operated gate valves.

WASHINGTON—War Department, Construction Division of Engineers, Munitions building, has awarded contracts for a manufacturing plant in Pennsylvania to cost over $5,000,000.

Florida

GREEN COVE SPRINGS, FLA.—City, T. F. Lucas, mayor, will open bids soon for extension to waterworks and sewer systems, estimated to cost $135,000. H. W. DeSaussure, Consolidated building, Jacksonville, Fla., engineer.

Mississippi

GLASS, MISS.—R. G. LeTourneau Co. of Mississippi, Ray Gieszl, plant manager, will establish plant here for manufacture of tractors, road machinery, etc.

Tennessee

WINCHESTER, TENN.—City, Joe Davis, mayor, plans $43,000 water mains and equipment at filtration plant. Walter L. Picton, American Trust building, Nashville, Tenn., engineer.

Missouri

ST. LOUIS—Broderick & Bascom Rope Co., 4203 Union boulevard, has awarded general contract for one-story, 60 x 130-foot addition to its wire rope factory to L. O. Stocker Co., Arcade building. Cost estimated at $40,000, with equipment. W. J. Knight & Co., Wainwright building, consulting engineers.

Oklahoma

SHAWNEE, OKLA.—City plans improvements to water system; has $35,000 WPA funds available.

Wisconsin

FOND DU LAC, WIS.—Giddings & Lewis Mfg. Co. has let contract to Hutter Construction Co., 134 Western avenue, for one-story, 150 x 300-foot addition. F. J. Stepnocki & Son, 104 South Main street, architect.

KENOSHA, WIS.—Tri-Color Machine Co. has plans by Lindl, Schutte & Lefebvre, 709 North Eleventh street, Milwaukee, for factory addition.

OSHKOSH, WIS.—Owner, care of Auler, Jensen & Brown, architects, plans one-story, 60 x 100-foot factory addition.

RACINE, WIS.—Andis Clipper Co., 1718 Layard avenue, has awarded contract for one-story, 60 x 120-foot addition to C. Korndoefer, 512 Augusta street. L. G. Henriksen, 3001 Washington avenue, architect.

RACINE, WIS.—Modine Mfg. Co., 1202 Seventeenth street, has given contract for one-story 70 x 168-foot factory to Nelson & Co. Inc., 1550 Yont street.

Texas

EL PASO, TEX.—City receives bids May 7 for construction and equipment for sewage treatment plant. Headman-Ferguson & Carollo, P. O. Box 375, engineers.

QUITMAN, TEX.—City, H. V. Puckett, mayor, votes April 28 on $35,000 bonds for waterworks, including pump and motor, pipeline distribution system and elevated water storage tank. Albert C. Moore & Co., 2404 Smith-Young tower, San Antonio, Tex., engineer.

Iowa

MARSHALLTOWN, IOWA—A. L. Brennecke, W. C. Dunkerton and G. J. Rummels, Marshalltown, will build two 82 x 200-foot foundry buildings,

estimated to cost about $40,000.

Washington

SEATTLE—Seattle-Tacoma Shipbuilding Corp., 2400 Eleventh avenue Southwest, is erecting addition to plant. Contract has been let to J. A. McEachern Co., Seattle.

YAKIMA, WASH.—Lindeman Power & Equipment Co. is building a steel foundry addition to its plant at 1011 South Third street and modern equipment will be installed.

Canada

HIGH PRAIRIE, ALTA.—Hales H. Ross, C.P.R. building, Edmonton, Alta., will erect sawmill and planing mill to cost $78,000 and will install machinery costing $85,000.

BELLEVILLE, ONT.—Reliance Aircraft & Tool Co. is having plans prepared by W. A. Watson, architect, 266 Front street, for construction of plant addition to cost about $30,000, with equipment.

ELMIRA, ONT.—Naugatuck Chemicals Ltd., 149 Strange street, Kitchener, Ont., has given general contract to Dunker Construction Co. Ltd., 251 King street West, Kitchener, for plant addition here to cost $25,000.

HAMILTON, ONT.—N. Slater Co., Sydney street, is considering plans for plant addition to cost about $25,000. W. H. Cooper is general manager.

MATTAWA, ONT.—Guelph Cask, Veneer & Plywood Co. Ltd., John street, has had plans prepared and will call bids for plant addition to cost about $25,000, including equipment.

NEW TORONTO, ONT. — Anaconda American Brass Ltd., Eighth street, has given general contract to Carter-Halls-Aldinger Co. Ltd., 419 Cherry street, Toronto, and number of subtrades have been let in connection with plant addition to cost $30,000.

ST. CATHARINES, ONT.—Foster Wheeler Ltd., 81 Eastchester street, has given general contract to Newman Bros. Ltd., 127 St. Paul street, for boiler plant addition to cost about $60,000.

ST. CATHARINES, ONT.—St. Catharines Steel Products Ltd., 72 Vine street, has given general contract to J. R. Stork for construction of fourth plant unit here to cost about $50,000.

TORONTO, ONT.—Amalgamated Electric Corp. Ltd., 384 Pape avenue, has extended contract previously placed with Foundation Co. of Ontario Ltd., 1158 Bay street, to include additional plant to cost about $70,000.

TORONTO, ONT.—DeHavilland Aircraft of Canada Ltd., Dufferin street, has given general contract to A. W. Robertson Ltd., 57 Bloor street West, for further enlargements to its plant to cost about $300,000, including woodworking plant, foundry and hammer building, extension to assembly plant, etc. David Shepherd, 57 Bloor street West, consulting engineer.

TORONTO, ONT.—Dominion Wheel & Foundries Ltd., 171 Eastern avenue, has given general contract to Russell Construction Co. Ltd., Harbor Commission building, for plant addition to cost about $30,000.

WINDSOR, ONT.—Packard Motor Car Co. of Canada Ltd., 862 Walker road, in association with Department of Munitions and Supply, Ottawa, H. H. Turnbull, secretary, is planning plant here for manufacture of engines.

DARTMOUTH, N. S.—Town council, J. L. Allan, engineer, is considering plans for addition to waterworks plant and system to cost $225,000.

HALIFAX, N. S.—Nova Scotia Light & Power Co. Ltd. is having plans prepared by Montreal Engineering Co., 244 St. James street, Montreal, for addition to power station to cost about $60,000.

JOLIETTE, QUE.—Joliette Steel Co. Ltd., Laval street, has given general contract to Purdy & Henderson Co. Ltd., 1414 Crescent street, Montreal, for addition to foundry to cost about $40,000, with equipment. Luke & Little, 1405 Bishop street, Montreal, architects.

MONTREAL, QUE.—Montreal Locomotive Works Ltd. has given general contract to Marien-Wilson Ltd., 1434 St. Catharine street West for construction of first building, 140 x 420 feet, in connection with further extensions to Longue Pointe Works.

QUEBEC, QUE.—Department of Munitions and Supply, Ottawa, H. H. Turnbull, secretary, has given general contract to Anglin-Norcross Corp. Ltd., 892 Sherbrooke street West, Montreal, for brass foundry plant here to cost with equipment about $500,000.

ST. JOSEPH DE BEAUCE, QUE.—J. L. Vachon et Fils will rebuild sash and door factory recently destroyed by fire at estimated cost, with equipment, of about $125,000.

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SPECIAL MOTOR GENERATOR SETS

5 KW. Frequency changer, 180 cycle, 3 phase, 220 volt Westinghouse with 3 ph., 60 cy. M.D.
8.4 KW. 60/180 volt DC Gen. Elec. with 220 volt 3 phase, 60 cycle motor.
4⅛ KW 70/75 volt DC Westinghouse with 220 volt 3 phase, 60 cycle motor.

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RELAYING RAILS — Super-quality machine-reconditioned—not ordinary Relayers.

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STEEL BUILDINGS
With or Without Crane
RUNWAYS AND CRANES
STEEL TANKS
Of All Kinds
PIPE AND TUBES

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Southwark 760 Ton Hydraulic Press
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8-Opening Hydraulic Press, 30" x 52" Steel Platens, with Pump, Motor, Valves, etc.
Complete Line of Presses, Pumps, Accumulators, Machine Tools, Motors, etc.

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Up to 10 ton of used or new 2¼" square, mild or carbon bars, A-3 priority.

LINDEMAN POWER EQUIPMENT CO.
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GEAR CUTTERS, Spur, 30", 40", M.D.
GEAR PLANERS, Bevel, 36" & 54" Gleason, M.D.
LATHES, 48"x22-1/2' & 48"x26-1/2' Johnson
LATHES, Grd. head, 27"x11', 30"x27', M.D.
PLANER, 36"x36"x10' American, 2 heads, M.D.
PUNCH, Multiple "E" L & A, cap. 340 tons
SHEARS, Plate 0"x1-1/4" Niesta, 6"x1-1/4" United
SHEARS, Squaring 54" and 48"x3/16", M.D.

LANG MACHINERY COMPANY
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Alloy steel billets, size 3" to 5½", lengths 10' to 16'.

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Connersville-Roots positive blowers.
Centrifugals for gas and oil burning.
Sand blast, grinder and dust exhausters.
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Also have 10,000 lbs. .008" diameter on 5 lb. spools.

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Overhead electric traveling and gantry—all capacities and spans, also portable steel buildings.

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Generator, Plating 6V 3500 Amp.
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Grinder, Knife 10' Bridgeport, M.D.
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Press, No. 59¼ Toledo, 12" Stroke
Press, Forging 150 ton United Steam Hyd.
Pipe Machs. 2-4-6-8-12" Williams, M.D.
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Two Pennsylvania 10 x 8 class 3-A Compressors, 325 R.P.M., Piston Displacement 336 Cubic Feet, Discharge Pressure 40 Pounds, Delivery 280 Cubic Feet of Air Per Minute. Also 8 x 8 Hack Saw, Small Belt-Driven Alligator Shear, and Drill Press.

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One 2-ton Capacity Whiting Bessemer Side Blow Converter, complete with direct motor drive, 5 lb. pressure blower and including ladles. Address Box 676, STEEL, Penton Bldg., Cleveland.

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Help Wanted

METALLURGIST

Experienced in operation of electric furnaces for the production of stainless steel and ferro alloys; To serve as operating manager of large plant. State age, details, experience and salary desired in first letter. Box 540, 217-7th Avenue, New York, N. Y.

WANTED — GENERAL PURCHASING Agent large established metal manufacturing concern engaged entirely in War work. Young or middle aged, prefer college educated in Engineering. Must be neat, alert, thorough, accurate, good conversationalist direct to point and not ragchewer. References of ability and character, experience and salary first letter. Address Box 681, STEEL, Penton Bldg., Cleveland.

WANTED—MAN WITH EXTENSIVE EXperience to serve as assistant superintendent of blast furnaces in large steel company. 35 to 45 years of age with technical training preferred. State salary expected. Address Box 637, STEEL, Penton Bldg., Cleveland.

WANTED — METALLURGIST—CAPABLE of overseeing the production of straight carbon and alloy steel castings—acid-electric furnace—steel foundry located in eastern Pennsylvania. In reply state age, experience and salary desired. Address Box 682, STEEL, Penton Bldg., Cleveland.

WANTED: YOUNG ENGINEER CAPABLE estimating and designing plate work. Should have plate shop experience. State salary desired first letter. Address Box 675, STEEL, Penton Bldg., Cleveland.

METALLURGICAL RESEARCH ENGIneer graduated in metallurgy preferably with some experience in research work alloy steels and steel specialties. Address Box 680, STEEL, Penton Bldg., Cleveland.

Help Wanted

WANTED: IN JOBBING FOUNDRY LOcated in Eastern Pennsylvania, producing steel castings, acid electric process, ranging from 1 lb. to 3 tons, a man who is thoroughly familiar with heading and gating and has a good knowledge of molding and core making and is capable of handling men; acting in the capacity of assistant to foundry superintendent. In reply, please state age, experience and salary desired. Address Box 635, STEEL, Penton Bldg., Cleveland.

WANTED: MECHANICAL ENGINEER, capable of assuming duties of Assistant Chief Engineer, for Steel Plant in the Pittsburgh District, to which position employment may lead. Applicants to furnish full particulars as to age, training and experience and salary expected. Address Box 678, STEEL, Penton Bldg., Cleveland.

PROCESSING ENGINEER WITH METALlurgical training wanted for improving existing steel mill practices; development of new production methods with view of increasing production and decreasing costs. Address Box 679, STEEL, Penton Bldg., Cleveland.

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WELL ESTABLISHED CHICAGO REPREsentative seeking accounts; commission basis; thoroughly acquainted with buyers in Illinois, Wisconsin and Indiana; several years' successful experience selling forgings, plates, tubing, sheets and other lines. Will start soliciting immediately. Address Box 665, STEEL, Penton Bldg., Cleveland.

PURCHASING AGENT, COLLEGE GRADuate; 30 years of age, married with family; 8 years' experience large metal plant, stampings, ferrous and nonferrous foundry, plastics; desirous of advancement by connecting with progressive company. Address Box 683, STEEL, Penton Bldg., Cleveland.

MANAGER, EXPERIENCED IN MANAGEment of small machinery manufacturing firm, all phases, including financing, production, selling, accounting, purchasing. Age 37, capable and aggressive. Reply Box 677, STEEL, Penton Bldg., Cleveland.

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Rare Opportunity for MFGRS. AGENTS

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An old reliable, highly rated manufacturer of an item used by all foundries, as well as most manufacturing plants—seeks to augment its present sales force through the addition of Manufacturer's Agents in key territories throughout the area stated.

The item in question is of superior construction; priced competitively; repeats regularly; pays an attractive commission on both initial and repeat orders—and is not faced by any raw material problems.

Accounts on protected basis.

The Agents we seek must be firmly established; have evidence of a worthwhile clientele; and willing to exchange such confidences as will lead to local personal interview with one of our company executives.

To repeat—this is a rare opportunity for qualified Agents to substantially add to their permanent income through representing a firm they will be glad to be associated with.

In writing, please give all particulars about yourself; lines now handled, territory covered, etc., Address Box 673, STEEL, Penton Bldg., Cleveland.

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◆ ◆ ADVERTISING INDEX ◆ ◆

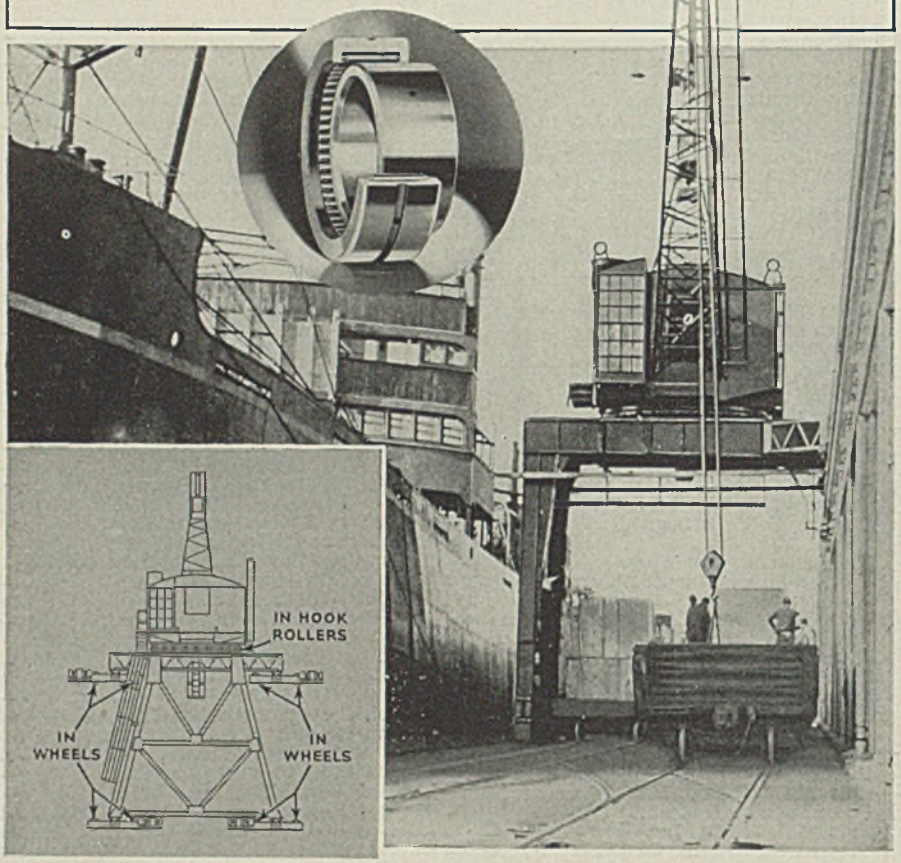
Where-to-Buy Products Index carried in first issue of month.

◆ ◆ ADVERTISING INDEX ◆ ◆

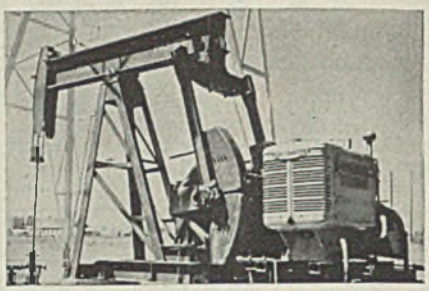
Where-to-Buy Products Index carried in first issue of month.

IN THE NEWS

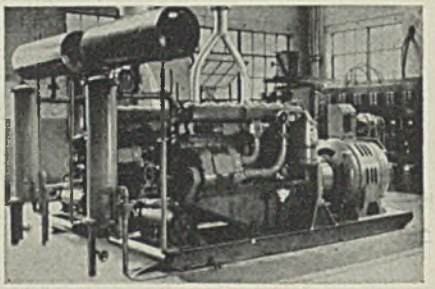
WITH BANTAM BEARINGS



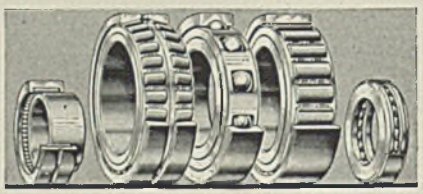
SPEEDY SHIPMENT OF WAR MATERIALS is a factor of vital importance in the program of the United Nations. Supplies are quickly loaded on shipboard by this revolving gantry crane built by American Hoist & Derrick Company. Crane is equipped with three hoisting drums, one lifting 15,500 pounds at 300 feet per minute, the others with a capacity of 10,000 pounds at 270 feet per minute. 20 Bantam Quill Bearings are used on travel mechanism, as shown in drawing, and on the wire rope blocks—another instance of the ways in which Bantam Bearings are rendering efficient, reliable performance in serving every phase of the Victory program.



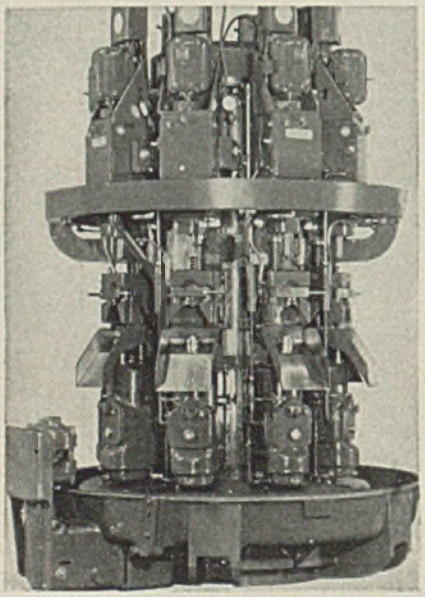
IN OIL WELL PUMPING UNITS, Bantam Quill Bearings are used by leading manufacturers to assure quiet, efficient operation, long service life, minimum need of attention. Cabot Shops, Inc., installs these compact, high-capacity units on equalizer and center bearings of its larger pumpers, obtains the advantages of anti-friction construction throughout.



ECONOMICAL POWER GENERATION is assured by modern engine and generator design. Developing 115 KW each in continuous 24-hour operation, these two generating units are powered by Murphy Diesel Company's 215 HP engines, with Bantam Quill Bearings in the generator drive assembly. For further information on these low-cost, high-capacity bearings, write for Bulletin H-104.



BANTAM'S ENGINEERING COOPERATION is especially valuable in meeting new and unusual requirements. Bantam makes every major type of anti-friction bearing—straight roller, tapered roller, needle and ball. Bantam engineers aid in the selection of the type that best suits your application—or design special bearings that meet your requirements. If you have a difficult bearing problem, TURN TO BANTAM.



SPEED AND ACCURACY are essential in machine tool operation—and Bantam's broad experience in bearing design and manufacture contributes to both these qualities. In this eight-station continuous drilling machine built by The Foote-Burt Company, the entire column rotates on a Bantam Ball Thrust Bearing measuring 27" O.D. by 22" I.D. Here is a typical example of Bantam's skill in the design of large bearings for heavy-duty applications.